Executive Order No. 215

Environmental Impact Statement

Mainline - MP 3.5 to 36.5

& Interchanges 2, 3, and 4

Revision 1e

June 2024

Prepared for

Prepared by

AECOM

(OPS No. T3839)

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Environmental Impact Statement

Chapter 1 Purpose and Need

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1 PURPOSE AND NEED

The New Jersey Turnpike Authority (NJTA) proposes to make improvements to the New Jersey Turnpike (Turnpike) as part of its Interchanges 1 to 4 Capacity Enhancements Program (Program) to address operational conditions, capacity constraints, maintenance requirements, and safety needs of the NJTA. The improvement area that is the subject of this Environmental Impact Statement (EIS) is the Turnpike northbound and southbound roadways (mainline) between Milepost (MP) 3.5 and MP 36.5, and Interchanges 2, 3, and 4. The boundaries for Interchange 2 are MP 12.5 to MP 13.5; MP 25.6 to MP 26.8 for Interchange 3; and MP 34 to MP 35.2 for Interchange 4. The Program corridor is in portions of the following counties: Burlington, Camden, Gloucester, and Salem (**Figure 1.1-1**).

Future improvements in the Program that are not considered in this EIS are MP 0.0 to MP 3.5, the area beyond the toll plaza at Interchange 2, and the area beyond the toll plaza at Interchange 3. With regard to Interchanges 2 and 3, the Program Design as reflected in this document includes changes to accommodate projected mainline traffic, geometric improvements, and safety improvements. NJTA is separately advancing improvements beyond the toll plazas at these interchanges that have independent utility and address site-specific needs at those locations. These improvement areas will be discussed in future EISs.

New Jersey Executive Order No. 215 (EO 215) requires state departments, agencies, and authorities to submit an environmental assessment or environmental impact statement to the New Jersey Department of Environmental Protection (NJDEP) to document the environmental effects of major construction projects. Projects with construction costs in excess of $7 million and land disturbance of five acres are categorized as Level 2 projects and are subject to the preparation of an Environmental Impact Statement (EIS). Because the NJTA will also be seeking federal permits for the Program, compliance with the National Environmental Policy Act (NEPA) is required. To comply with EO 215 and NEPA, the NJTA must demonstrate that the Program will reduce or eliminate the potential for the Program to have adverse environmental impacts.

The Program purpose and need is the foundation of EO 215 and NEPA; it provides the reason and justification for the Program and forms the basis for developing and evaluating a reasonable range of alternatives. This chapter presents the Program purpose (Section 1.4, Purpose of the Program) and establishes the needs for the Program (Section 1.5, Need for the Program) by outlining the existing and foreseeable future transportation problems in the Turnpike corridor that the Program is intended to address. Data supporting existing and foreseeable future conditions in the Turnpike corridor are the context for the Program and are presented in Section 1.1 (Program Context).

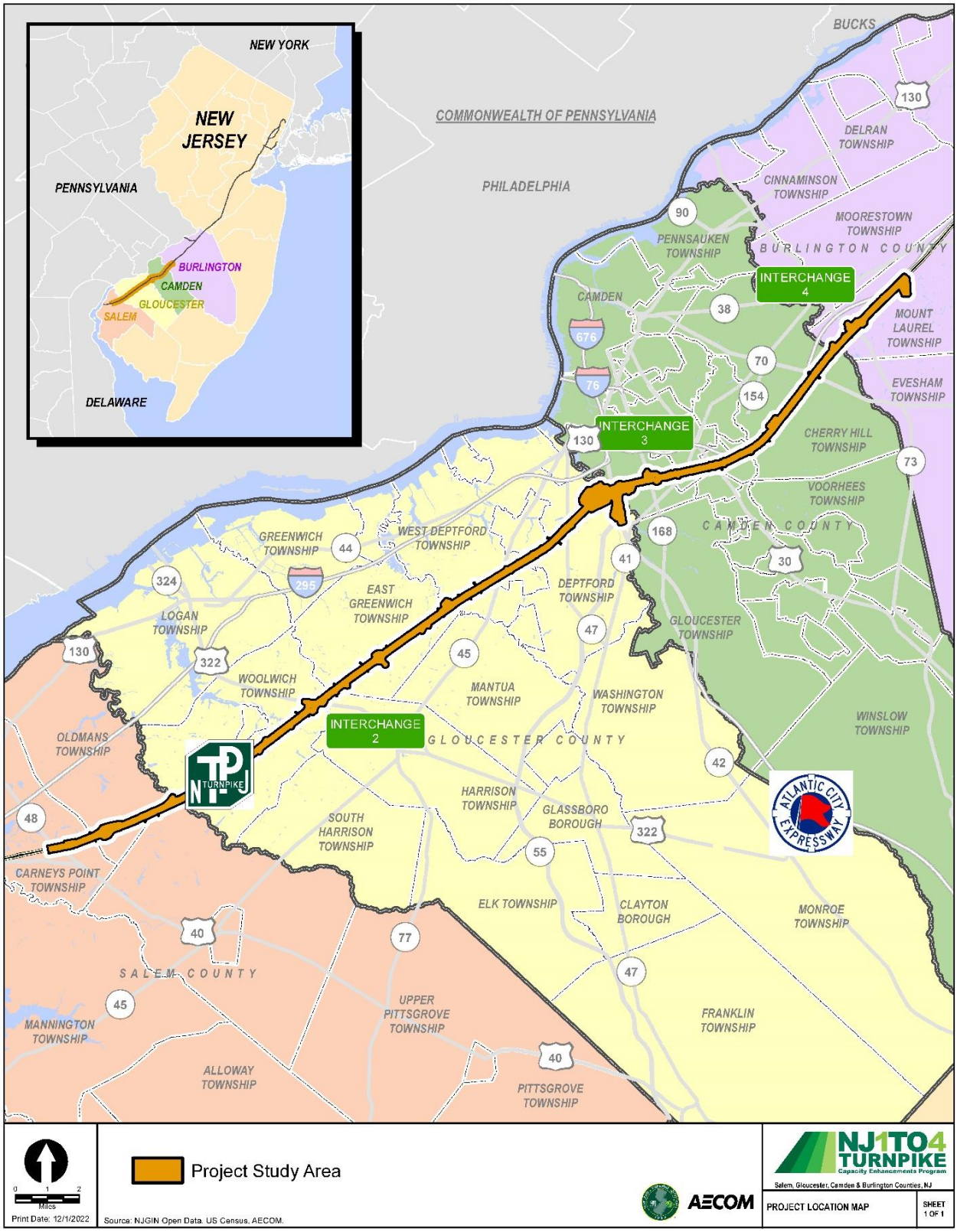
1.1 PROGRAM CONTEXT

1.1.1 Turnpike Location and Functions

The Turnpike is the primary north-south, high-speed, limited access highway in New Jersey (**Figure 1.1-1**), serving as part of the spine of the interstate transportation system in the US Northeast. Although the portion of the Turnpike between Interchanges 1 and 4 is not part of Interstate I-95, it connects with the following metropolitan areas and interstate highways:

- Wilmington, Delaware and points south via I-295;
- Philadelphia, Pennsylvania via I-76;
- Southern Pennsylvania via I-276; and,
- Central and northern Pennsylvania via I-78 and I-80; and New York via I-287, I-278, I-78, I-495, and I-95.

Figure 1.1-1: Program Location Map



Source: AECOM 2022

The Turnpike also serves a significant function in the intrastate transportation system, collecting significant traffic volumes to, from, and between suburban locations and major employment centers within New Jersey (NJ) and nearby cities: New York City, Newark, Trenton, Philadelphia, Camden, and Wilmington. Examples of roadways that feed the Turnpike in southern NJ are:

- NJ 322 (Swedesboro Road) at Interchange 2 (MP 12.9) in Woolwich Township, Gloucester County.
- NJ 168 (Black Horse Pike) and I-295 at Interchange 3 (MP 26.1) in the Boroughs of Runnemede and Bellmawr, Camden County; and,
- NJ 73 and I-295 at Interchange 4 (24.5) in the Township of Mount Laurel in Camden County;

The Turnpike is part of the National Highway System (NHS) of the US, which is a network of roadways that are important to the Nation's economy, defense, and mobility. A key feature of the NHS is connection with other modes of transportation, such as major airports, ports, rail or truck terminals, rail stations, and pipeline terminals.

1.2 EXISTING TRAFFIC VOLUMES AND TRAVEL CONDITIONS

1.2.1 Existing Mainline Traffic Volumes and Travel Conditions

The Turnpike has experienced significant growth in traffic volumes over time because of its importance as a link to the interstate and intrastate transportation system and because of population and employment growth in NJ and the surrounding region. The 2017 *Traffic Operational Study of the New Jersey Turnpike, Interchanges 1 to 6* (HNTB, 2017) identified the southbound roadway between Interchanges 3 and 4 to be the most congested segment in that study area. Contributing factors to congestion include growth in traffic volumes over time and the absence of a third travel lane on the northbound and southbound roadways south of Interchange 4. Reduction of travel lanes from three to two requires traffic to be consolidated into two lanes south of Interchange 4.

The 2022 *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program, Traffic Analysis Report, Mainline (MP 3.5 – 36.5)* (AECOM, 2022) supports the 2017 report findings using a qualitative measure known as level of service (LOS) to describe roadway operating conditions. LOS is a way of describing roadway operations and congestion. Roadway congestion is an operating condition during which traffic demand approaches or exceeds the available roadway capacity. The Transportation Research Board's *Highway Capacity Manual, Sixth Edition: A Guide for Multimodal Mobility Analysis* (Transportation Research Board, 2016) provides six categories of LOS ranging from A to F. **Table 1.2-1** presents the characteristics of LOS.

Table 1.2-1: Description of LOS Levels

LOS Category	Description of Traffic Operating Conditions
A	Free-flow operating conditions with no delay or effect on operating speeds.
B	Near free-flow operating conditions with little to no delay or effect on operating speeds.
C	Near free-flow conditions with some delay or effect on operating speeds. Compared to LOS A and B, LOS C restricts some freedom to maneuver, and lane changes require care and vigilance on the part of the driver. Minor incidents can deteriorate operating conditions. Queues may be expected to form behind any significant blockages.
D	Absence of free-flow conditions; operating speeds are affected. Freedom to maneuver is seriously limited, drivers experience reduced comfort levels. Minor incidents will create queuing and operating conditions are deteriorated, because the traffic stream has little space to absorb disruptions.
E	Absence of free-flow conditions; operating at roadway capacity; speeds are seriously affected. Freedom to maneuver is severely limited. Incidents create severe queuing and operating conditions are deteriorated.
F	Absence of free-flow conditions; operating over roadway capacity; speeds are severely affected; travel time cannot be predicted. No freedom to maneuver.

Source: Transportation Research Board, Highway Capacity Manual, Sixth Edition: *A Guide for Multimodal Mobility Analysis.*

The NJTA is directed by its enabling legislation (NJ Statute § 27:23-1) to construct, maintain, and operate the Turnpike as a modern express highway, and to remove congestion and hazardous conditions to allow vehicular traffic to operate on a non-congested Turnpike mainline and interchanges in a manner that does not expose motorists to hazardous conditions. To achieve this direction, the NJTA uses LOS C or better as a benchmark for acceptable operations along the Program's mainline. LOS C or better allows near to free-flow conditions, which is acceptable for freeway operational design in the suburban/rural area in which the Program is located. This is in contrast to other sections of the Turnpike mainline that exist in dense urban settings, where an LOS D can be considered acceptable for freeway operational design due to overall higher traffic volumes, the public's willingness to accept, and substantial cost of improvements in urban settings. From the 2017 Report[1]:

> *The Authority uses LOS 'C' as a benchmark for the operation of each roadway segment in its jurisdiction, as documented in the Strategic Plan. In congested or urban areas, many other agencies accept LOS 'D' for freeway operational design. It is understandable that the Authority desires to avoid operations at LOS 'D' (or worse) when queues are susceptible to form for even minor incidents. HNTB is using the LOS 'C' benchmark as a threshold for considering roadway widening under this study.*

1 Note: The 2017 Report references the NJTA Strategic Plan in effect at that time.

The use of different LOS thresholds for urban and rural facilities is supported by the Chapter 10 of the Highway Capacity Manual (7th Edition, 2022), which notes that motorists in non-urban settings have higher LOS expectations for freeway facilities. This is also supported by the AASHTO Green Book (2018), which notes that motorists generally accept different levels of congestion based on the nature of a transportation facility and duration of the trip. Table 2-3 in the AASHTO Green Book references LOS C and D as customary design levels of service for freeways in suburban and urban settings.

In the 2022 traffic study, Maximum Recorded Volumes were used in the analysis because these volumes are generally higher than other types of volumes recorded during the collection of actual Turnpike traffic counts, including Highest Seasonal Average Volumes and Highest Volumes in Congested Conditions. Definitions of these volume types are as follows:

- Maximum Recorded Volumes – This is the highest hourly volume regardless of season or day of week.
- Highest Seasonal Average Volumes – Traffic volumes are grouped by season of the year (Winter = November – February; Summer = May – August; Spring/Fall = March, April / September, October). Within each season, traffic volumes are averaged by day of the week and hour of the day. The highest average among these groupings is the Highest Seasonal Average Volume.
- Highest Volumes in Congested Conditions – The highest hourly volume, regardless of season or day of week, was selected for analysis.

Maximum Recorded Volumes are represented for the 2019 base year (**Table 1.2-2).** In the 2019 base year, traffic densities (i.e., the number of passenger vehicles per mile per travel lane) contributed to congestion and impacted traffic service quality. Included with the traffic data are heavy vehicle percentages and average speeds. The results of the analysis indicate that between Interchanges 3 and 4, LOS D operations in 2019 occurred for the Maximum Recorded Volumes in both the NS and SN directions.

Table 1.2-2: 2019 Base Year LOS Analysis: Maximum Recorded Volumes

NJ Turnpike Section	Roadway	Maximum Recorded Volumes				
		2019 Volume (vph)	Heavy Vehicles (%)	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	3,175	2.7	C	71.9	24.1
	SN	3,076	2.2	C	64.3	26.0
Between Interchanges 2 - 3	NS	3,185	10.6	C	72.3	25.9
	SN	3,142	2.3	C	66.3	25.8
Between Interchanges 3 - 4	**NS**	**3,523**	**2.5**	**D**	**65.2**	**29.3**
	SN	**3,394**	**2.1**	**D**	**67.0**	**27.5**
North of Interchange 4	NS	4,384	2.3	C	69.4	22.9
	SN	4,351	3.4	C	70.3	22.7

Notes: Volumes shown are in vehicles per hour (vph). Bolded values indicate an LOS below C.
Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

1.2.2 Interchange Traffic Volumes and Travel Conditions

This section describes the traffic volumes and travel conditions at Interchanges 2, 3, and 4.

1.2.2.1 Interchange 2 – (MP 12.9)

Interchange 2 provides a connection between the Turnpike and Swedesboro Road (US Route 322) in the Township of Woolwich, Gloucester County. The connection to US Route 322 is at a signalized intersection.

Past and present development that contributes to traffic volumes and travel conditions in the area of Interchange 2 includes the extensive warehouse, industrial, and distribution center development in Logan Township on both sides of Raccoon Creek. Operations in that location include, but are not limited to, a Target distribution center; four Amazon warehouse and delivery facilities; and logistics centers such as XPO, CTDI, Lineage, Blueline, Leslie's Pro Commercial, Calavo Growers, Inc., Unilev, Powell Electronics, AMI Metals, Thermo Fisher Scientific, US Foods, and John Crane. Valtris Chemical company has its facility along the river. Trucking operations are in and near the Logan Township complex, including J.B. Hunt, Champion, and other sales and rental centers. Other developments include light industrial manufacturing, and the residential communities of Swedesboro, Mullica Hill, Glassboro, Woolwich, and Logan.

In the 2019 base year, the current single lane configuration of the ramps between the Turnpike and the toll plaza has sufficient capacity to maintain a LOS C or better. Likewise, the existing number of toll plaza lanes and the toll plaza configuration are sufficient. Of concern are the intersection signal phasing and turning traffic volumes on the Turnpike ramp approach to US Route 322, which are causing ramp traffic to queue into the toll plaza exit area. While the 2019 base year analysis results show LOS D or better for all intersection approaches during both peak hours, the maximum queue shown for the Turnpike ramp approach during the weekday PM peak hour exceeded a 500-foot distance between the toll plaza area and the approach stop line.

1.2.2.2 Interchange 3 – (MP 26.1)

Interchange 3 provides a connection between the Turnpike and Black Horse Pike (NJ Route 168) through a six-lane toll plaza in the Boroughs of Runnemede and Bellmawr, Camden County. Past and present development that contributes to traffic volumes and travel conditions in the area of Interchange 3 includes the extensive development of the communities of Runnemede, Blackwood, Bellmawr, Mt. Ephraim, Haddon Heights, Audubon, Highland Park, Oaklyn, Collingswood, Camden, and others. In addition, Bellmawr's industrial and warehouse area features distribution centers such as Amazon and US Logistics, manufacturing and business enterprises, and wholesale and retail operations.

Analysis of the ramps at Interchange 3 in the 2019 base year condition indicates that Ramp NT should carry two lanes instead of the existing one lane in order to accommodate future traffic volumes, address geometry constraints, and provide additional vehicle storage. The existing single-lane configurations of the other ramps have suitable capacity to maintain acceptable LOS C or better. Analysis of the toll plaza indicates that the existing number of toll plaza lanes and current toll collection configuration are sufficient. However, the lanes exiting the toll plaza approach capacity during the weekday PM peak hour. Black Horse Pike experiences heavy traffic, including truck traffic, in part because it serves as a direct connection to I-295 approximately one mile west (truly north) of the interchange.

1.2.2.3 Interchange 4 – (MP 34.5)

Interchange 4 provides connection between the Turnpike and NJ Route 73 in the Township of Mt. Laurel, Burlington County. Past and present development that contributes to traffic volumes and travel conditions in the area of Interchange 4 includes the extensive development of the communities of Cherry Hill, Mount Laurel, Moorestown, Pennsauken, Marlton, Cinnaminson, Delran, and others. Warehouse, manufacturing, and distribution facilities surround the Turnpike south of the interchange, including Goodman, Stonhard, Hikma Pharmaceuticals, and others. Intermixed within these facilities are wholesale and retail operations.

Single-lane Ramps NT and ST experience recurring congestion in the 2019 base year. The existing measure in place to address ramp congestion during the weekday AM peak hour is signing on Ramp NT, which permits use of the right shoulder of the ramp if the ramp lane is congested.

Regarding toll plaza operations, the existing number of toll plaza lanes and current toll collection configuration are sufficient for traffic volumes passing through the toll plaza at Interchange 4 in the 2019 base year.

NJ Route 73 experiences heavy traffic because it serves as a direct connection to I-295 approximately 0.75 miles north of the Turnpike. The New Jersey Department of Transportation (NJDOT) is currently progressing a project to construct improvements along NJ Route 73 between the I-295 interchange to the north of the Turnpike and the Church Road intersections south of the interchange. These improvements would address congestion along the corridor, including connections with the Turnpike.

1.3 FUTURE TRAFFIC AND TRAVEL DEMAND

The NJTA chose 2040 as the Design Year for the Program because of the availability of reasonably foreseeable data for the future condition in 2040 from the Metropolitan Planning Organizations with authority in the Program area: the Delaware Valley Regional Planning Commission (DVRPC) and the South Jersey Transportation Planning Organization (SJTPO). The following subsections describe the demographic growth and development trends and the relationship of those trends to 2040 traffic volumes and travel demand on the Turnpike.

1.3.1 Demographic Growth and Development Trends

This section presents data regarding foreseeable future trends in population, households, and employment growth that will influence traffic volumes on the Program corridor. The sources for these data include the following:

- The DVRPC's adopted 2021 *Long Range Plan, Connections 2050* (DVRPC Plan);
- The SJTPO's adopted 2021 *Regional Transportation Plan 2050* (SJTPO Plan); and,
- The 2021 Planning Board meeting minutes of the Program area municipalities.

The DVRPC Plan forecasts population growth in Burlington (6.5 percent), Camden (2.0 percent), and Gloucester counties (7.2 percent) by 2040. Employment growth is also forecasted in Burlington (11.0 percent), Camden (11.8 percent), and Gloucester counties (19.2 percent) by 2040. The DVRPC identifies growth in the following job sectors: construction; utilities; information; professional, scientific, and technical services; educational services; and arts, entertainment, and recreation. Employment declines are forecasted in manufacturing; wholesale trade; finance and insurance; and public administration.

The Land Use Vision in the DVRPC Plan identifies infill and redevelopment of existing developed lands as the primary source of growth in Burlington, Camden, and Gloucester counties. The forecasted trend is the result of the emphasis DVRPC places on center-based development, which is a land use concept that focuses and concentrates development and redevelopment in specific geographic areas while preserving agricultural and natural lands outside town centers.

The SJTPO Plan forecasts an approximately 11 percent loss of population in Salem County by 2040. Employment decline is also forecast in Salem County at a rate of approximately 11 percent. The SJTPO identifies recent job losses in the following sectors: trade; transportation, and utilities; education and health services; and professional and business services. These declines are expected to continue, although the number of jobs in manufacturing, leisure, and hospitality is growing.

Table 1.3-1 identifies planned and approved developments in the Program area, including warehouses, residential developments, storage facilities, and other enterprises. This EIS assumes these planned and approved developments will be operational by 2040. In addition, the NJTA's outreach activities for the Program identified additional planned development in the area of Interchange 2, including 14 development sites. These sites, in combination with the development described for Woolwich Township in **Table 1.3-1**, total 9 million square feet of warehouse space, 610,000 square feet of retail, and 1,507 residential units.

The need for warehouse space to support ecommerce has led to the development and construction of new warehouses within the Program area. While not located specifically within the Program area, the following developments are discussed to offer an example of the scale of the growing warehouse industry within the region.

According to Newmark's Q3 2021 Greater Philadelphia Industrial Market Report, there are nearly 8 million square feet of warehouse under construction within Salem, Gloucester, Camden, and Burlington counties. This construction will support the industrial market and address the market-wide decrease in industrial space vacancy rate, which fell from 4.9 percent to 4.4 percent year over year. Salem County has the lowest inventory at 5,428,569 square feet and has 1,600,500 square feet under construction. Gloucester County has 30,060,671 square feet of total inventory, with the greatest amount under construction at 3,313,356 square feet. Camden County has 33,094,135 square feet of inventory with 201,250 square feet under construction. Burlington County is one of the most desirable industrial markets in the country with 54,682,500 square feet of total inventory and 2,883,540 square feet under construction.

1.3.2 Relationship of Growth Trends to Traffic Forecasting

Foreseeable growth in population and employment are factors used in forecasting future travel demand on the Turnpike. Other factors that contribute to future travel demand include committed transportation projects (such as the I-295 Missing Moves at NJ Route 42, I-76/ I-295/NJ Route 42 Direct Connect project, and NJ Route 73 corridor improvements) as well as development projects in southwestern New Jersey (**Table 1.3-1**).

These data were input into the SJTPO's South Jersey Travel Demand Model and DVRPC's Travel Improvement Model to generate and distribute travel trips in the models' regions, predict mode choice (i.e., whether each trip would be made by personal vehicle, transit, or other method), and travel route assignment.

Table 1.3-1: Planned and Approved Developments

Municipality, County	Address	Development Block and Lot	Type	Approximate Location
Woolwich Township, Gloucester County	US Route 322/Swedesboro Road	Block 59, Lots 6, 6.01, 6.02, 8, and 10 and Block 62, Lots 2 and 3	Warehouse development	Vicinity of Interchange 2 MP 13.0 to MP 13.5 (Northbound)
East Greenwich Township, Gloucester County	North side of Mantua-Paulsboro Road	Block 1404, Lot 1 and 1.01	121-unit residential townhome development	Vicinity of Mantua Road MP 18.0 to MP 18.3 (Northbound)
Woodbury Heights Borough, Gloucester County	Glassboro Road	Block 38 Lots 2, 3, 10.01, and 11	Self-storage Facility	Vicinity of Glassboro Road MP 21.0 (Southbound)
Runnemede Borough, Camden County	Roughly bounded by Bowers Avenue, NJ Route 41, and Central Avenue	Entirety of Blocks 40-52, 32-39, 21-23, 25, and 27-29.	Approved non-condemnation plan	Vicinity of North Blackhorse Pike MP 26.0 (Northbound)
Barrington Borough, Camden County	636 Clements Bridge Road	Block 11, Lot 5.01	Personal Use Storage Building	Vicinity of Clements Bridge Road MP 27.3 (Southbound)
Lawnside Borough, Camden County	301 Oak Avenue	Block 405, Lot 1	Site Improvements	Vicinity of East Oak Avenue MP 28.5 to 29.0 (Northbound)
Cherry Hill Township, Camden County	1701 Route 70 East	Block 500.02, Lot 2	Bulk Variance	Vicinity of Haddonfield-Berlin Road MP 30.0 (Northbound)
	1490 Haddonfield-Berlin Road	Block 433.01, Lot 2	Bulk Variance	Vicinity of Marlton Pike (NJ 70) MP 32.2 (Northbound)

Source: Municipal planning board meeting minutes, 2021.

1.3.3 2040 Truck Freight Movements on the Turnpike

This section presents data to explain foreseeable truck traffic on the Program corridor in 2040 without the Program. According to the NJDOT's *NJ Statewide Freight Plan* (Freight Plan) (NJDOT, 2017), trucks handle 74 percent of state-to-state freight transportation (defined as the collection and distribution of import and export goods). The other freight modes that make up the balance (26 percent) of state-to-state freight transportation are pipeline, rail, water, and air. Nationally, trucks handle approximately 3 percent of imported goods and approximately three percent of exported goods, and the national percentage of state-to-state truck freight is forecasted to grow by 48 percent by 2045. The dominant mode for movement of international freight is water.

The bulk of truck freight through New Jersey moves along interstate corridors, including the I-295/I-95/Turnpike corridor, I-80, and I-78. Freight arriving from other countries travels primarily by ship to ports, the largest being in the New York City and Philadelphia areas. At ports, freight is transferred to trucks for shipment to end users (businesses, retail establishments, and consumers). Thereby, interstate highway corridors enable both international and state-to-state truck freight movements. For example, the I-295/I-95/Turnpike corridor provides a north-south route between ports, suppliers, and end users in New York and Pennsylvania, among other nearby states. Within New Jersey, the I-295/I-95/Turnpike corridor also connects to state and local highways, such as US Route 322 and NJ Route 168, where suppliers and end users are based.

The Freight Plan notes that in 2016, New Jersey ranked 8th among US states in Gross Domestic Product, having produced more than $581 billion in goods and services. Approximately 28 percent of New Jersey's economy is represented by sectors that are directly engaged in the production and handling of freight (manufacturing, wholesale trade, retail trade, construction, transportation and warehousing, utilities, agriculture, and mining). New Jersey is also a significant producer and end user of supply chain materials. In addition, retail businesses and consumers in New Jersey are significant end users of goods transported by truck through warehouses, distribution centers, and fulfillment centers. As a result of New Jersey's prominent role in the production, handling, and consumption of goods, New Jersey is a significant producer of waste hauled by trucks to disposal sites.

The I-295/I-95/Turnpike corridor is one of the primary corridors in New Jersey for handling truck freight. The Freight Plan analyzes the three highways as a single corridor because the highways are roughly parallel to one another and share the bulk of north-south freight traffic. Traffic shifts occur among the highways depending on which highway provides the most efficient routing and where congestion and incidents occur.

Table 1.3-2 summarizes existing (2007) and forecasted (2035) annual truck freight tons on the I-295/I-95/Turnpike corridor. The Freight Plan forecasts 41 percent growth in annual truck freight tonnage on the I-295/I-95/Turnpike corridor by 2035. Growth is forecasted in each of the three categories of truck freight. Tonnages of the following types of freight are expected to grow substantially by 2035: machinery, electronics, and transportation equipment (94 percent); furniture and fixtures (257 percent); food and commodities (50 percent); energy products (18 percent); chemicals (58 percent); distribution traffic (60 percent); and waste (73 percent).

The Freight Plan states that trucks are the predominant mode for moving freight in New Jersey and that the I-295/I-95/Turnpike corridor, along with the state's other interstate highways (I-80 and I-78), carries the greatest volume of goods across all types of freight. The Plan cites roadway congestion, which slows the movement of goods, as a key challenge to efficient operation of New Jersey's businesses and ultimately New Jersey's economic development goals. The Freight Plan concludes that growth in truck freight traffic is forecasted and highlights the importance of maintaining safe, efficient, and reliable operations along New Jersey key freight movement highways, including the I-295/I-95/Turnpike corridor.

Table 1.3-2: Summary of Existing (2007) and Forecasted (2035) Annual Truck Freight Volumes on the I-295/I-95/Turnpike Corridor

Type of Freight	2007 Annual Truck Tons	2035 Annual Truck Tons	Percent Change in Annual Truck Tons by 2035
Machinery, Electronics, and Transportation Equipment	6.7 million tons	13.0 million tons	94%
Furniture and Fixtures	0.7 million tons	2.5 million tons	257%
Nondurable Customer Goods – Food Commodities	10 million tons	15 million tons	50%
Nondurable Customer Goods – Textiles and Apparel	1 million tons	1 million tons	0%
Nondurable Customer Goods – Paper and Printed Materials	2.5 million tons	2.5 million tons	0%
Construction Materials	24 million tons	24 million tons	0%
Energy Products	13.2 million tons	15.6 million tons	18%
Chemicals	11.1 million tons	17.5 million tons	58%
Pharmaceuticals	0.7 million tons	0.7 million tons	0%
Distribution Traffic	25 million tons	40.1 million tons	60%
Waste	6.4 million tons	11.1 million tons	73%
Total Annual Truck Tons	101.3 million tons	143 million tons	41%

Note: 2007 and 2035 Annual Truck Tons are at the high end of the range.
Source: NJDOT, 2017. *New Jersey Statewide Freight Plan*

1.3.4 2040 Traffic Volumes and Travel Conditions Without the Program

Compared to the 2019 base year, traffic increases on the mainline by 2040 without the Program will range from 3 to 7 percent during the weekday peak hours, while increases to Friday Summer traffic volumes will range from 2 to 6 percent. Included with the traffic volumes are heavy vehicle percentages, average speeds, and the results of the analysis, which indicate the following:

- Between Interchanges 3 and 4, LOS D operations will occur for the Highest Seasonal Average Volumes.
- Mainline sections south of Interchange 4 will operate at LOS D under Maximum Recorded Volumes.
- All six mainline sections will operate at LOS E or worse operations for the Highest Volumes in Congested Conditions.

Although the 2040 and 2019 base year LOS ratings are similar, vehicle density will be higher, and vehicle operating speeds will be lower in 2040. These changes will contribute to relatively poorer operating conditions in 2040. Based on the NJTA's LOS C or better benchmark for acceptable level of service, the modeling results for 2040 without the Program indicate that increasing the mainline to a three-lane section in each direction is warranted.

At Interchanges 2 and 3, traffic increases will be more pronounced in 2040 than at Interchange 4 without the Program because of:

- Traffic generated by planned development on US Route 322 (Interchange 2). In addition to existing development, other significant development is planned in the immediate vicinity of Interchange 2, including 9 million square feet of warehouse space, 610,000 square feet of retail, and 1,507 residential units.
- Traffic generated by the increase in capacity on NJ Route 73 after completion of the NJDOT improvement project;
- Traffic redistribution as a result of NJDOT's I-295/I-76/Route 42 Direct Connection Program; and,
- Suppression of traffic volume changes along NJ Route 168 and constrained Black Horse Pike geometry.

1.4 PURPOSE OF THE PROGRAM

The purpose of the Program is to accommodate existing and foreseeable traffic demand on the Turnpike mainline and its Interchanges 2, 3, and 4, thereby achieving the goals stated in the NJTA's enabling legislation to construct, maintain, improve, manage, repair, and operate the Turnpike in a manner that:

- Facilitates vehicular traffic operations (i.e., maintains and improves mobility);
- Removes existing handicaps and hazards; and,
- Addresses safety needs.

1.5 NEED FOR THE PROGRAM

As shown in the description of the Program corridor in Section 1.1 (Program Context), the foreseeable travel demand would not be served by the existing Turnpike and its interchanges because of capacity limitations and roadway congestion. The need for the Program has five transportation components: (1) Additional mainline roadway capacity between MP 3.5 and MP 36.5; (2) Need to reconfigure Interchanges 2, 3, and 4 to accommodate the additional mainline capacity; (3) Need to address mainline safety; (4) Need to address the operation of Interchanges 2, 3, and 4 regarding capacity constraints, operational conditions, and safety; and (5) Need to address NJTA maintenance requirements in the Program corridor.

1.5.1 Need for Additional Mainline Roadway Capacity Between MP 3.5 and MP 36.5

As stated in Section 1.2.1, the NJTA is guided by its enabling legislation to construct, maintain, improve, manage, repair, and operate the Turnpike in a manner that facilitates vehicular traffic operations, removes existing handicaps, and hazards, and addresses safety needs. The NJTA's LOS C or better benchmark allows for traffic flow at operating speeds that are near free-flow conditions on a freeway of multilane highway. Even at LOS C, note that LOS C restricts some freedom to maneuver, and lane changes require care and vigilance on the part of the driver. Minor incidents can deteriorate operating conditions, and queues may be expected to form behind any minor or major blockages.

The need for additional roadway capacity between Interchanges 1 and 4 was identified in the 2022 *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5*) (AECOM, 2022), which identified the following conditions for the 2019 base year and 2040 No-Build condition (see also **Tables 3.4-1 thru 3.4-3** and **Table 3.5-1 thru 3.5-3** in Chapter 3):

- Between Interchanges 3 and 4, LOS D operations would occur in 2040 for the Highest Seasonal Average Volumes.
- Most mainline sections south of Interchange 4 would operate at LOS D in 2040 under Maximum Recorded Volumes.
- Each of the six mainline sections would operate at LOS D or worse in 2040 under Highest Volumes in Congested Conditions.

The findings of the 2022 *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report Mainline (MP 3.5 to 36.5)* (AECOM 2022) demonstrate that traffic volumes in the existing condition are affecting operations on the Turnpike in the Program area. In addition, the analysis indicates that by 2040, traffic volumes on the Turnpike in the Program area would increase in the No-Build condition. This growth in traffic volumes would negatively impact traffic operations by increasing Turnpike congestion in all segments in the Program area.

In addition to AECOM's Traffic Analysis Report, HNTB completed the 2017 report, *Traffic Operational Study of New Jersey Turnpike Interchanges 1 to 6*, which supports AECOM's 2022 finding that the southbound Turnpike between Interchanges 3 and 4 is the most congested segment in the Program area. In addition, HNTB reported that all segments of the Turnpike would operate at LOS D or worse in 2040, which supports AECOM's traffic analysis findings. Note that the operating conditions reported in the HNTB study were generally worse than those in AECOM's current traffic analysis, primarily because the HNTB study applied a higher anticipated population growth rate to the analysis (representing pre-2008 and pre-pandemic forecasts compared to current growth rate forecasts made by the DVRPC). For that reason, AECOM's 2022 traffic analysis is the more appropriate forecasting tool to determine 2040 operating conditions.

Another method of measuring roadway congestion is in terms of the cost to motorists. The Texas A&M Transportation Institute's 2021 *Urban Mobility Report* examines congestion using this method in each of the nation's 101 major metropolitan areas. The Institute reported that auto commuters in the United States wasted an average of 54 hours in congested roadway conditions in 2019 and 27 hours in 2020. Among metropolitan areas, each auto commuter in the Greater Philadelphia region (including the Program area) wasted an average of 63 hours in congested conditions in 2019 and 37 hours in 2020. The NJTA has previously widened other parts of the Turnpike to address capacity constraints, beginning with the construction of an additional travel lane north of Interchange 4 in the mid-1950's. Addressing capacity constraints in the Program area is a need that has developed over the life of the Turnpike.

1.5.2 Need to Configure Interchanges 2, 3, and 4 to Accommodate the Mainline Capacity Improvements

To accommodate the mainline capacity improvements and the new mainline configuration, the NJTA would have to adjust each existing interchange ramp connection. Specifically, increasing mainline capacity would affect the location of ramps and the acceleration and deceleration lanes along the mainline.

1.5.3 Need to Address Mainline Safety

Safety is a cornerstone of the NJTA's enabling legislation, and it is a key goal of the Program. There is a need to address mainline safety related to vehicle crashes, the potential for flooding and storm surges, and the maintenance of the Turnpike's ability to serve as an emergency evacuation route within the Program area. Each of these needs is further explained below.

- Vehicle crashes: The NJTA has identified traffic congestion on the Program mainline as potentially increasing the likelihood of crashes because there is less room for motorists to maneuver in congested conditions. The 2022 *Traffic Analysis Report, Mainline (MP 3.5 – 36.5)* identifies several areas along the Program mainline where crashes have been reported, including several locations where the rate of reported crashes exceeds statewide crash averages. More detailed information on existing mainline safety conditions can be found in Section 3.4 (Traffic and Safety Effects, Affected Environment). Due to these safety conditions, there is a need to evaluate solutions in the Program to reduce vehicle crashes.
- Storm surges, flooding, and future sea-level rise: The NJ Department of Environmental Protection (NJDEP) has identified storm surge areas in the Program area. Storm surge areas are defined as waterways or low-lying areas that can experience weather-related flooding, and they can be found at the following locations along the mainline:
    - MP 3.5 to MP 4.0 – Delaware Bay
    - MP 8 – Oldmans Creek
    - MP 12 – Raccoon Creek
    - MP 17.5 – Edwards Run
    - MP 18.5 – Mantua Creek
    - MP 24.5 to MP 26 – Big Timber Creek

    In addition, the NJTA has identified areas along the mainline that are vulnerable to flooding in the existing condition and as a result of future sea-level rise as climate change continues to occur. Section 4.21 (Sustainability) further describes the locations in the Program area that are vulnerable to storm surges and flooding in the existing condition and to future sea-level rise. Storm surges, flooding, and future sea-level rise can cause roadway damage and service disruptions on the Turnpike and can impair the safety of all Turnpike users. Due to the potential for storm surges, flooding, and future sea-level rise, there is a need for the NJTA to build into the Program design and management solutions for NJTA to address these occurrences.
- Evacuation route: The NJ Office of Emergency Management has identified the Turnpike as part of an evacuation route network of roadways in Burlington, Camden, Gloucester, and Salem counties. Designated evacuation routes, such as the Turnpike in the Program area, are critically important to public safety. Therefore, there is a need to ensure the function of the mainline as an evacuation route is preserved.

1.5.4 Need to Address the Operation of Interchanges 2, 3, and 4 and Safety because of the Mainline Improvements

As a result of the Program adding a travel lane on the mainline and moving the ramps to and from the mainline at Interchanges 2, 3, and 4, there is a need for the NJTA to make adjustments to the ramps between the mainline and the toll plazas to achieve current design standards for ramp geometry, capacity, and operations. At Interchange 2, the NJTA identified the additional need to address the connection between the existing maintenance yard driveway and interchange ramp that can cause conflicts between customer traffic on the ramp and yard traffic. At Interchange 3, the NJTA was asked to examine the congestion issue on Route 168 as it relates to the interchange. Section 2.2.2 (Alternatives Considered, Concept Studies) describes where adjustments occur at existing Turnpike Interchanges 2, 3, and 4.

1.5.5 Need to Address the NJTA's Turnpike Maintenance Requirements

The NJTA's design criteria includes requirements that enable efficient and practical maintenance of Turnpike facilities and infrastructure. In planning for improvements in the Program corridor, the NJTA applies the Turnpike maintenance requirements in addition to design and safety requirements. Examples of design criteria for maintenance include, but are not limited to, maintenance vehicle access points, particularly access to the NJTA's existing Maintenance District 1 at MP 13.4; and providing a cost-efficient design that addresses long-term maintenance costs and provides for ease of maintenance activities.

In another example, the bridge structures over the mainline are currently 72 years old and near the end of their expected life span as defined by the NJTA's Design Manual (Section 2.2). Maintenance and repair of these structures typically requires temporary and disruptive roadway closures and traffic detours during bridge maintenance and repair activities. The replacement bridge structures are designed for a 75-year expected life span and will be wider than the existing bridges to allow for future maintenance and repair (such as deck replacement) using construction staging; as such, no roadway closures or traffic detours would be required.

Environmental Impact Statement

Chapter 2 Alternatives Considered

June 2024

Prepared for

Prepared by

AECOM

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2 ALTERNATIVES CONSIDERED

This chapter summarizes the process by which the NJTA developed the design of the Program. The process involved five steps: identifying the range of alternatives and assessing the potential for these alternatives to address the Program Purpose and Need (Section 2.1), Concept Studies (Section 2.2), Preliminary Design (Section 2.3), Identification of the Alternatives Evaluated in this EIS (Section 2.4), and Overview of Construction Activities for the Program (Section 2.5). Other activities the NJTA undertook to inform the design process described in this chapter are summarized in this EIS as well: Purpose and Need (Chapter 1), Traffic, Safety, and Environmental Evaluations (Chapters 3 and 4), and Public and Agency Outreach (Chapter 5).

2.1 IDENTIFY RANGE OF ALTERNATIVES

The NJTA's initial step in the evaluation process was to identify the range of alternatives and assess the potential for these alternatives to meet the Program purpose and need presented in Chapter 1. The categories of alternatives are the following:

- No-Build Alternative
- Turnpike Operational Alternatives
- Non-Turnpike Capital or Operational Alternatives
- New North-South, Limited Access Roadway
- Public Transit
- Freight Rail
- Transportation Demand Management (TDM) Strategies
- Turnpike Cross-Section Improvements

Each of these alternatives is described and evaluated in the following subsections.

2.1.1 No-Build Alternative

The No-Build Alternative is the 2040 condition without the Program which assumes all other major regional committed projects will occur. The major regional committed projects consist primarily of planned capacity, operational, safety, and pavement improvements to Program area roadways aimed at addressing forecasted demographic shifts for the horizon year 2040 and state-of-good-repair needs (see **Table 2.1-1**). Other projects are transit improvements, including the Glassboro-Camden Line and South Jersey Bus Rapid Transit (BRT). The projects would provide additional transit service options in the Program area. The NJTA has no control over the scope, timing, implementation, or effects of the listed committed projects.

Table 2.1-1: Major Regional Committed (Funded) Projects by 2040 in the Program Area

Project	Type	Description
Americans with Disabilities Act (ADA) South, Contract 4	Highway	Bring projects into compliance with current ADA design requirements
Glassboro-Camden Line	Transit	Construct new transit line from Camden to Gloucester County
I-295 at NJ Route 38	Roadway	Add missing movements at interchange
NJ 70	Roadway	Reconstruct from NJ 38 to Cropwell Road
NJ 70	Roadway	Operational and Safety Improvements from NJ 38 to NJ 73; Intersection Improvements at Kingston Road and Covered Bridge Road
NJ 73 at Church Road and Fellowship Road	Roadway	Convert intersections to grade-separated interchanges
New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program	Surface Transportation	Proposed widening of one additional lane in each direction from the existing four lane section at MP 0.0 to just north of the existing Interchange 4 at MP 36.5
Pavement Preservation - Route 38 from Route I-295 to Route 206	Highway	Pavement preservation program statewide
Perkintown Road (CR 644)	Surface Transportation	Mill and pave, sub-base repair, replace broken curb, striping, raised pavement markers, guide rail upgrades, signage upgrades, drainage upgrades
Route I-295/42, Missing Moves, Bellmawr	Highway	New ramps and related improvements
Route 38, Nixon Drive to Route I-295 Bridge	Highway	Resurface within the project limits and provide connectivity for sidewalk, upgrade of existing traffic signals, guiderail upgrades and drainage improvements
Route 47, Grove Street to Route 130, Pavement	Highway	Resurface, rehabilitate, reconstruct, and update the ADA requirements, and correct a culvert which causes a flooding condition
Route 73, Church Road (CR 616) and Fellowship Road (CR 673) Intersections	Highway	Improve operational and safety conditions within the Route 73 corridor
South Jersey BRT	Transit	New BRT from Avondale Park-and-Ride and Delsea Drive to Center City, Philadelphia
US Route 322	Roadway	Widen from US 130 to NJ Turnpike
US Route 322/CR 536 (Swedesboro Road), Woolwich-Harrison Township Line to NJ Route 55	Highway	Restore 6.7 miles of the existing pavement surface through a mill and overlay, new striping and pavement markings, upgrade of the existing guiderail and pedestrian facilities

Sources: New Jersey Department of Transportation's *NJ Statewide Transportation Improvement Plan FY 2020-2029* and GIS shapefiles from NJGIN Open Data website (https://njogis-newjersey.opendata.arcgis.com/); DVRPC's *Connections 2045, Plan for Greater Philadelphia* and GIS Shapefiles from DVRPC website (https://www.dvrpc.org/mapping/data/); and SJTPO's *Transportation Improvement Program, Fiscal Years 2022-2031* (https://www.sjtpo.org/tip/).

The No-Build Alternative would not make any capacity or operating improvements to the Turnpike mainline or Interchanges 2, 3, or 4. As described in Section 1.1.3 (Future Traffic and Travel Demand), traffic volumes and roadway congestion would continue to increase in the future as population, employment, and vehicular use increases along the north-south travel corridor formed by the Turnpike, I-295, and I-95. Along the Turnpike, 2040 operating conditions in the No-Build Alternative would be poorer than in 2019 and would not achieve the NJTA's benchmark of LOS C or better (see Section 1.2.1 for definition). For these reasons, the No-Build Alternative would not remove the congestion and negative operating conditions that are present on the mainline and at Interchanges 2, 3, and 4. As a result, the No-Build Alternative would not address the Program purpose and need because it would not provide additional mainline capacity or address the operation of Interchanges 2, 3, and 4.

However, the No-Build Alternative is retained in this EIS to serve as a baseline condition against which the effects of the NJTA's Initially Preferred Alternative (IPA) can be compared.

2.1.2 Turnpike Operational Alternatives

This section evaluates the practicability of applying the following roadway operational management strategies to the Turnpike mainline in the Program area and Interchanges 2, 3, and 4: High Occupancy Vehicle (HOV) lanes, High Occupancy Toll (HOT) lanes, and Contra-Flow (Reversible) lanes. In addition, ITS as a transportation system management technique is discussed.

High Occupancy Vehicle (HOV) lanes – An HOV is a passenger vehicle that carries multiple passengers who are primarily commuters (such as carpools, vanpools, and buses). Use of HOV lanes would require one of the existing travel lanes along the Turnpike mainline to be dedicated as an HOV lane. Because the mainline has only two travel lanes in each direction, reserving one of those travel lanes just for HOV would require all other traffic to use one lane in each direction. This condition would significantly increase roadway congestion and reduce operating capacity on the mainline, which is contrary to the Program purpose and need. In addition, HOV lanes are typically dedicated for use by HOV only. HOV lanes would not address Program area congestion and operational conditions because the Turnpike carries relatively high percentages of non-commuter passenger vehicles and a relatively large portion of commercial vehicles. Commercial vehicles cannot take advantage of HOV lanes. Finally, for the commuters that use the Turnpike, employment destinations occur throughout the Program area rather than in centralized locations. This condition makes establishing fixed origins and destinations for ridesharing challenging because of limited potential for ride-sharing. As a result of these factors, HOV lanes are impractical as an alternative and are not being considered as part of the Program.

High Occupancy Toll (HOT) Lanes – HOT lanes are, typically, dedicated travel lanes that offer free access to high-occupancy vehicles while requiring payment of a toll by low-occupancy vehicles. Similar to HOV lanes, HOT lanes would constrain the Turnpike mainline by removing one travel lane in each direction from general use and requiring most Turnpike traffic to use the single general-purpose lane. This condition would significantly increase roadway congestion and reduce operating capacity on the mainline, which is contrary to the Program purpose and need. As a result, HOT lanes are impractical as an alternative and are not being considered as part of the Program.

Contra-Flow (Reversible) Lanes – Reversible lanes are controlled by a movable barrier to separate streams of traffic, and they enable traffic to flow in either direction depending on roadway conditions. Such lanes are typically used on short sections of highways near tunnels and bridge crossings, such as at the former Tappan Zee Bridge (now known as the Mario M. Cuomo Bridge) in New York, and are most effective when traffic flows during a particular time period and predominantly in one direction. Along the Turnpike mainline in the Program area, northbound and southbound traffic flows are relatively balanced (i.e., similar numbers of vehicles in each direction) throughout the day. The presence of bridge piers in the center median of the Turnpike would conflict with contra-flow lane shifts. Another downside to contra-flow lanes is that it is extremely time consuming and expensive to move a barrier twice each weekday to accommodate morning and evening peak period traffic flows, even over short distances. However, the most significant issue with contra-flow lanes is similar to the problem with HOV and HOT lanes; one of two existing travel lanes would be dedicated to contra-flow, forcing all traffic in one direction to use the remaining single travel lane. As a result, contra-flow lanes are impractical as an alternative and are not being considered as part of the Program.

2.1.3 Non-Turnpike Capital or Operational Alternatives

The Turnpike is one of three parallel north-south routes in the Program area: I-295, I-95, and the Turnpike. These three roadways accommodate both local and through traffic volumes and are used interchangeably by drivers depending on the operating conditions on any one roadway. Due to the interrelatedness of these three roadways, statewide and regional planning considers the north-south travel function of these three roadways as a unit. Each roadway carries substantial traffic and is subject to changes in operating conditions based on congestion and incidents. Similar to the NJTA, the New Jersey Department of Transportation (NJDOT) (I-295) and the Pennsylvania Department of Transportation (PennDOT) (I-95) plan and implement capacity and operational improvement projects according to need, engineering conditions, and environmental factors related to each roadway. Adding capacity and addressing operational conditions along one roadway could cause a shift in traffic to another roadway, depending on the driver's estimate of which roadway would provide the best balance of travel time and cost. However, making capacity and operational improvements to either I-295 or I-95 as a means to address existing and forecasted mainline capacity needs would not address the operational deficiencies along the mainline (the absence of a third travel lane south of Interchange 4) and the congested conditions at Interchanges 2, 3, and 4.

2.1.4 Provide a New North-South Limited Access Roadway Alternative

After the completion of the Turnpike in 1952, NJDOT proposed a limited-access highway, parallel to U.S. Route 1, to serve medium and long-distance traffic in the Philadelphia to New York corridor. This highway would have extended I-95 through central New Jersey from Hopewell in Mercer County to Piscataway in Middlesex County. In 1980, NJDOT withdrew its support for the project due to difficulties gaining community approval and acceptance. Instead, the Pearl Harbor Memorial Turnpike Extension and the Turnpike north of Interchange 6 to I-95 were redesignated as I-95. The NJDOT's eventual abandonment of a new I-95 roadway is an example of the impracticality of building a new limited-access highway on a new alignment in New Jersey.

2.1.5 Public Transit

The Program area is served by alternative transportation systems including public, private, interstate, intercity, and local transit. This section identifies these services by county and discusses how and where these systems operate in relation to the Turnpike's north-south regional orientation.

The alternative transportation systems described in this section provide vital interstate, intercity, and local transit services. Although some of these services operate in a north-south direction to make regional connections, such as the few NJ TRANSIT and Greyhound bus services to New York City, most routes are oriented between county destinations and the City of Philadelphia, or they are focused on making local connections within and across counties.

2.1.5.1 Burlington County

Burlington County is served by the following public, private, and on-demand transportation providers:

- NJ TRANSIT operates the River LINE light rail system from Trenton, Mercer County to Camden with stops in Mercer, Burlington, and Camden counties.
- NJ TRANSIT and several private bus companies provide express bus services between various locations in Burlington County, and New York City, Philadelphia, and other towns/counties in New Jersey.
- NJ TRANSIT operates local bus routes within urban areas and between urban and suburban communities.
- Greyhound operates intercity bus service from Mt. Laurel to other cities within and outside New Jersey.
- The Cross County Connection Transportation Management Association (TMA), in conjunction with the Burlington County Board of County Commissioners, operates the BurLink shuttle bus service that connects with NJ TRANSIT bus routes and River LINE light rail stations.

The River LINE light rail system connects Burlington County residents to Trenton to the north and Camden to the south. In Trenton, commuters can connect to NJ TRANSIT Northeast Corridor trains for service to Newark, New York City, and Southeastern Pennsylvania Transportation Authority (SEPTA) R-7 trains to Philadelphia (30th Street Station). In Camden, commuters can connect to Port Authority Transit Corporation (PATCO) service into downtown Philadelphia.

BurLink provides express and local shuttle bus service between various activity centers in Burlington County and major public transportation routes and stations.

Sen-Han Transit, a division of the non-profit Senior Citizens United Community Services organization, provides transportation to citizens 60 years and older as well as disabled persons in Burlington and Camden counties. Sen-Han offers fixed route and on-demand transit services for non-emergency medical appointments, personal business, and local shopping. On-demand rides on the Sen-Han service are on a first-call, first-serve basis and users must arrange for rides several days in advance.

The efforts of central New Jersey business leaders, local government officials, NJDOT, and NJ TRANSIT led to the incorporation of the Cross County Connection TMA in 1989 to provide solutions for transportation problems and manage alternative transportation services for seven counties in New Jersey, including Burlington County. The goal of the Cross County Connection is to address mobility issues in the region, while also creating initiatives to reduce the number of vehicles on local and state roadways. Its mission is to improve the quality of life through transportation solutions.

Cross County Connection is a non-profit organization that currently partners with large state and Federal agencies such as NJDOT, NJ TRANSIT, and the Federal Highway Administration (FHWA) to provide transportation solutions for mobility issues facing counties, municipalities, and employers in the region. Cross County Connection acts as a centralized source for carpools or vanpools, while also offering up-to-date information on commuter rail, light rail, buses, shuttles, bicycling, walking, and traffic conditions.

Cross County Connection also partners with local area employers to develop transportation resources to help their employees get to and from work. These can range from basic services, such as providing bus or train schedules, to more complex services such as organizing carpools and vanpools and developing employee commuter benefit programs.

2.1.5.2 Camden County

Camden County is served by the following public, private, and on-demand transportation providers:

- NJ TRANSIT operates 25 bus routes serving the Walter Rand Transportation Center in the City of Camden and 7 additional routes in Camden County. Many of the bus routes serving Walter Rand are also interstate services that operate in Philadelphia.
- NJ TRANSIT also provides Access Link service in Camden County, which is a public transportation service established to comply with the paratransit regulation of the Americans with Disabilities Act (ADA).
- The South Jersey Transportation Authority (SJTA) operates the Pennsauken Industrial Park Shuttle Route.
- Greyhound operates intercity bus service from the Walter Rand Transportation Center in Camden County to other cities.
- NJ TRANSIT's River LINE operates in Camden County.
- The Delaware River Port Authority operates the PATCO High Speed Line rapid transit system between Philadelphia and the City of Camden, including extension service eastward to Lindenwold in Camden County.
- Fifteen municipalities provide transportation for senior citizens and disabled residents.

2.1.5.3 Gloucester County

Gloucester County is served by the following public, private, and on-demand transportation providers:

- NJ TRANSIT operates 11 bus routes in Gloucester County, most of which are interstate services with Philadelphia as the terminal destination.
- NJ TRANSIT also provides Access Link service in Gloucester County.
- Gloucester County, in partnership with Pascal Sykes Foundation, SJTA, United Way of Gloucester County, People for People, NJ TRANSIT, and Cross County Connections, provides the Pureland East-West Shuttle. This service operates between the Pureland Industrial Park and the Avandale Park & Ride with intermediate stops.
- The Gloucester County Division of Transportation Services provides non-emergency medical and essential business transportation services to senior citizens, people with disabilities, veterans, and the general public in rural areas.
- Twelve municipalities provide shuttle services for senior citizens and disabled residents.

2.1.5.4 Salem County

Salem County is served by the following public, private, and on-demand transportation providers:

- NJ TRANSIT and Salem County Transit operate 13 local bus routes in the SJTPO region, which encompasses Salem, Cumberland, Atlantic, and Cape May counties.
- NJ TRANSIT and local bus operators also operate local bus services within the SJTPO region, including Salem County.
- NJ TRANSIT also provides a number of interstate bus services in the SJTPO region and connects to Philadelphia and New York City.
- A range of government organizations provide transportation services for the transit disadvantaged such as senior citizens, people with disabilities, and low-income populations. These services are typically on-demand. An example is Pearl Transit.

2.1.6 Goods Movement

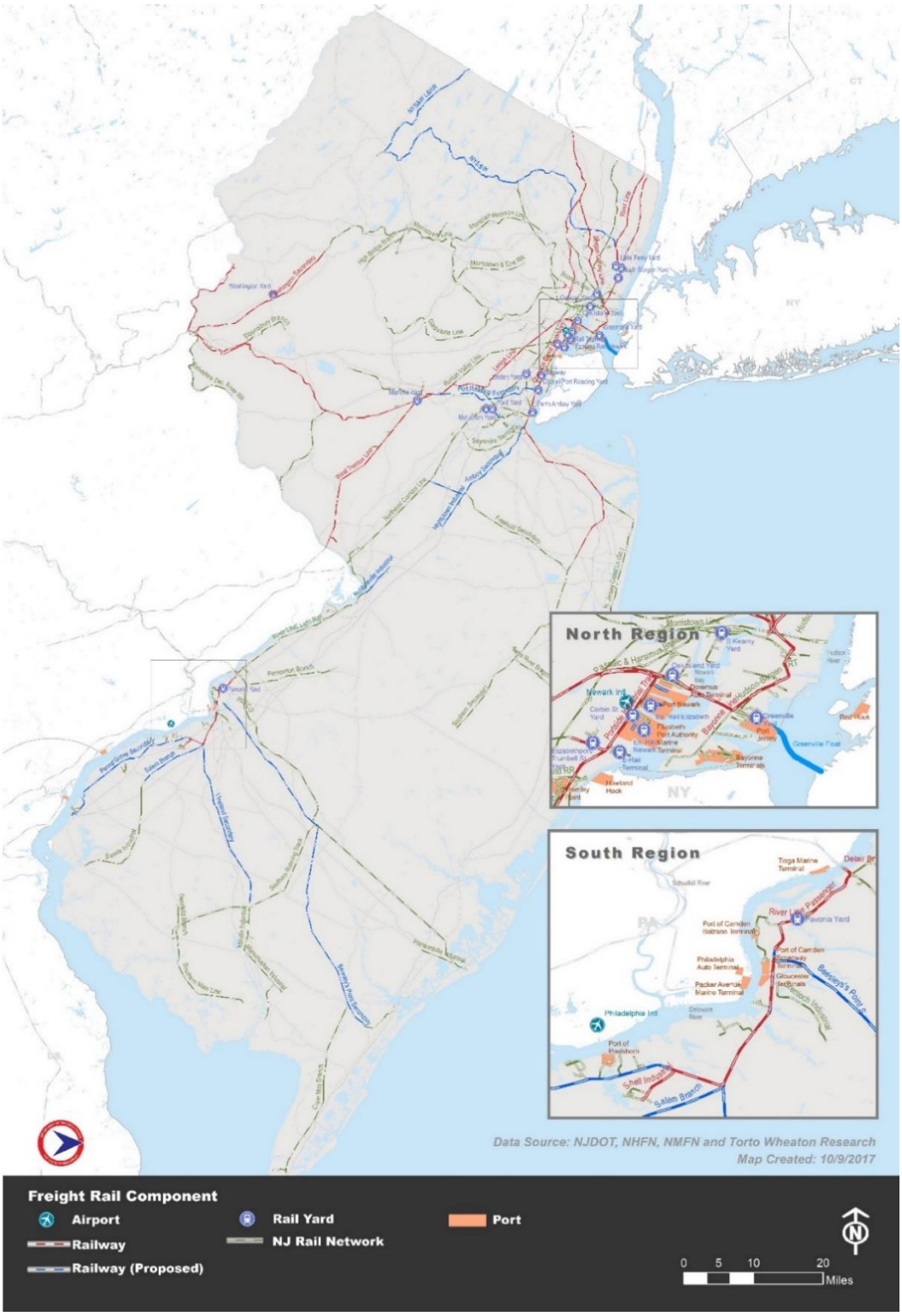
In general, the goods movement system has two components: 1) goods moving from a port, air, or rail terminal to a logistics facility (a warehouse or distribution facility), and 2) goods moving from the logistics facility to the end user. Typically, goods moved in components 1 and 2 are finished products that are moved by trucks over roadways such as the Turnpike. Freight railroads operate differently; generally, freight railroads carry bulk materials from supplier to user, such as coal deliveries to power plants. Although some goods movement involve a combination of transportation modes to achieve components 1 and 2, most goods movements operate in the manner described above and are not interchangeable. As a result, the 2017 *New Jersey Statewide Freight Plan* (NJDOT, 2017) forecasts 41 percent growth in the volume of goods moved by truck on the Turnpike (in combination with I-95 and I-295) by 2035 (Section 1.3.3). Growth in the volume of goods movement will mean growth in the number of trucks on the Turnpike/I-95/I-295 corridor by 2035.

Figure 2.1-1 is an image from the 2017 *New Jersey Statewide Freight Plan* showing the existing freight railroad network in the state. This image shows that the freight railroad network in the Program area is limited to serving ports and manufacturers that are primarily within the state. The freight railroad system does not operate continuously in the north-south regional direction as does goods movement by truck via the Turnpike. Because the infrastructure is not in place to allow movement of goods by freight rail in a north-south regional context, and because the operational practice is not in place to shift regional truck movements to rail freight, it is not feasible to shift the movement of goods from trucks to rail. Thus, growth in the number of trucks carrying freight on the Turnpike is unavoidable.

2.1.7 Transportation Demand Management (TDM)

The purposes of TDM are to reduce the need to travel, increase vehicle occupancy, encourage the use of alternative modes of travel, and shift trips outside peak periods of travel. TDM strategies accomplish these goals by changing personal travel behavior which, in turn, increases the efficiency of the existing transportation system (i.e., reduce traffic congestion, increase safety, improve mobility, conserve energy, and reduce pollution emissions).

Figure 2.1-1: Existing Freight Railroad Corridors in New Jersey



Source: *New Jersey Statewide Freight Plan*, Figure 78, 2017, prepared by the New Jersey Department of Transportation.

Some TDM strategies improve the transportation options available to consumers, while others provide an incentive for people to change their travel mode, time of travel, or destination. Many TDM strategies address peak period travel situations by reducing the total number of trips or the number of single occupant vehicle trips during peak hours. TDM measures are most effective in areas that are heavily populated and near major employment centers. Examples of common TDM strategies are described below.

- **Congestion Pricing** – With this strategy, drivers are charged higher toll rates during peak periods of roadway congestion and lower toll rates during periods of less roadway congestion. This strategy was implemented on the Turnpike in 2000 and has resulted in a reduction of less than 1 percent in the rate of traffic growth during peak traffic periods. This result indicates that while a small benefit is derived from congestion pricing, the benefit is not large enough to address roadway congestion and LOS conditions in the Program area.
- **Ridesharing (Carpools/Vanpools)** – Ridesharing is a group of commuters who either ride together in a personal vehicle (carpool) or in a van (vanpool). Typically, participating commuters work together, or in the same vicinity, and live near each other. While ridesharing can be beneficial, the strategy is difficult to apply in the Program area where suburban development features lack population density and many major employment centers.
- **Shuttle Services** – This is a type of public transit using vans or small buses. The scope of shuttle services tends to be small, with short trips. Shuttle services most often benefit persons with limited mobility or disabilities. While shuttle services can be a benefit to those individuals, the small-scale nature of the strategy is not large enough to address roadway congestion and LOS conditions on the Turnpike in the Program area.
- **Park-and-Ride Facilities** – This strategy uses parking lots strategically located near transit hubs and highway interchanges to encourage public transportation and rideshare usage, mainly by commuters. These facilities tend to be located near the edges of heavily populated areas. A large number of people would need to use park-and-ride facilities to meaningfully reduce roadway congestion. The suburban style development in the Program area results in many origins and destinations among drivers using the Turnpike; therefore, the use of park-and-ride facilities is not a practical alternative.

In summary, the highly dispersed nature of travel in the Program area, the lack of population and employment density in areas surrounding the Turnpike between Interchanges 2, 3, and 4 to support TDM strategies in a significant way, and the large proportion of Turnpike users that are outside the typical target audience of TDM strategies (such as non-commuters and goods movement) mean that implementing additional TDM strategies in the Program area would not substantially reduce future travel demand on the Turnpike. As a result, TDM strategies would not meet the Program purpose and need and are not practical alternatives.

2.1.8 Turnpike Cross-Section Improvements

This alternative considers whether, and how, changes to the cross-section of the existing Turnpike in the Program area could address traffic congestion. Section 2.2 describes the Concept Studies the NJTA undertook to examine cross-section improvements. The process of identifying an Initially Preferred Alternative (IPA) that would address the Program purpose and need and, therefore, identified by the NJTA for further study in Preliminary Design, is also explained in Section 2.2. Section 2.3 describes Preliminary Design activities undertaken by the NJTA to advance the IPA. Section 2.4 describes the IPA, which is assessed in this EIS.

2.2 CONCEPT STUDIES

The NJTA initiated the design for the Program with a Concept Studies process. The purpose of Concept Studies was to identify and compare reasonable alternative designs and strategies that address the Program purpose and need while achieving existing design standards for highway facilities. This section summarizes the Concept Studies undertaken by the NJTA for the Program. The focus of Concept Studies was to add one travel lane on each of the northbound and southbound roadways of the mainline and to make improvements to the ramps at Interchanges 2, 3, and 4 as a result of the addition of the mainline travel lanes.

In developing alternatives and strategies, the NJTA applied the following design criteria with the goal of meeting or exceeding the desirable and absolute minimum design criteria for each design element in the Program:

- NJTA – Garden State Parkway New Jersey Turnpike *Design Manual,* up to and including DCA2022-DM-04 dated 9/27/2022 (for Turnpike mainline, ramps and U-turns)
- NJDOT *Roadway Design Manual*, 2015, up to and including BDC20MR-02 dated 10/2/20 (for NJDOT roadways)
- NJDOT *Design Manual Bridges and Structures*, Sixth Edition, 2016, up to and including BDC18MB-01 dated 6/4/18 (for NJDOT structures)
- American Association of State Highway Transportation Officials (AASHTO) publication, *A Policy on Geometric Design of Highways and Streets*, 2018 (including for concept and Preliminary Design of local and county roadways; during Final Design, the individual municipalities and counties should be contacted regarding their specific design criteria, if any).

Each alternative and strategy was evaluated by considering existing conditions, the ability to achieve the purpose and need of the Program, operational and safety considerations, right-of-way (ROW) needs, environmental and utility effects, and construction costs. In addition, the NJTA considered the input from public and agency outreach activities during Concept Studies. The following subsections summarize the alternatives and strategies developed and considered by the NJTA for each design element.

2.2.1 Mainline Improvements

The Program would add a 12-foot travel lane to the North-South (NS) and South-North (SN) roadways, provide a 12-foot outside shoulder, and reconstruct the left shoulder pavement as needed. Adding a travel lane in each direction on the mainline would require lengthening of existing bridges over the Turnpike to accommodate the additional travel lanes. Also, culverts that convey waterways and drainage under the Turnpike would be lengthened. Adding a travel lane in each direction on the mainline would require widening existing bridges that carry the mainline over other roadways, railroads, and waterways. Replacement of other existing Turnpike infrastructure would be required to accommodate mainline improvements including sign structures, lighting, intelligent transportation system (ITS) facilities, utilities, drainage and stormwater management systems, and retaining walls.

One geometric alternative was developed for the mainline improvements; the addition of a third travel lane to the outside of both the NS and SN roadways. However, the NJTA initially considered three mainline bridge alternatives:

- Alternative 1 - Original Deck Replacement and New Widening
- Alternative 2 - Original Superstructure Replacement and Widening
- Alternative 3 - Full Replacement

The NJTA evaluated each bridge on the basis of the existing condition of the bridge, the age of the bridge, the need for widening to accommodate the Program, and cost. The table in Appendix D titled, Bridge Recommendations Summary, lists the findings for each bridge.

During Concept Studies, existing utilities were identified using License to Cross data provided by the NJTA, as-built plans from various NJTA contracts with utility providers, bridge inspection reports for overpassing structures, initial coordination with utility providers, and initial field verification. Major utilities, such as petroleum and natural gas pipelines and fiber optic lines, were identified along and across the Turnpike. In addition, local utilities, such as water and sanitary sewer pipelines, and electric, telephone, and gas distribution lines were identified. The mainline improvements have the potential to impact and require relocation of existing utilities; therefore, further discussion regarding utilities is provided in Section 4.19 (Utilities). The NJTA would undertake more detailed utility studies during Final Design of the Program.

During the Concept Studies, existing drainage and stormwater management systems were identified, as well as the need for additional stormwater management for mainline improvements. Regarding the latter, the addition of a travel lane in each direction would increase the amount of pavement within the Turnpike ROW. The additional pavement would increase the amount of stormwater on the Turnpike, thereby requiring the NJTA to provide additional stormwater management facilities along the mainline. The NJTA's initial assessment of drainage and stormwater management facility needs indicates that such facilities can be accommodated within the existing Turnpike ROW. The NJTA performed a more detailed drainage and stormwater management study during Preliminary Design and would undertake additional studies during Final Design of the Program.

2.2.2 Interchange Improvements

During the Concept Studies, the NJTA examined the need for improvements to existing Turnpike Interchanges 2, 3, and 4 in the Program area. For design requirements, the NJTA applied the *New Jersey Turnpike Authority – Garden State Parkway New Jersey Turnpike Design Manual*, up to and including DCA2021-DM03 dated 8/6/21. For acceleration lane standards, the NJTA would conform to current AASHTO 2018 guidance, *A Policy on Geometric Design of Highways and Streets* for high-speed facilities, in addition to applying the updated acceleration standards in its own Design Manual. Specifically, acceleration lanes would be designed using parallel-type acceleration lanes rather than tapered acceleration lanes.

2.2.2.1 Interchange 2 (MP 12.9)

Interchange 2 is located at Turnpike MP 12.9 and provides connection to Swedesboro Road (US Route 322) in the Township of Woolwich, Gloucester County. The NJTA developed four alternatives to address the Program purpose and need at Interchange 2; Alternative 3A was selected for the reasons described below.

Alternative 3A would move the existing Turnpike maintenance yard driveway access point to the north of the U-turn structure to eliminate motor vehicle interaction between Ramp TN and driveway traffic. In addition, the alignments of Ramps TS and TN were refined to increase the curve radii; a 1,000-foot radius is proposed. These curves would provide for a higher ramp speed and a shorter acceleration lane length. The Swedesboro Road (US Route 322) signalized intersection would also be improved by signal optimization. A northbound dual left turn lane configuration would be provided for more left-turn capacity. These intersection improvements would shorten vehicle queues and process more left-turning vehicles per signal cycle. The dual left turn would require widening Swedesboro Road approximately 15 feet in the westbound direction to provide two receiving lanes for the dual left turns. The widening would be extended approximately 800 feet to allow an appropriate merge distance for westbound traffic to return to one lane and meet the existing roadway configuration. There is sufficient existing ROW to accomplish this widening without additional ROW acquisition.

Comparison with other alternatives: The NJTA evaluated each alternative in terms of achieving safety and operational requirements, and having potential impacts to the environment, ROW needs, utilities, and cost (**Table 2.2-1**)**.** The NJTA selected Alternative 3A for advancement because it would provide the desirable ramp radius for Ramp ST and meet applicable design criteria while requiring minor additional ROW. In addition, Alternative 3A would be as good or better than the other alternatives in achieving safety and operational requirements, avoiding or minimizing environmental impacts, avoiding or minimizing utility impacts, and minimizing cost.

Table 2.2-1: Interchange 2: Summary of Alternatives Evaluation

Alternative		Environmental Impacts	ROW Impacts	Utility Impacts	Construction Cost	Advantages	Disadvantages
Interchange 2	1	• Minor impact to wetlands • Minor impact to preserved farmland	0.3 acres	• Relocation of 5 poles associated with widening along Route 322	$35.2M	• Improves Ramp ST radii to meet desirable minimum (235 feet) • Minimal impact to wetlands • Minimal impact to ROW	• Does not provide sufficient distance from Ramp TN taper to Maintenance driveway
	2	• Significant impact to wetlands • Significant impact to preserved farmland	6.9 acres	• Relocation of 5 poles associated with widening along Route 322	$38.5M	• Improves Ramp ST radius to meet desirable minimum (235 feet) • Relocated ramps allow for ease of maintenance and protection of traffic (MPT) for ramp construction	• Most significant impact to ROW • Most significant impact to wetlands and preserved farmlands
	3	• Minor impact to wetlands	No Impact	• Relocation of 5 poles associated with widening along Route 322	$35.0M	• Reduced impact to wetlands • No ROW required • Flatter radius on Ramp TN allows for more efficient/safer merge	• Minimum loop ramp radius is 200 feet, minimum desirable is 235 feet.
	3A	• Minor impact to wetlands	0.4 acres	• Relocation of 5 poles associated with widening along Route 322	$37.8M	• Improves Ramp ST radii to meet desirable minimum (235 feet) • Flatter radius on Ramp TN allows for more efficient/safer merge	• Impact on existing ROW • Impact on wetlands

Notes: MPT = maintenance and protection of traffic. Costs based on conceptual designs created without the use of survey or full engineering designs. Final Design engineering and construction supervision are not included in these costs.

2.2.2.2 Interchange 3 (MP 26.1)

The existing Interchange 3 is located at Turnpike MP 26.1 in the Boroughs of Bellmawr and Runnemede, Camden County and serves as a connection between the Turnpike and Black Horse Pike (NJ Route 168). The NJTA developed three alternatives to address the Program purpose and need at Interchange 3; Alternative 1 was selected for the reasons described below.

In Alternative 1, Interchange 3 would be retained with specific enhancements to ramps. Ramp NT would be widened to a 2-lane ramp with no ROW impacts; widening would increase ramp capacity and shorten traffic queues during peak periods. Ramp TN would be reconstructed to provide the desirable minimum radius of 235 feet and would remain a single lane. This change would improve traffic operations and ramp capacity, resulting in a LOS C. Structure No. 26.13AR, which carries Ramps TN and ST over the Turnpike, would be maintained; this bridge was replaced in 2005.

Ramp ST would be reconstructed to accommodate the mainline capacity improvements and the reconstruction of Ramp TN. Ramp ST would also be brought up to current design standards and capacity needs.

The improvements in Alternative 1 would require additional ROW. Existing 30” and 16” petroleum lines that are outside the Turnpike ROW would have to be relocated so as to be outside the proposed ROW. The Turnpike ROW needs, and pipeline relocation, would require ROW from the residential community along Central Avenue, including partial and full property acquisitions that are described in more detail in Section 4.3 (Property Acquisitions and Displacements).

Comparison with other alternatives: The NJTA evaluated each alternative in terms of achieving safety and operational requirements, having potential impacts to the environment, ROW needs, utilities, and cost (**Table 2.2-2**). Each alternative would have environmental impacts; however, Alternative 1 would have the least impacts to wetlands and riparian zones. Each alternative would impact and require relocation of existing pipelines, although Alternative 2 would have the most impact to pipelines. Alternative 1 would have the least ROW needs, while Alternative 2 would have more impacts to residential properties and Alternative 3 would have more impacts to commercial properties, but no impacts to residential properties.

2.2.2.3 Interchange 4 (MP 34.5)

The existing Interchange 4 is located at Turnpike MP 34.5 in the Township of Mt. Laurel, Camden County. The interchange serves as a connection between the Turnpike and NJ Route 73. The NJTA developed four alternatives to address the Program purpose and need at Interchange 4; Alternative 3 was selected for the reasons described below.

In order to accommodate the mainline widening, Alternative 3 would replace the existing bridge over the Turnpike (Structure 34.49A) at the interchange with a longer bridge structure 5 feet south of the existing interchange bridge. The new bridge would be constructed while allowing the existing bridge to maintain traffic operations for Ramps TN and ST. Alternative 3 would

Table 2.2-2: Interchange 3: Summary of Alternatives Evaluation

Alternative		Environmental Impacts	ROW Impacts	Utility Impacts	Construction Cost	Advantages	Disadvantages
Interchange 3	1	• Minor impact to wetlands and riparian zones • Potential impact to designated redevelopment area	4.2 acres	• Relocation of existing 30" Colonial and 16" Sunoco Petroleum pipelines	$18.3M	• Improves Ramp TN radius to meet desirable minimum (235 feet) • Minimal environmental impact • Least impact to ROW	• Significant impact to major utilities • Significant impact to ROW (residential properties)
	2	• Minor impact to wetlands and riparian zones • Potential impact to designated redevelopment area	5.4 acres	• Relocation of existing 30" Colonial and 16" Sunoco Petroleum pipelines	$61.4M	• Improves Ramp TN radius to meet desirable minimum (235 feet)	• Most significant impact to existing ROW residential properties • Most significant impact to major utilities
	3	• Minor impact to wetlands and riparian zones • Potential impact to designated redevelopment area	14.6 acres	• Relocation of existing 30" Colonial and 16" Sunoco Petroleum pipelines	$58.3M	• Improves Ramp TN radius to meet desirable minimum (235 feet) • Least ROW impact to residential properties	• Significant impact to major utilities • Significant impact to ROW (commercial properties)

Notes: Costs based on conceptual designs created without the use of survey or full engineering designs. Final Design engineering and Construction Supervision are not included in these costs.

require a complete realignment of Ramp TN beyond its existing location to address capacity and operational constraints. Based on the traffic analysis for Interchange 4, a multi-lane operation would be required on Ramps NT and TN to accommodate forecasted traffic volumes. Ramps ST and TS would remain single lane ramps, as the NJTA's traffic analysis indicates a LOS C or better would be provided through design year 2040.

Comparison with other alternatives: The reasons Alternative 3 was selected by the NJTA are summarized in **Table 2.2-3**. One reason for the selection of Alternative 3 is that portions of the improvements can be constructed offline, which means that the new Program elements can be constructed with reduced impacts to existing traffic operations. Offline construction is typically easier, less costly, and shorter in duration than construction that has to be staged to maintain traffic operations. Alternative 1 could also be partly constructed offline; however, Alternative 1 would have the most impacts to existing pipelines (Alternative 3 would not impact pipelines) and would require the greatest amount of new ROW. Another disadvantage unique to Alternative 1 is the reduction in the offset of the ramps to the toll plaza. These disadvantages led the NJTA to eliminate Alternative 1 from further consideration.

Alternative 2A shares the disadvantages of Alternative 1 in terms of pipeline impacts and additional ROW needs. Alternative 2A would also require online construction, meaning Program elements would be constructed while maintaining traffic operations. Online construction would worsen traffic congestion at Interchange 4 during Program construction. Alternative 2B would also require online construction that would worsen traffic congestion during Program construction. However, like Alternative 3, Alternative 2B would not impact pipelines or require additional ROW. Alternative 1 would have the most impacts to wetlands compared to the other alternatives; however, all other environmental impacts would be similar among the alternatives.

Table 2.2-3: Interchange 4 Summary of Alternatives Evaluation

Alternative		Environmental Impacts	ROW Impacts	Utility Impacts	Constructability	Construction Cost	Advantages	Disadvantages
Interchange 4	1	• Impacts to wetlands, riparian zone, flood hazard area • Potential to encounter known soil or groundwater contamination	0.85 acres	• Impact to Sunoco (16”) and Colonial (30”) Petroleum pipelines	Offline 1 stage construction	$37.772M	• Addresses traffic congestion at TN and NT Ramps • Offline construction minimizes impacts to operations during construction	• Impacts to Sunoco (16”) and Colonial (30”) Petroleum pipelines • Impacts to adjacent ROW • Reduces offset of ramps to toll plaza
	2A	• Impacts to wetlands, riparian zone, flood hazard area • Potential to encounter known soil or groundwater contamination	0.37 acres	• Impact to Sunoco (16”) and Colonial (30”) Petroleum pipelines	Staged online construction (2 or more sequential stages)	$37.775M	• Addresses traffic congestion at TN and NT Ramps	• Staged construction would worsen existing traffic congestion during construction • Impacts to Sunoco (16”) and Colonial (30”) Petroleum pipelines • Impacts to adjacent ROW
	2B	• Impacts to wetlands, riparian zone, flood hazard area • Potential to encounter known soil or	None	• Impact to underground gas and telephone utilities	Staged online construction (2 or more sequential stages)	$37.78M	• Addresses traffic congestion at TN and NT Ramps • No impacts to major utilities	• Staged construction would worsen existing traffic congestion during construction

Alternative		Environmental Impacts	ROW Impacts	Utility Impacts	Constructability	Construction Cost	Advantages	Disadvantages
		groundwater contamination						
	3	• Impacts to wetlands, riparian zone, flood hazard area • Potential to encounter known soil or groundwater contamination	None	• Impact to underground gas and telephone utilities	Offline 1 stage construction	$37.129M	• No impacts to major utilities • Offline construction minimizes impacts to operations during construction	• No major disadvantages

Notes: Costs are based on conceptual designs created without the use of survey or full engineering designs. Final Design engineering and construction supervision are not included in these costs.

2.2.3 Selection of Initially Preferred Alternatives (IPAs)

At the conclusion of the Concept Studies process, and for the reasons described in the foregoing subsections, the NJTA selected IPAs for further study during Preliminary Design, the next phase of study for the Program. The IPAs are the following elements:

- Mainline improvements: The addition of one lane to the NS and SN roadways, a 12-foot wide shoulder along each new lane, full replacement of most of the bridges over the mainline and that carry the mainline over existing roadways, railroads, and waterways;
- Geometric and/or capacity improvements to Interchanges 2, 3, and 4, including:
    - Interchange 2 (Alternative 3A);
    - Interchange 3 (Alternative 1); and,
    - Interchange 4 (Alternative 3);
- Replacement of overhead sign structures to accommodate full-width shoulders.

2.3 PRELIMINARY DESIGN

The NJTA completed Preliminary Design studies that built upon the IPAs developed during the Concept Studies, including the addition of one lane to the NS and SN mainline roadways; a 12-foot wide shoulder along each new lane; substantial reconstruction or replacement of nearly all structures along or over the mainline; geometric and/or capacity improvements to Interchanges 2, 3, and 4; and replacement of overhead sign structures to accommodate full-width shoulders.

The Preliminary Design phase of work included additional engineering to refine the design of the mainline, bridges over and along the mainline, and Interchanges 2, 3, and 4. As part of this activity, the NJTA completed further evaluation of design options at overpassing and underpassing roads (including bridge widths, and horizontal and vertical alignments), interchanges, detailed traffic analysis, additional environmental evaluation, further study of utilities, more detailed study of drainage and stormwater management, further assessment of ROW impacts and the means to avoid or minimize additional ROW needs for the Program, conceptual construction staging, and initial lighting design.

During Preliminary Design, the NJTA completed an extensive stakeholder outreach program. Representatives from the four counties and all municipalities in the Program area were engaged, as well as state and regulatory agencies with authority in the Program area: NJDOT, the Delaware River and Bay Authority, the Delaware River Port Authority/Port Authority Transit Corporation (PATCO), the New Jersey Department of Environmental Protection (NJDEP), the U.S. Army Corps of Engineers (USACE), the FHWA, and the New Jersey Historic Preservation Office (NJHPO). More information on outreach efforts is found in Chapter 5 (Public and Agency Outreach).

In addition, during Preliminary Design the NJTA initiated coordination with over 30 utility companies and agencies including petroleum, natural gas, water, electric, sanitary sewer, fiber optic, and phone/cable/internet providers. Coordination with these utility providers would continue during Final Design, and more details on this coordination can be found in Section 4.19 (Utilities).

More details regarding the activities and results of the NJTA's Preliminary Design phase of work for the Program can be found in the *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program, Preliminary Design Report* (AECOM, 2022).

2.3.1 Preliminary Design – Initially Preferred Alternative (IPA)

At the conclusion of Preliminary Design, the NJTA selected an IPA for further study. The IPA consists of the following elements:

- Mainline improvements: The addition of one lane to the NS and SN roadways, a 12-foot wide shoulder along each new lane, significant reconstruction, or replacement of nearly all structures along the corridor, replacement of overhead sign structures to accommodate full-width shoulders, and adjustment of the vertical profiles of the SN and NS roadways to achieve current NJTA design criteria and AASHTO's guidance, *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2018);
- Geometric and/or capacity improvements to Interchanges 2, 3, and 4, including:
    - Interchange 2 (Alternative 3A): realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration; replace and lengthen Structure No. 12.86A to accommodate the mainline capacity improvements; provide congestion relief and safety improvements including parallel acceleration and deceleration lanes; modify Ramp ST to achieve current design standards; and modify Ramps TS and TN to allow for higher ramp operating speeds;
    - Interchange 3 (Alternative 1): realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration; provide a two-lane exit ramp for Ramp NT to allow additional capacity; construct parallel acceleration and deceleration lanes; and provide the minimum desirable radius of 235 feet on Ramp ST;
    - Interchange 4 (Alternative 3): realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration; replace and lengthen Structure No. 34.49A to accommodate the mainline improvements; provide a parallel acceleration lane that conforms to current AASHTO requirements for high-speed facilities; provide a two-lane operation on Ramps TN and NT to maintain a desirable LOS; increase the minimum radius on Ramp TN to meet the NJTA's desirable minimum of 235 feet for this high-volume ramp; and replace the two existing tapered acceleration lanes at Ramps TN and TS with parallel type acceleration lanes.

2.4 EIS ALTERNATIVES

This EIS examined the No-Build Alternative (Section 2.1.1) and the IPA, which is described in the following subsections.

2.4.1 Initially Preferred Alternative

The NJTA's IPA is the combination of alternatives selected for the mainline improvements and Interchanges 2, 3, and 4 during Preliminary Design (Section 2.2). The IPA is the 2040 condition with the Program; it assumes the other major regional committed projects in the No-Build Alternative will occur (Section 2.1.1). This section is organized according to the Program elements.

2.4.1.1 Mainline Capacity Improvements

As described in Section 2.2.1 and the *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program, Preliminary Design Report* (AECOM, 2022), the Program would add one lane to the NS and SN roadways and a 12-foot wide shoulder along each new lane. The mainline capacity improvements would include full replacement of most bridges over the mainline and that carry the mainline over roadways, railroads, and waterways, and replacement of overhead sign structures to accommodate full-width shoulders. The bridges include those that carry the mainline over other roadways, railroads and waterways, bridges that pass over the Turnpike, and bridge culverts that convey waterways across the Turnpike ROW. **Table 2.4-1** provides a guide to the mainline improvements. Appendix A contains a typical section of the mainline from the Preliminary Design drawings showing the additional travel lane in each direction. Bolded elements are proposed, non-bolded elements are existing conditions.

Table 2.4-1: Guide to the Mainline Capacity Improvements

Mainline Capacity Improvements - Key Features
• Provide new 12-foot travel lane on SN (northbound) roadway • Provide new 12-foot travel lane on NS (southbound) roadway • Provide 12-foot outside shoulder on northbound and southbound roadways
• Lengthen existing bridges over the mainline and widen existing bridges on the mainline to accommodate mainline improvements; lengthen existing culverts that convey drainage and waterways under the mainline
• Accommodate or relocate existing utilities along and across the mainline
• Provide additional drainage and stormwater management facilities to address runoff from new impervious pavement • Relocate and restore existing mainline drainage and stormwater management facilities that are impacted by the Program
• Replace existing sign structures, lighting, ITS facilities, utilities, and retaining walls that support mainline operations

Source: AECOM 2022

2.4.1.2 Interchange 2 (MP 12.9)

Interchange 2 is located at Turnpike MP 12.9 in the Township of Woolwich, and it provides connection to Swedesboro Road (US Route 322). As described in Section 2.2.1 (Mainline Improvements), the Program would provide improvements to existing Interchange 2 to address the Program purpose and need, address operational constraints, and achieve current design criteria. The proposed improvements at Interchange 2 are a refinement of Alternative 3A, which was recommended as the IPA during the Concept Studies phase for Interchange 2 and refined during Preliminary Design. **Table 2.4-2** provides a guide to the Interchange 2 improvements. A map of the Interchange 2 improvements is provided in **Figure 2.4-1**.

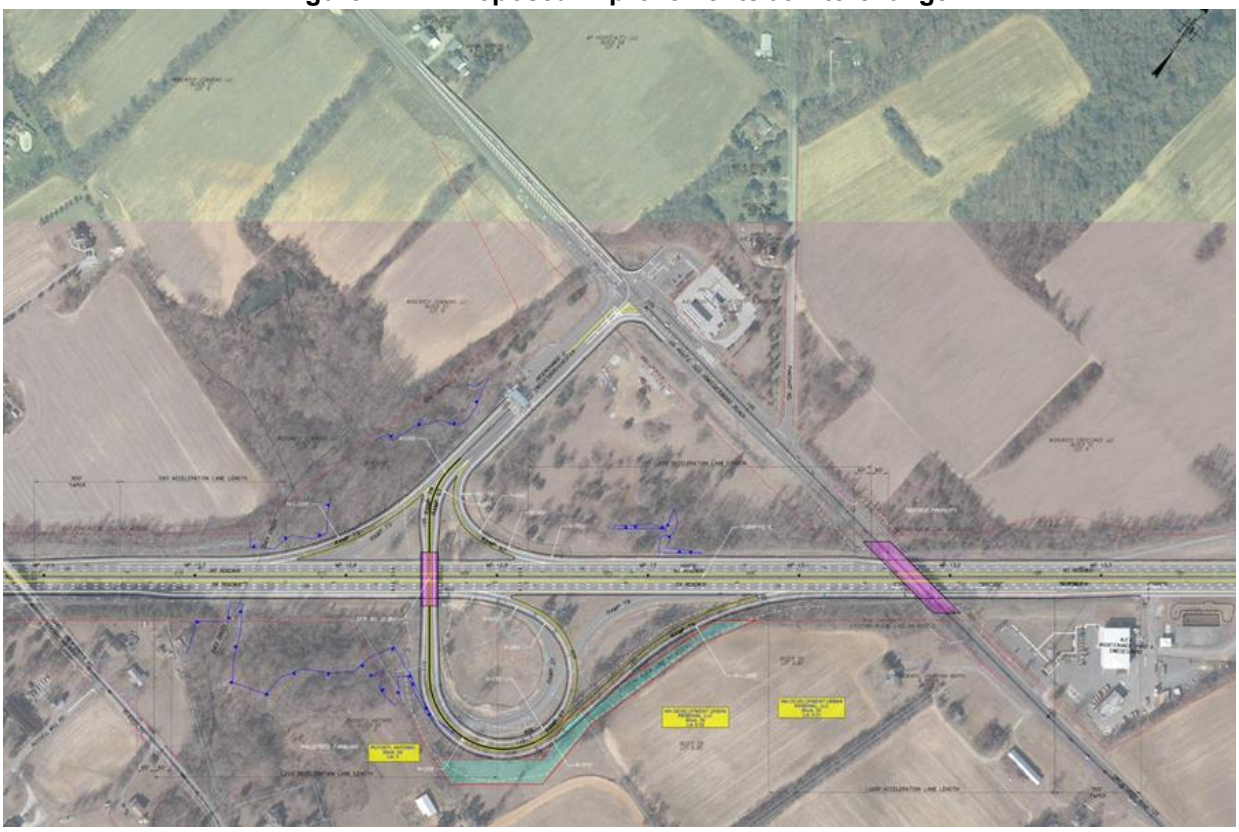
This EIS assesses the portion of Interchange 2 between the mainline and the existing toll plaza. The portion of Interchange 2 beyond the toll plaza to the US Route 322 intersection is under study by the NJTA in coordination with NJDOT and the municipality and will be the subject of a separate environmental review.

Table 2.4-2: Guide to the Interchange 2 Improvements

Interchange 2 Improvements - Key Features
• Realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration • Increase the minimum radius on Ramp ST to meet the NJTA's desirable minimum of 235 feet • Increase the radii of Ramps TS and TN to 1,000 feet to allow for a higher ramp merge speed • Replace and lengthen Structure No. 12.86A to accommodate the mainline capacity improvements • Provide congestion relief and safety improvements including standard acceleration and deceleration lanes
• Provide additional drainage and stormwater management facilities to address runoff from new impervious pavement • Relocate and restore existing interchange drainage and stormwater management facilities that are impacted by the Program
• Replace existing sign structures, lighting, ITS facilities, utilities, and retaining walls that support interchange operations

Source: AECOM 2022

Figure 2.4-1: Proposed Improvements at Interchange 2



Source: New Jersey Turnpike Interchanges 1 to 4 Capacity Improvements, Preliminary Design Report – Mainline (MP 3.5-36.5), 2022

2.4.1.3 Interchange 3 (MP 26.1)

Interchange 3 is located at MP 26.1 at the boundaries of the Township of Bellmawr and the Borough of Runnemede in Camden County. The interchange serves as a connection between the Turnpike and Black Horse Pike (NJ Route 168). As described in Section 2.2.1 (Mainline Improvements), the Program would provide improvements to existing Interchange 3 to address the Program purpose and need, address operational constraints, and achieve current design criteria. The proposed improvements at Interchange 3 are a refinement of Alternative 1, which was recommended as the IPA during the Concept Studies phase for Interchange 3 and refined during Preliminary Design. The Authority considered other designs for Interchange 3; however, those designs would have resulted in more impacts to residential and industrial properties on the SN roadway of the mainline. The refinement to Alternative 1 has the least impacts to residential, commercial, and industrial properties of the designs considered. **Table 2.4-3** provides a guide to the Interchange 3 improvements. A map of the Interchange 3 improvements is provided in **Figure 2.4-2**.

This EIS assesses the portion of Interchange 3 between the mainline and the existing toll plaza. The portion of Interchange 3 beyond the toll plaza to the NJ Route 168 intersection is under study by the NJTA in coordination with NJDOT and the municipalities and will be the subject of a separate environmental review.

Table 2.4-3: Guide to the Interchange 3 Improvements

Interchange 3 Improvements - Key Features
• Realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration • Provide a two-lane exit ramp for Ramp NT to allow additional storage capacity • Replace and realign Structure No. 26.13AR to accommodate the interchange design • Construct standard acceleration and deceleration lanes
• Provide additional drainage and stormwater management facilities to address runoff from new impervious pavement • Relocate and restore existing interchange drainage and stormwater management facilities that are impacted by the Program
• Replace existing sign structures, lighting, ITS facilities, utilities, and retaining walls that support interchange operations

Source**:** AECOM 2022

Figure 2.4-2: Proposed Improvements at Interchange 3

Source: New Jersey Turnpike, 2023.

2.4.1.4 Interchange 4 (MP 34.5)

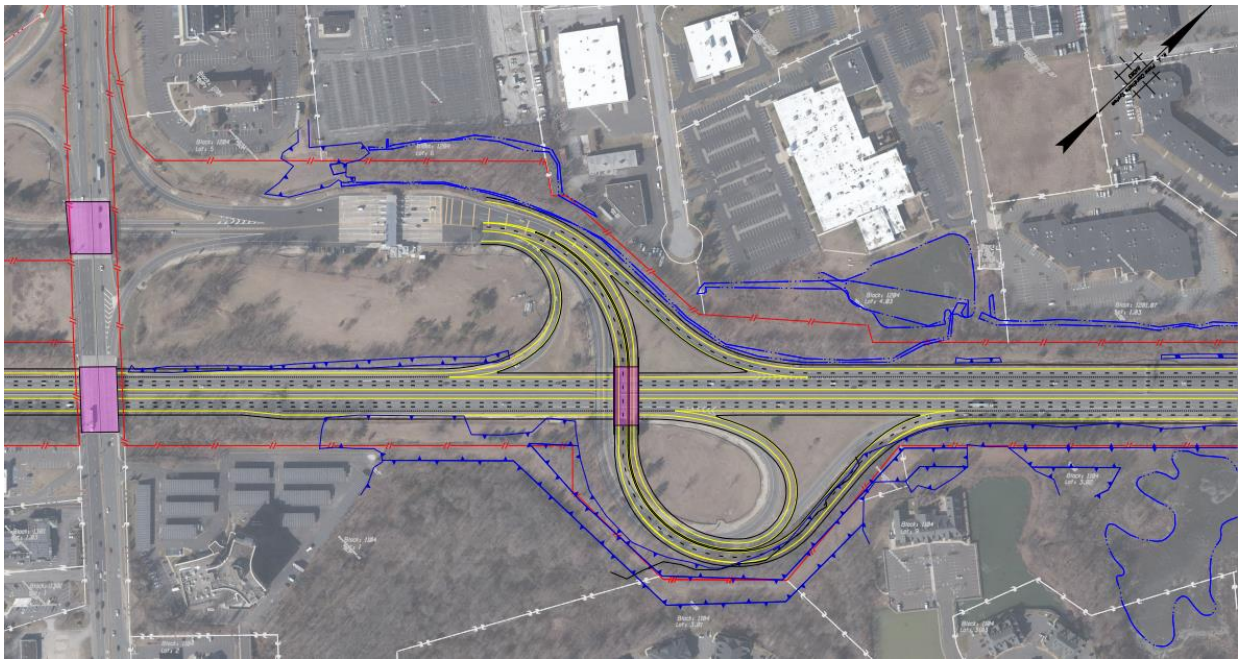
Interchange 4 is located at MP 34.5 in the Township of Mt. Laurel in Camden County. The interchange serves as a connection between the Turnpike and NJ Route 73. As described in Section 2.2.1 (Mainline Improvements), the Program would provide improvements to existing Interchange 4 to address the Program purpose and need, address operational constraints, and achieve current design criteria. The proposed improvements at Interchange 4 are a refinement of Alternative 3, which was recommended as the IPA during the Concept Studies phase for Interchange 4 and refined during Preliminary Design. **Table 2.4-4** provides a guide to the Interchange 4 improvements. A map of the Interchange 4 improvements is provided in **Figure 2.4-3**.

Table 2.4-4: Guide to the Interchange 4 Improvements

Interchange 4 Improvements - Key Features
• Replace and lengthen Structure No. 34.49A to accommodate the mainline improvements
• Realign Ramps ST, TN, NT, and TS to meet the new mainline roadway configuration • Provide a two-lane operation on Ramps TN and NT to maintain a minimum LOS • Increase the minimum radius on Ramp TN to meet the NJTA's desirable minimum of 235 feet for this high-volume ramp • Replace the two existing tapered acceleration lanes at Ramps TN and TS with parallel type lanes that conform to current AASHTO requirements for high-speed facilities
• Provide additional drainage and stormwater management facilities to address runoff from new impervious pavement • Relocate and restore existing interchange drainage and stormwater management facilities that are impacted by the Program
• Replace existing sign structures, lighting, ITS facilities, utilities, and retaining walls that support interchange operations

Source**:** AECOM 2022

Figure 2.4-3: Proposed Improvements at Interchange 4



Source: New Jersey Turnpike Interchanges 1 to 4 Capacity Improvements, Preliminary Design Report – Mainline (MP 3.5-36.5), 2022

2.5 OVERVIEW OF CONSTRUCTION ACTIVITIES

This section provides an overview of how construction of the Program could be undertaken. This overview is based on the design refinements as reported in the *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program, Preliminary Design Report* (AECOM, 2022). The report provides more details on Program construction considerations. Prior to the commencement of construction, the NJTA and its construction contractor(s) would develop specific construction sequencing plans. These plans would describe where construction would occur and the duration of those activities.

The NJTA plans to have several contractors building elements of the Program simultaneously. The NJTA would determine the method for constructing the Program during Final Design. The NJTA would remain responsible for the Program.

The NJTA and its contractor(s) would be guided during construction by Federal, state, and local laws and standards for construction activities related to the Program. In addition, the NJTA would apply its own standards and requirements that govern construction activities including, but not limited to, the NJTA's 2021 *Garden State Parkway New Jersey Turnpike Design Manual* (NJTA, 2021) with amendments and the NJTA's 2009 *Design Standards*.

2.5.1 Construction Schedule

The NJTA proposes to phase design and construction of the Program; the following are the Final Design contract sections:

- 2 - MP 3.5 to MP 6.2
- 3 - MP 6.2 to MP 9.0
- 4 - MP 9.0 to MP 14.5
- 5 - MP 14.5 to MP 20.4
- 6 - MP 20.4 to MP 26.2
- 7 - MP 26.2 to MP 31.3
- 8 - MP 31.3 to MP 36.5

Each design contract section would be broken down into construction contract segments; these segments are subject to change as the Program advances during Final Design.

The NJTA anticipates construction of the Program would take place between 2026 and 2039, with two sections being advanced for construction at a time beginning from north, to connect to the existing three-lane cross-section, to south along the mainline. This staggered approach would result in the more northerly sections to be further along in construction at any given time compared to the more southerly sections. The time to construct each Program segment would differ based on the types of construction activity required, site characteristics, weather, and other factors.

2.5.2 Typical Construction Activities

Table 2.5-1 identifies typical construction activity tasks, though actual construction activities and durations would be determined by the NJTA in coordination with its contractors during development of the Program construction plan during Final Design. Construction activity is likely to begin simultaneously in several sections of the Program to accommodate activities such as the mainline capacity improvements.

Table 2.5-1: Typical Construction Activities

Activity	Tasks
Pre-construction survey	Locate utilities, establish ROW and Program control points and centerlines, and relocate survey monuments
Site preparation	Relocate utilities and clear and grub ROW (demolition), establish haul routes, erect safety devices and mobilize special construction equipment, prepare construction equipment staging areas and stockpile materials, and establish maintenance of traffic
Heavy construction	Construct the structures, including foundation elements, construct mainline widening and interchanges, reconstruct adjacent roadways and sidewalks
Medium construction	Construct service area improvements, install drainage, minor earthwork, and roadway paving; a separate service area program would conduct service area improvements separately from this Program
Light construction	Finish work, install utilities and traffic signal elements, lighting, landscaping, signage and striping, clean up, and operational testing

Source**:** AECOM 2022

Constructability analyses enabled the NJTA to preliminarily identify construction staging for the mainline and the interchanges. The following sections briefly describe the preliminary construction plan that was developed by the NJTA during Preliminary Design.

2.5.2.1 Mainline Staging

Along the mainline, the first construction activity would be the replacement of structures that carry local roadways over the mainline and replacement of structures that are along the mainline. With that work completed, mainline construction staging would continue by temporarily converting the inside shoulder (adjacent to the median) to a temporary travel lane and shifting traffic to it to maintain two lanes of traffic in each travel direction. With the traffic temporarily shifted, the right travel lane would be closed, and construction of the additional travel lane and new right-side shoulder would occur.

Where mainline roadway profile adjustment is proposed, all traffic would be temporarily shifted to the opposite mainline roadway. For example, if profile adjustment work is being completed on the northbound roadway, both northbound and southbound traffic would temporarily be shifted to the southbound roadway. After the profile adjustment work on one of the roadways is completed, all traffic would be shifted to the other roadway to enable profile adjustment construction to be completed on the other roadway.

2.5.2.2 Interchange 2 Staging

Prior to initiating construction of Interchange 2, lengthening and replacement of the adjacent bridges along the mainline would be completed. Realigned Ramp TS would then be constructed with a temporary pavement tie-in to the existing Ramp TS, and it would then be opened to traffic. After the concrete island is removed and temporary pavement constructed, Ramp ST and TN would be shifted to the north side of the bridge, and the south portion of the replacement bridge would be constructed along a slightly off-line alignment to the south.

Following construction of the southern portion of the bridge, Ramp TN and Ramp ST traffic would be shifted to the new bridge and demolition of the existing bridge within a center work zone would proceed. The final stage would include demolition of the north portion of the bridge and construction of the remainder of the new bridge. Upon completion of this stage, the concrete island would be constructed on the bridge and final ramp tie-ins implemented. The construction work activity outside the toll plaza would be performed independently. During Final Design, coordination with NJDOT would be required concerning the widening along Swedesboro Road, including obtaining Allowable Lane Closure Hours.

2.5.2.3 Interchange 3 Staging

Structures No. 25.88 (NJ Turnpike over Route 168 [Black Horse Pike]) would be reconstructed first. Afterward, the north half of realigned Structure No. 26.13AR (Ramp ST and Ramp TN over the NJ Turnpike) would be constructed while traffic remains on the existing structure. Ramp NT would then be realigned. Realigned Ramp ST would be constructed and tied to the new structure as well as the realigned Ramp NT. Ramp ST traffic would then be shifted to the new bridge. Ramp TN would use the existing structure as the north half of the existing bridge is demolished and the southern half of the new Str. No. 26.13AR is constructed. When complete, Ramp TN would be realigned to the new structure and the remaining portion of the existing demolished. The abandoned Ramp ST, TN, and NT pavement would then be removed allowing for completion of the basins.

The construction work activity outside the toll plaza would be performed independently. The concrete median island between Ramps WT and TE would be removed and temporary pavement placed. By shifting traffic and making use of the shoulders, Structure No. 26.13B (NJ Turnpike Ramps WT and TE over Route 168) would be reconstructed in three main stages. Maintenance and Protection of Traffic (MPT) requirements would depend on the profile adjustment on Route 168. If existing grades on Route 168 are to be maintained, and the bridge is raised to achieve the required clearance, the MPT would be primarily limited to shoulder closings to allow construction of the new bridge piers. If Route 168 is to be lowered, then staged work across the roadway would be required and the center turn lane would be needed for northbound and/or southbound Route 168 traffic. During Final Design, coordination with NJDOT would be required concerning construction and MPT along Route 168.

2.5.2.4 Interchange 4 Staging

The proposed work at the interchange would include the replacement of Structure No. 34.49A and the realignment of all ramps. Minor adjustments to the toe of slope of Structure No. 34.21R would be necessary to construct the Ramp TS acceleration lane. Structure No. 34.49A would be lengthened to accommodate the addition of the third lane and acceleration/deceleration lanes associated with Ramps TN, ST, NT, and TS. This lengthening would necessitate the replacement of Structure No.. 34.49A as well as sign structures No. 34.31N, 34.48N, 34.60S and 34.75S within construction pre-stage 1.

The realigned Ramp TN would be constructed with temporary pavement tie-ins to the existing pavement during stage 1 while traffic is still traveling on the existing bridge. Portions of the proposed lane and shoulder pavement for Ramps NT, TS and ST would be constructed while maintaining traffic on the remaining pavement.

During stage 2, as traffic is transitioned to the new pavement for Ramps NT and TS, a temporary pavement tie-in would be constructed for Ramp ST existing pavement. Ramp ST traffic would be transitioned to the new pavement while Ramp TN maintains traffic on existing pavement. Also, during stage 2, Ramp TN and ST pavement approaching the new bridge structure would be constructed.

During stage 3, while maintaining traffic on the existing bridge, the portion of pavement for Ramp TN would be constructed as well as the remaining pavement for Ramp ST. Following the construction of remaining portions of pavement for Ramps ST and TN, the traffic would be shifted to the new bridge and then demolition of the existing structure would occur within the work zone.

Figure 2.5-1 illustrates typical construction activity for ramps at the interchanges. **Figure 2.5-2** illustrates typical construction activity to add a travel lane in each direction on the Turnpike. The **Figure 2.5-3** illustrates typical bridge construction activity of the Turnpike. NJTA would determine actual construction activities and equipment needs during development of the Program construction plan during the Final Design phase of the Program.

Figure 2.5-1: Ramp Construction

Aerial view of construction activity at Turnpike Interchange 7 during the NJTA's Interchange 6 to 9 Widening Program. Note that construction activity at Interchanges 2, 3, and 4 would be less complex than shown in this photograph (fewer ramps and bridges, and less cost).

Source**:** njturnpikewidening.com

Figure 2.5-2: Construction of Additional Travel Lanes

Aerial view of mainline construction work on the Turnpike during the NJTA's Interchange 6 to 9 Widening Program. Note that construction activity on the Program mainline would be less complex than shown in this photograph (only one travel lane as opposed to three, and less cost).

Source: AECOM 2022

Figure 2.5-3: Bridge Construction over Turnpike

View of new bridge under construction over the Turnpike during the NJTA's Interchange 6 to 9 Widening Program.

Source: njturnpikewidening.com

2.5.3 Construction Contract Packages

The NJTA expects to enter into contracts with multiple construction contractors to build the Program. The NJTA has preliminarily estimated that each Final Design segment will include one or two construction contracts, each covering a specific geographic area and including the design elements that occur within the geographic area (AECOM, 2022). Each contract would operate independently of the rest of the Program. A particular contractor may be awarded more than one contract.

During construction, the contractors would maintain two traffic lanes through staged construction, limiting each work zone to approximately 10,000 feet. Current NJTA policy requires a three mile spacing between lane closures, which will stagger the roadway and bridge work throughout the Program corridor.

2.5.4 Relationship to Other Planned Development

Section 4.2.2.4 (Economic Development) of this EIS describes a number of planned development projects by others in the Program area, such as warehouse development in Woolwich Township near Interchange 2 and a 121-unit residential townhome community in East Greenwich Township near Mantua Road (MP 18.0 - MP 18.3). The NJTA would maintain awareness of these projects through coordination with municipalities as the Program advances.

2.5.5 Construction Plan

The NJTA would develop and implement a construction plan prior to the start of Program construction. The plan would identify procedures and protocols for minimizing impacts to transportation and natural and human environments during Program construction. The activities described in this section are preliminary and subject to change as the Program design advances. The potential impacts of construction result from several activities:

Haul routes and access points - Construction of the Program would require designated routes and access points for workers, construction materials, and equipment to, from, and within Program construction sites as well as for removing excess materials from the sites. The NJTA would coordinate with NJDOT, the counties, and the municipalities to identify haul routes and site access points. Construction site access points would be established where workers, materials, and equipment enter the staging areas or the site and where equipment and unwanted materials leave the site. Where reasonably feasible, access points would be located at staging areas to reduce the need for additional movements of material and equipment. By limiting access points to specific locations, the NJTA would minimize impacts to surrounding properties and resources and limit potential impacts on the transportation network. Potential haul routes would be identified on public roads to move equipment and materials to construction site access points as well as to remove unwanted materials.

Staging Areas - The limit of disturbance (LOD) described in the EIS delineates the permanent operations and temporary construction work areas within which Program activities would occur to the extent they can reasonably and feasibly be defined at the current level of design

(Appendix B - LOD Map). The LOD accommodates likely areas where construction equipment would operate and where construction materials would be stored and moved from the ground to elevated work areas. The Program contractors would be responsible for identifying actual locations for equipment and materials during construction activities and for obtaining approvals for such locations if they differ from those defined in the contract documents. Reasons for the NJTA and its contractors choosing other staging areas may include site constraints such as existing terrain, existing development, and the roadway network. Depending on construction sequencing needs and feasibility, land area needs and impacts may be minimized by locating some staging areas on sites designated for permanent Program elements, such as interchange areas inside interchange loop ramps.

Activities and Sequencing - The range of construction work to be performed would include excavation; installation of at-grade facilities, such as the mainline widening; construction of the structures that carry roadways over the Turnpike and other roadways; and construction of related infrastructure such as drainage, signage, highway lighting, traffic signals, and utilities. Construction sequencing would be determined when detailed construction activities are more fully developed, but the NJTA expects that multiple elements of the Program would be under construction simultaneously and the Program would be built in sections. Because some construction activities would take longer than others, such as constructing bridges, some areas along the Turnpike would potentially be affected for longer time periods than others.

Transportation Management - Prior to construction, the NJTA would develop and implement a maintenance and protection of traffic (MPT) plan for the Program construction. The NJTA would develop the MPT in coordination with other providers of roadway, transit, and emergency services to minimize adverse impacts to transportation. The MPT Plan would include, but may not be limited to, schedule and timeline, public information and outreach program, a monitoring plan, and a maintenance of traffic plan that includes traffic control, temporary lane closures, transit, and roadway operations management, including transit service adjustments and substitute services, bicycle and pedestrian accommodation, and parking accommodation for affected non-residential property owners.

The NJTA would be responsible for implementing the MPT Plan's public information and outreach program, which is intended to inform motorists, transit riders, residents, businesses, schools, emergency service and delivery providers, and the public of temporary changes to traffic patterns, and transit services. Appropriate lines of communication would be maintained with emergency service providers throughout construction regarding current and upcoming construction activities, potential issues, and planned route changes.

Environmental Compliance – Environmental permits and approvals for the Program would become part of the construction plans to ensure compliance of the construction activities with applicable Federal, state, and local requirements.

Environmental Impact Statement

Chapter 3 Traffic and Safety Effects

June 2024

Prepared for

Prepared by

AECOM

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3 TRAFFIC AND SAFETY EFFECTS

3.1 INTRODUCTION

This chapter describes three traffic and safety conditions within and near the Program corridor: the baseline, the forecasted future under the No-Build Alternative, and the forecasted future with the NJTA's IPA. Long-term operations as well as short-term construction phase traffic and safety conditions for the NJTA's IPA are described. Measures the NJTA has incorporated into the IPA to minimize and mitigate traffic and safety impacts are identified. More detail regarding traffic and safety conditions can be found in the *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)* (AECOM, 2022).

In addition, alternative transportation opportunities in Program corridor counties are described in Section 2.1.5 (Public Transit).

3.2 REGULATORY CONTEXT

The NJTA is directed by its enabling legislation (NJ Statute § 27:23-1) to construct, maintain, and operate the Turnpike as a modern express highway, and to remove congestion and hazardous conditions to allow vehicular traffic to operate on a non-congested Turnpike mainline and interchanges in a manner that does not expose motorists to hazardous conditions. To achieve this direction, the NJTA uses LOS C or better as a benchmark for acceptable operations along the Program's mainline. LOS C or better allows near to free-flow conditions, which is acceptable for freeway operational design in the suburban/rural area in which the Program is located. This is in contrast to other sections of the Turnpike mainline that exist in dense urban settings, where an LOS D can be considered acceptable for freeway operational design due to overall higher traffic volumes, the public's willingness to accept, and substantial cost of improvements in urban settings. From the 2017 Report[1]:

> *The Authority uses LOS 'C' as a benchmark for the operation of each roadway segment in its jurisdiction, as documented in the Strategic Plan. In congested or urban areas, many other agencies accept LOS 'D' for freeway operational design. It is understandable that the Authority desires to avoid operations at LOS 'D' (or worse) when queues are susceptible to form for even minor incidents. HNTB is using the LOS 'C' benchmark as a threshold for considering roadway widening under this study.*

The use of different LOS thresholds for urban and rural facilities is supported by the Chapter 10 of the Highway Capacity Manual (7th Edition, 2022), which notes that motorists in non-urban settings have higher LOS expectations for freeway facilities. This is also supported by the AASHTO Green Book (2018), which notes that motorists generally accept different levels of congestion based on the nature of a transportation facility and duration of the trip. Table 2-3 in the AASHTO Green Book references LOS C and D as customary design levels of service for freeways in suburban and urban settings.

[1] Note: The 2017 Report references the NJTA Strategic Plan in effect at that time.

LOS qualitatively describes the operating conditions of a roadway or facility based on such factors as speed, travel time, maneuverability, delay, and safety. LOS indicates the degree of maneuverability within the traffic stream. The LOS criteria for basic freeway sections are provided in **Table 3.2-1**. LOS A describes completely free-flow conditions with densities of up to 11 passenger cars per mile per lane (pc/mi/ln), while LOS F represents forced break down flow with densities in excess of 45 pc/mi/ln.

Table 3.2-1: Basic Freeway Sections - LOS Criteria

LOS	Density Range (Passenger Cars per Mile per Lane)
A	0 to 11
B	>11 to 18
C	>18 to 26
D	>26 to 35
E	>35 to 45
F	>45

Source: Highway Capacity Manual, 6th Edition (2016)

3.3 METHODOLOGY AND DATA SOURCES

The primary Program study area for traffic assessment includes the Turnpike mainline from MP 3.5 to MP 36.5, for a length of 33 miles. The primary study area also includes the interchanges and associated ramp systems between the mainline and the interchange toll plazas. There are three interchanges, with associated ramps and toll plazas, within the Program area. These interchanges include:

- Interchange 2 at MP 12.9;
- Interchange 3 at MP 26.1;
- Interchange 4 at MP 34.5.

The secondary Program study area for traffic assessment extends in all directions to cover the geographic area that would have a direct effect on the Program in terms of shifts in traffic patterns to north-south roadways; socioeconomic and demographic influences on trip generation; and distribution, patterns of travel, and modes of transportation.

To assess traffic operating conditions in the primary study area, a detailed capacity and LOS analysis was conducted for the Turnpike mainline sections between interchanges and local signalized intersections that are in close proximity to a Turnpike interchange.

Traffic data collected for analyses performed for the Program was obtained from the following sources for the years stated:

- NJDOT Traffic Monitoring System (2017-2019)
- DVRPC Travel Monitoring Count (2017-2019)
- SenSys puck traffic data supplied by NJTA's Operations Department (2017 through 2021)

- Toll Plaza volume data supplied by the NJTA's Operations Department (2019 and 2021)
- Turnpike Origin-Destination patterns by toll plaza, supplied by NJTA's Operations Department (2019)
- Origin-Destination patterns outside Turnpike ticket system obtained through Streetlight (2019)
- Traffic count data obtained through Streetlight (2019)
- Crash data records, supplied by NJTA's Operations Department (2017 through 2019)
- Crash data records, obtained through NJDOT Safety Voyager (2017 through 2019)

Other projects and/or studies within the Program area that also contributed traffic data included the following:

- I-295/NJ Route 168 Concept Development Study, commissioned by NJDOT (currently underway)
- N.J. Route 73 Corridor Improvements, Church Road to I-295, commissioned by NJDOT (currently underway)
- Traffic Impact Study for Proposed Warehouse Development, prepared by Consulting Engineering Services, LLC, latest revision March 2021 (development located along US Route 322, east of Turnpike crossing)

Upon completing the data collection, the NJTA identified gaps in the data and developed a traffic data collection program to obtain the missing information. These data were used to supplement the available data for analysis. The data collection program included manual turning movement counts (TMC) and automatic traffic recorder (ATR) counts collected during June 2021.

To evaluate the impacts of the Program, a planning analysis was conducted using the DVRPC Travel Improvement Model (TIM). This planning-level regional travel demand model consists of four basic travel demand steps: vehicle trip generation, vehicle trip distribution, travel mode choice, and travel route assignment. The extent of this model includes all 9 member counties in the DVRPC metropolitan area, plus an extended area covering 16 counties spanning across New Jersey, Pennsylvania, Delaware, and Maryland.

Traffic volumes developed for the Program were produced using a Base Year of 2019, reflecting pre COVID-19 pandemic traffic volumes and patterns. This Base Year was chosen because the pandemic was still on-going when the analysis was prepared, as were the impacts of the pandemic on traffic volumes and patterns. The long-term impacts of the pandemic are not yet fully understood, and the version of the DVRPC TIM on which the traffic volume forecasts are based did not account for pandemic impacts.

The DVRPC TIM was then retrofitted with the latest sociodemographic information and planned projects in the adopted Transportation Improvement Program plan in the primary and secondary study areas. Because of the availability of this reasonably foreseeable sociodemographic information and planned projects data for the future condition in 2040, year 2040 was selected

as the Program Design Year. Using this sociodemographic information and data on planned projects, traffic and travel patterns were generated by TIM. The forecasted traffic volumes were then used to develop highway network growth rates and apply those rates to the base traffic volumes to establish Design Year 2040 No-Build Alternative and IPA traffic volumes for weekday AM, weekday PM, and summer Friday PM peak hours.

Analysis techniques, including Synchro, VISSIM, and the Highway Capacity Manual, were used to evaluate and compare existing and projected traffic operations represented by the Base Year 2019 and Design Year 2040 traffic volumes.

Existing and No-Build analyses assumed the existing mainline geometric configuration of two lanes in each direction. The IPA analyses assumed the capacity improvements would be in place: three lanes in each direction. Because traffic volumes and roadway conditions vary along the mainline and at each interchange, the analyses examined each segment of the mainline between the interchanges individually, the section north of Interchange 4, and each of the Interchanges 2, 3, and 4.

The 2040 No-Build Alternative assumes no Program-related changes to the roadway network. However, improvements planned by others were assumed to be completed, such as the I-295 Missing Moves at NJ Route 42, I-76/I-295/NJ Route 42 Direct Connect project, and NJ Route 73 corridor improvements (Section 2.1.1 [No-Build Alternative]).

Using the same 2019 Base Year volumes, traffic was projected for the 2040 IPA condition. The 2040 IPA condition was modeled assuming a six-lane roadway along the length of the Turnpike within the Program limits. Similar to the No-Build forecast, other known projects, geometric changes, and assumed developments occurring in the region have been included in the forecast models. Volumes were forecasted for each of the Turnpike sections (between each interchange) from Interchanges 1 to 5 for the weekday AM and PM peak hours and the summer Friday PM peak hour in both the northbound and southbound directions.

3.4 AFFECTED ENVIRONMENT

This section describes existing traffic conditions along the Program mainline and at Interchanges 2, 3, and 4. In addition, this section discusses other roadway facilities as relevant (local, county, and state interstate highways, and other roadways) in the Program area.

3.4.1 2019 Base Year Traffic Conditions - Mainline

3.4.1.1 Traffic Volumes and LOS

In the 2019 Base Year condition, the analysis results show that all segments of the mainline operated at LOS C or better for each of the three peak hours, except for one location. The NS roadway and SN roadway segments between Interchanges 3 and 4 operated at a LOS D during the summer Friday PM peak hour in the 2019 Base Year.

Additional mainline analysis considered the highest traffic volumes encountered on the Turnpike, which do not normally occur during the weekday peak hours. These volumes included highest seasonal averages, maximum recorded volumes, and highest volumes in

congested areas. **Table 3.4-1** though **Table 3.4-3** show 2019 Base Year traffic volumes and LOSs for these categories. Note that the mainline north of Interchange 4 contains three lanes in each direction. Included with the traffic volumes are heavy vehicle percentages and average speeds. Results of the analysis indicate the following:

- Between Interchanges 3 and 4, the mainline operated at LOS D under the Highest Seasonal Average Volumes.
- Two of the eight mainline sections, also between Interchanges 3 and 4, operated at LOS D under Maximum Recorded Volumes.
- All six mainline sections will operate at LOS E or worse operations for the Highest Volumes in Congested Conditions.
- .

3.4.1.2 Traffic Operations During Incident Response

During an incident on the Turnpike, three traffic control outcomes are possible in the 2019 Base Year: move traffic off the travel way (no travel lanes are closed), partially block the travel way (one lanes and/or shoulder are closed), and full closure of the travel way (all travel lanes and shoulders are closed). A one lane closure in the 2019 Base Year would result in at least a 50 percent reduction in roadway capacity for the duration of the incident.

Table 3.4-1: 2019 Base Year LOS Analysis: Highest Seasonal Average Volumes

N.J. Turnpike Section	Roadway	Highest Seasonal Average Volumes				
		2019 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	2,956	2.3	C	63.1	24.4
	SN	2,936	2.2	C	65.1	24.2
Between Interchanges 2 - 3	NS	2,965	2.5	C	69.3	24.1
	SN	2,944	2.3	C	66.4	24.3
Between Interchanges 3 - 4	**NS**	**3,398**	**2.5**	**D**	65.2	**28.4**
	SN	**3,139**	**2.1**	**D**	65.1	**26.2**
North of Interchange 4	NS	3,931	2.3	C	69.8	20.4
	SN	3,990	2.2	C	69.7	20.7

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Note: Bolded values indicate a LOS level below C. .

Table 3.4-2: 2019 Base Year LOS Analysis: Maximum Recorded Volumes

N.J. Turnpike Section	Roadway	Maximum Recorded Volumes				
		2019 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	3,175	2.7	C	71.9	24.1
	SN	3,076	2.2	C	64.3	26.0
Between Interchanges 2 - 3	NS	3,185	10.6	C	72.3	25.9
	SN	3,142	2.3	C	66.3	25.8
Between Interchanges 3 - 4	**NS**	**3,523**	**2.5**	**D**	**65.2**	**29.3**
	SN	**3,394**	**2.1**	**D**	**67.0**	**27.5**
North of Interchange 4	NS	4,384	2.3	C	69.4	22.9
	SN	4,351	3.4	C	70.3	22.7

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Note: Bolded values indicate a LOS level below C.

Table 3.4-3: 2019 Base Year LOS Analysis: Highest Volumes in Congested Conditions

N.J. Turnpike Section	Roadway	Highest Volumes In Congested Conditions				
		2019 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	**NS**	**3,147**	**9.3**	**E**	**41.0**	**44.6**
	SN	N/A				
Between Interchanges 2 - 3	NS	N/A				
	SN	**2,932**	**2.3**	**F**	**30.0**	**53.2**
Between Interchanges 3 - 4	**NS**	**3,397**	**2.5**	**E**	**48.0**	**38.6**
	SN	**3,280**	**2.1**	**E**	**41.0**	**43.4**
North of Interchange 4	**NS**	**4,330**	**2.3**	**E**	**40.0**	**39.7**
	SN	**3,555**	**3.4**	**D**	**39.0**	**33.4**

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5).*

Note: Bolded values indicate a LOS level below C.

3.4.2 2019 Base Year Traffic Conditions – Interchanges 2, 3, and 4

Interchange 2. Interchange 2 is located on the Turnpike mainline at MP 12.9. Interchange 2 is a trumpet interchange providing connections between the Turnpike and Swedesboro Road (US Route 322) in the Township of Woolwich, Gloucester County. Single-lane ramps to and from the Turnpike access the toll plaza, which provides a total of four toll lanes serving exiting and entering traffic. The connection to US Route 322 is at a signalized intersection that also provides access to a gas station/convenience store and park-and-ride lot. **Figure 3.4-1** is a location map of the interchange.

Figure 3.4-1: Turnpike Interchange 2

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*

In the 2019 Base Year condition, the analysis indicates that the current single-lane configuration of the ramps between the Turnpike and the toll plaza had sufficient capacity to maintain an LOS C. Likewise, the existing number of toll plaza lanes and the toll plaza configuration was sufficient. Of concern is that the intersection signal phasing and turning traffic volumes on the Turnpike ramp approach to US Route 322 were causing ramp traffic to queue into the toll plaza exit area and sometimes through the plaza. While the 2019 Base Year analysis results in **Table 3.4-4** show LOS D or better for all approaches during both peak hours, the maximum queue shown for the Turnpike ramp approach during the weekday PM peak hour exceeded the 500-foot available distance between the toll plaza area and the intersection stop line.

Table 3.4-4: Summary of Intersection Capacity Analysis – US Route 322/Turnpike Ramps – 2019 Base Year Traffic Volumes

MOVEMENT	WEEKDAY AM PEAK HOUR					WEEKDAY PM PEAK HOUR				
	2019 BASE YEAR					2019 BASE YEAR				
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec/veh)	QUEUE (ft)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec/veh)	QUEUE (ft)
EB L	12	C	0.05	24.2		8	B	0.02	17.5	
EB T	322	D	0.69	36.3		521	D	0.83	37.1	
EB R	219	A	0.39	5.4		96	A	0.18	4.3	
WB L	447	D	0.93	42.3	196	139	C	0.70	31.9	102
WB T	345	B	0.41	13.7		304	B	0.38	14.4	
WB R	9					2				
NB L	**186**	**D**	**0.70**	**41.1**	**241**	**390**	**D**	**0.88**	**50.1**	**522**
NB T	**11**					**13**				
NB R	100	A	0.20	6.1		422	A	0.53	5.4	
SB L	28	C	0.24	23.6		18	C	0.07	22.3	
SB T	100					15				
SB R	22	A	0.04	0.1		17	A	0.03	0.1	

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bold text indicates queue length exceeds available vehicle storage capacity on the ramp.

Interchange 3. Interchange 3 is located on the Turnpike mainline at MP 26.1. Interchange 3 is a double-trumpet interchange configuration providing connection between the Turnpike and Black Horse Pike (NJ Route 168) through a six-lane toll plaza. The ramps between the toll plaza and the Turnpike each consist of a single lane. Ramps between the toll plaza and NJ Route 168 also consist of a single lane. **Figure 3.4-2** is a location map of Interchange 3. Black Horse Pike experiences heavy traffic, including truck traffic, in part because it serves as a direct connection to I-295 approximately one mile west (truly north) of the Turnpike interchange. The NJDOT has a project in Concept Development for improvements at the NJ Route 168/I-295 interchange.

Figure 3.4-2: Turnpike Interchange 3

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*

Analysis of the Interchange 3 ramps in the 2019 Base Year condition indicates that Ramp TN should carry two lanes instead of the existing one lane in order to accommodate existing traffic volumes. The existing single-lane configuration of the other three ramps had suitable capacity to maintain LOS C or better. Analysis of the toll plaza indicates that the existing number of toll plaza lanes and current toll collection configuration were sufficient in the 2019 Base Year.

The ramp lanes exiting the toll plaza approached capacity during the weekday PM peak hour. Because the ramp junctions with N.J. Route 168 are currently controlled by yield signs, the following two signalized intersections immediately north of the Turnpike ramps were analyzed: the Benigno Boulevard and Browning Road crossings. **Table 3.4-5** and **Table 3.4-6** present the results of the analyses for the 2019 Base Year at these intersections. The results indicate LOS levels of below C occurred on most approaches to the N.J. Route 168 and Browning Road intersection in the 2019 Base Year and on many approaches to the N.J. Route 168 and Benigno Boulevard intersection in the same year.

Table 3.4-5: 2019 Base Year LOS Analysis: N.J. Route 168 and Browning Road

MOVEMENT	WEEKDAY AM PEAK HOUR				WEEKDAY PM PEAK HOUR			
	2019 BASE YEAR				2019 BASE YEAR			
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)
EB L	**152**	**F**	**1.21**	**180.0**	**168**	**F**	**1.38**	**239.7**
EB T	**210**	**E**	**0.78**	**57.8**	**298**	**F**	**1.06**	**105.9**
EB R	**72**				**76**			
WB L	**111**	**D**	**0.61**	**46.6**	**82**	**E**	**0.67**	**56.4**
WB T	**301**	**F**	**1.08**	**112.1**	**345**	**F**	**1.19**	**147.3**
WB R	**89**				**77**			
NB L	72	B	0.31	**11.7**	**163**	**D**	**0.78**	**34.0**
NB T	**787**	**E**	**1.04**	**70.4**	**672**	**D**	**0.98**	**53.5**
NB R	**35**				**73**			
SB L	81	C	0.51	**24.5**	**121**	**D**	**0.75**	**45.3**
SB T	611	C	0.79	**30.4**	**590**	**D**	**0.86**	**35.9**
SB R	69				123			

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

The results of the signalized intersection analysis are informative but can also be misleading. The N.J. Route 168/Browning Road intersection appears to be a primary source for roadway congestion on N.J. Route 168 by virtue of the failing LOS (E or F) and volume-to-capacity ratios greater than 1.00 on the mainline and side streets. Vehicular queue lengths on the northbound approach to the intersection range from 800 to 970 feet, depending on the peak hour, which extends near or through the adjacent signalized intersection at Benigno Boulevard. Given that the friction of driveway and side street movements was not modelled for in this analysis, the actual vehicular queue lengths are likely to be worse than those reported. The misleading aspect of the analysis result is the high LOS on the N.J. Route 168 northbound approach at Benigno Boulevard (LOS A during both weekday peak hours), given the vehicular queues that extend southward from the upstream Browning Road intersection.

Table 3.4-6: 2019 Base Year LOS Analysis: N.J. Route 168 and Benigno Boulevard

MOVEMENT	WEEKDAY AM PEAK HOUR 2019 BASE YEAR				WEEKDAY PM PEAK HOUR 2019 BASE YEAR			
	VOLUME	LOS	V/C RATIO	DELAY	VOLUME	LOS	V/C RATIO	DELAY
EB L	125	**F**	**0.93**	**101.4**	**135**	**F**	**1.01**	**122.4**
EB T	1				4			
EB R	274	B	0.68	13.6	141	B	0.49	12.8
WB L	**4**	**D**	**0.03**	**38.8**	**3**	**D**	**0.03**	**38.8**
WB T	**1**				**2**			
WB R	6	A	0.03	0.2	8	A	0.04	0.2
NB L	263	A	0.62	8.2	322	B	0.76	14.5
NB T	763	A	0.69	9.7	765	A	0.69	9.7
NB R	2				2			
SB L	5	A	0.01	7.4	11	A	0.03	7.5
SB T	651	B	0.63	14.7	651	B	0.63	14.7
SB R	138	A	0.15	1.7	86	A	0.10	1.9

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

VISSIM models were developed to simulate the existing 2019 Base Year condition on N.J. Route 168 between the Turnpike and Browning Road and to confirm the magnitude of vehicular queues from the 2019 analysis results. These models showed maximum vehicular queue lengths of up to 1,020 feet extending from the Browning Road intersection on N.J. Route 168 northbound. These vehicular queue lengths were measured during the weekday AM and PM peak hours and would extend through the upstream intersection at Benigno Boulevard. In addition, vehicular queues of up to 775 feet, measured during the weekday PM peak hour, extended upstream from the Benigno Boulevard intersection along N.J. Route 168 northbound, which would extend past the Ramp TW entrance.

Interchange 4. Interchange 4 is located on the Turnpike mainline at MP 34.5. Interchange 4 is a trumpet interchange that provides connections between the Turnpike and NJ Route 73 in the Township of Mt. Laurel, Camden County. **Figure 3.4-3** provides a location map of the interchange.

NJ Route 73 experiences heavy traffic because it has a direct connection to I-295 approximately 0.75 miles north of the Turnpike. The NJDOT is currently progressing a project to construct improvements along NJ Route 73 between the I-295 interchange to the north of the Turnpike and Church Road intersections south of the interchange. These improvements would address congestion along the corridor, including connections with the Turnpike.

Single lane Ramps NT and ST experienced congestion in the 2019 Base Year. The existing measure in place to address ramp congestion during the weekday AM peak hour was signing on Ramp NT, which permitted use of the right shoulder of the ramp if the ramp lane is congested.

Figure 3.4-3: Turnpike Interchange 4

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Regarding toll plaza operations, the existing number of toll plaza lanes and current toll collection configuration was sufficient for traffic volumes passing through the toll plaza at Interchange 4.

Because the ramp junctions with N.J. Route 73 are currently controlled by yield signs, two signalized intersections were analyzed along the N.J. Route 73 corridor at this interchange. The N.J. Route 73/Fellowship Road intersection, north of the Turnpike interchange, is one of the reasons for the recurring queuing that occurs on Ramp TW during the weekday AM peak hour. The N.J. Route 73/Rogers Walk intersection, located south of the interchange, was also analyzed. **Table 3.4.7** and **Table 3.4-8** show the 2019 Base Year analysis for the two intersections.

This analysis shows LOS E and F for several lane groups at each of the intersections. Of note is the northbound approach at the N.J. Route 73/Fellowship Road intersection, which consistently shows LOS D for the protected left turn movement, while the shared through/right turn lanes operate consistently at LOS E or F with volume-to-capacity (v/c) ratios above 1.00. At the N.J. Route 73/Rogers Walk intersection, several turning movements, specifically the side street left turn and the southbound left turn all operate at LOS E, based on the control delays indicated.

Table 3.4-7: 2019 Base Year LOS Analysis: N.J. Route 73 and Fellowship Road

MOVEMENT	WEEKDAY AM PEAK HOUR 2019 BASE YEAR				WEEKDAY PM PEAK HOUR 2019 BASE YEAR				SUMMER FRIDAY PM PEAK HOUR 2019 BASE YEAR			
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)
EB L	**239**	**D**	**0.61**	**48.4**	**420**	**E**	**0.9**	**72.0**	**404**	**E**	**0.87**	**66.1**
EB T	**738**	**E**	**0.87**	**61.2**	**446**	**D**	**0.62**	**53.2**	**434**	**D**	**0.57**	**51.0**
EB R	152	A	0.31	8.9	**408**	**D**	**0.89**	**51.8**	**430**	**E**	**0.92**	**55.3**
WB L	**170**	**E**	**0.48**	**56.1**	**334**	**E**	**0.58**	**56.3**	**352**	**E**	**0.63**	**58.2**
WB T	264	**E**	**0.68**	**59.5**	**340**	**E**	**0.84**	**70.4**	**335**	**E**	**0.84**	**69.9**
WB R	298	C	0.68	33.9	**455**	**F**	**1.01**	**81.1**	**438**	**E**	**0.98**	**72.8**
NB L	73	C	0.48	31.4	**107**	**D**	**0.65**	**44.2**	**103**	**D**	**0.63**	**42.5**
NB T	**2,118**	**F**	**1.13**	**97.5**	**2,143**	**F**	**1.10**	**87.1**	**2,061**	**E**	**1.05**	**70.0**
NB R	**578**				**322**				**310**			
SB T	**2,153**	**D**	**0.91**	**47.7**	**1,974**	**D**	**0.94**	**53.5**	**2,083**	**E**	**0.98**	**59.8**
SB R	604	B	0.70	12.5	301	A	0.44	7.8	317	A	0.46	9.1

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Note: Bolded values indicate a LOS level below C.

Table 3.4-8: 2019 Base Year LOS Analysis: N.J. Route 73 and Rogers Walk

MOVEMENT	WEEKDAY AM PEAK HOUR 2019 BASE YEAR				WEEKDAY PM PEAK HOUR 2019 BASE YEAR				SUMMER FRIDAY PM PEAK HOUR 2019 BASE YEAR			
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)
EB L	**12**	**E**	**0.11**	**58.7**	**118**	**F**	**0.86**	**102.4**	**117**	**F**	**0.85**	**101.5**
EB R	1	A	0.01	0.0	8	A	0.04	0.4	8	A	0.04	0.4
WB L	**62**	**E**	**0.29**	**60.9**	**145**	**E**	**0.54**	**64.6**	**147**	**E**	**0.55**	**64.9**
WB R	40	A	0.23	2.7	116	B	0.51	16.8	115	B	0.50	16.8
NB T	2221	C	0.78	23.5	2222	B	0.71	15.3	2209	B	0.71	15.2
NB R	55	A	0.06	0.3	55	A	0.05	0.2	55	A	0.05	0.2
SB L	**295**	**E**	**0.87**	**61.1**	90	C	0.55	30.9	91	C	0.55	31.2
SB T	1742	A	0.63	5.6	1701	A	0.66	7.3	1729	A	0.67	7.4
SB R	51	A	0.04	0.9	10	A	0.01	0.0	10	A	0.01	0.0

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Note: Bolded values indicate a LOS level of below C.

The distance between the northbound stop line at the N.J. Route 73/Fellowship Road intersection and the entrance from Turnpike Ramp TW is about 600 feet. The range of vehicular queue lengths that extend from the stop line is reported to be between 964 feet (the shortest average vehicular queue of the three time periods) and 1,300 feet (the longest 95th percentile vehicular queue of the three time periods), but actual 95th percentile vehicular queues may be considerably longer because demand exceeds capacity (LOS F). While Ramp TW enters N.J. Route 73 northbound in its own travel lane, weaving maneuvers occur, both within the short distance between Ramp TW and the intersection, but also between Ramp TW and the downstream ramp to I-295 northbound, which is a lane drop. Traffic on Ramp TW wanting to make left turns at Fellowship Road would need to cross the two through lanes of N.J. Route 73 to make that turn, while additional weaving movements occur between N.J. Route 73 traffic destined to I-295 northbound and Ramp TW traffic desiring to remain on N.J. Route 73 northbound.

3.4.3 Existing Safety Conditions

This discussion of safety conditions uses crash records provided by the NJTA's Operations Department between 2017 and 2019. These crash rates were compared with statewide averages to understand if the rate of crashes at any one location is greater than average crash statistics for the entire state. A crash rate that is higher than the statewide average is an indicator that the location has conditions that warrant consideration of measures to reduce crash rates.

Mainline. In the 2019 Base Year, seasonal congestion along the Turnpike mainline between Interchanges 1 and 2 and recurring congestion at the southbound lane drop at Interchange 4 reduced free-flow conditions along the highway at various times. As operating speeds decrease and maneuvering room is reduced, the potential for crashes increases. The following summarizes the mainline crash data for the three-year period 2017-2019, which includes the 2019 Base Year; the total crashes along the Turnpike in the Program area was 1,800:

- Approximately 24 percent of total crashes occurred during either the AM or PM commuter peak periods, which cover 20 hours of the week.
- Approximately 23 percent of total crashes involved at least one heavy vehicle.
- Approximately 990 crashes occurred in interchange areas or service areas, which include the mainline lanes between the deceleration and acceleration lanes, ramps, toll plaza areas, and local roadway ramp terminus areas.
- Approximately 58 percent of total mainline crashes occurred on the NS roadway. The split is slightly higher between Interchanges 1 and 2 (62 percent), likely accounting for larger crash totals approaching the Interchange 1 toll plaza.
- Approximately 72 percent of crash types within the Program limits were same direction (rear end), sideswipe, and fixed object. This figure is lower than the 2019 Statewide Average for Interstates and Freeways, though for some individual mainline sections fixed object crashes trend above statewide averages (MP 13.4-26.1; MP 26.3 at the Interchange 3 on/off ramps; and MP 34.9-34.7 at Interchange 4).

- Approximately 15 percent of total crashes involved animals.
- Approximately 77 percent of crashes occurred under dry conditions.
- Approximately 60 percent of total crashes occurred under daylight conditions, while 33 percent occurred during night or dusk conditions. The latter figure trends above statewide averages.
- Approximately 20 percent of crashes involved either minor or serious injury, with five fatal crashes recorded during the three-year period. This figure trends well above the statewide average.
- The five fatal crashes can be described as follows: All occurred under dry roadway conditions. Note that police reports have not been consulted for further details beyond those provided.
    - At MP 5.4, NS roadway, a pedestrian fatality occurred during night conditions. This is in the vicinity of the Clara Barton Service Area.
    - At MP 6.6, NS roadway, a non-fixed object crash occurred during dawn/dusk conditions. This location is north of the Clara Barton Service Area.
    - At MP 17.7, NS roadway, a fixed object crash occurred during daylight conditions. A guide rail was identified as the fixed object struck. This location is in the vicinity of the Edwards Creek crossing.
    - At MP 30.3, SN roadway, a pedestrian fatality occurred during dawn/dusk conditions. This location is opposite the Walt Whitman Service Area (along the NS roadway).
    - At MP 33.2, SN roadway, a head-on crash occurred during night conditions. This location is between the Route 70 and Pennsauken Creek crossings. One of the motorists involved travelled the wrong way on the SN roadway.

Interchange 2. Crash rates above the statewide average were reported at the Interchange 2 toll plaza and at the intersection of Interchange 2 with US Route 322. None of the crashes resulted in fatalities.

Interchange 3. Crash rates above the statewide average were reported at the Interchange 3 toll plaza, the Turnpike ramps to the toll plaza, and at the intersection of Interchange 3 with NJ Route 168. None of the crashes resulted in fatalities.

Interchange 4. Crash rates above the statewide average were reported at the Interchange 4 toll plaza, the Turnpike Ramp NT, and at the intersection of Interchange 4 with NJ Route 73. One of the crashes resulted in a fatality.

3.5 ENVIRONMENTAL CONSEQUENCES

3.5.1 No-Build Alternative Traffic Conditions – Mainline

3.5.1.1 Traffic Volumes and LOS

Table 3.5-1 through **Table 3.5-3** show Design Year 2040 No-Build Alternative traffic volumes corresponding with the three volume categories described previously. Compared to the 2019 Base Year, traffic increases in the No-Build Alternative range from 3 percent to 7 percent during the weekday peak hours, while increases to Friday summer traffic volumes ranged from 2 percent to 6 percent. Included with the traffic volumes are heavy vehicle percentages, average speeds, and the results of the analysis, which indicates the following:

- Between Interchanges 3 and 4, LOS D operations would occur for the Highest Seasonal Average Volumes.
- Mainline sections south of Interchange 4 would operate at LOS D under Maximum Recorded Volumes.
- All six mainline sections will operate at LOS E or worse operations for the Highest Volumes in Congested Conditions.

Based on the NJTA's benchmark of LOS C or better (see Section 3.2), the results presented in **Tables 3.4-1** through **3.4-3** and **Tables 3.5-1** through **3.5-3** indicate that providing three lanes in each direction is warranted, both for the Base Year 2019 and the 2040 Design Year No-Build Alternative.

Table 3.5-1: 2040 Design Year No-Build LOS Analysis: Highest Seasonal Average Volumes

N.J. Turnpike Section	Roadway	Highest Seasonal Average Volumes				
		2040 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	2,956	2.3	C	65.4	25.2
	SN	3,008	2.2	C	65.5	25.0
Between Interchanges 2 - 3	NS	3,039	2.5	C	65.3	25.4
	SN	3,017	2.3	C	65.4	25.1
Between Interchanges 3 - 4	**NS**	**3,482**	**2.5**	**D**	**61.4**	**30.9**
	SN	**3,217**	**2.1**	**D**	**64.0**	**27.3**
North of Interchange 4	NS	4,028	2.3	C	67.2	21.7
	SN	4,088	2.2	C	67.1	22.1

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

Table 3.5-2: 2040 Design Year No-Build LOS Analysis: Maximum Recorded Volumes

N.J. Turnpike Section	Roadway	Maximum Recorded Volumes				
		2040 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	**NS**	**3,254**	**2.7**	**D**	**63.5**	**28.0**
	SN	**3,152**	**2.2**	**D**	**64.5**	**26.6**
Between Interchanges 2 - 3	**NS**	**3,264**	**10.6**	**D**	**61.0**	**31.5**
	SN	**3,220**	**2.3**	**D**	**63.9**	**27.4**
Between Interchanges 3 - 4	**NS**	**3,610**	**2.5**	**D**	**60.0**	**32.8**
	SN	**3,478**	**2.1**	**D**	**61.5**	**30.7**
North of Interchange 4	NS	4,493	2.3	C	65.6	24.8
	SN	4,459	3.4	C	65.5	25.0

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

Table 3.5-3: 2040 Design Year No-Build LOS Analysis: Highest Volumes in Congested Conditions

N.J. Turnpike Section	Roadway	Highest Volumes in Congestion Conditions				
		2040 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	**NS**	**3,226**	**9.3**	**E**	**41.0**	**45.8**
	SN	N/A				
Between Interchanges 2 - 3	NS	N/A				
	SN	**3,004**	**2.3**	**F**	**30.0**	**54.5**
Between Interchanges 3 - 4	**NS**	**3,481**	**2.5**	**E**	**48.0**	**39.5**
	SN	**3,361**	**2.1**	**E**	**41.0**	**44.5**
North of Interchange 4	**NS**	**4,437**	**2.3**	**E**	**40.0**	**40.7**
	SN	**3,643**	**3.4**	**D**	**39.0**	**34.3**

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

3.5.1.2 Traffic Operations During Incident Response

During an incident on the Turnpike, three traffic control outcomes are possible in the 2040 No-Build Alternative: move traffic off the travel way (no travel lanes are closed), partially block the travel way (one lane and/or shoulder are closed), or full closure of the travel way (all travel lanes and shoulders are closed). A one lane closure in the 2040 No-Build Alternative would result in at least a 50 percent reduction in roadway capacity for the duration of the incident.

3.5.2 No-Build Alternative Traffic Conditions – Interchanges 2, 3, and 4

Interchange 2. In the 2040 Design Year No-Build Alternative, traffic operational analysis indicates the current single-lane configuration of the ramps between the Turnpike and the toll plaza has suitable capacity to maintain LOS C. Likewise, the existing number of toll plaza lanes and the toll plaza configuration would be sufficient in the 2040 No-Build Alternative. However, as shown in **Table 3.5-4**, forecasted growth and development by Design Year 2040 would increase traffic volumes through Interchange 2, causing traffic queues to exceed the 500-foot

distance between the toll plaza and the US Route 322 intersection approach stop line. As a result, a failing LOS E and F would be experienced at Interchange 2 compared to LOS D in the 2019 Base Year.

Table 3.5-4: Summary of Intersection Capacity Analysis – US Route 322/Turnpike Ramps – Design Year 2040 Build-Alternative Traffic Volumes (No Geometric Improvements)

MOVEMENT	WEEKDAY AM PEAK HOUR					WEEKDAY PM PEAK HOUR				
	2040 DESIGN YEAR BUILD					2040 DESIGN YEAR BUILD				
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec/veh)	QUEUE (ft)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec/veh)	QUEUE (ft)
EB L	12	B	0.04	19.6		8	B	0.02	18.4	
EB T	241	C	0.41	24.2		**568**	**D**	**0.85**	**38.4**	
EB R	397	A	0.52	4.6		103	A	0.18	4.5	
WB L	510	C	0.81	22.0	275	**222**	**D**	**0.83**	**42.2**	**192**
WB T	377	B	0.40	10.9		390	B	0.43	11.8	
WB R	9					2				
NB L	**199**	**E**	**0.93**	**77.1**	**285**	**439**	**F**	**1.22**	**149.1**	**602**
NB T	**10**					**13**				
NB R	170	A	0.36	6.2		500	B	0.68	10.5	
SB L	29	C	0.29	28.8		19	C	0.12	25.6	
SB T	104					15				
SB R	23	A	0.05	0.2		17	A	0.03	0.1	

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Notes: Bolding indicates a LOS level of below C and a queue length in excess of 500 feet. EB = eastbound; NB = northbound; SB = southbound; WB = westbound; L = left turn; R = right turn; T = straight movement.

Interchange 3. Growth in traffic volumes within the interchange area would occur by Design Year 2040. The resulting traffic growth would cause the vehicular queue length on Ramp NT to exceed the length of the single-lane ramp, causing the traffic queue to extend from the ramp onto the mainline ramp deceleration lane. This condition would not be addressed in the 2040 No-Build Alternative. The single-lane configuration of the other two ramps has suitable capacity to maintain a LOS C. Analysis of the toll plaza indicates that the existing number of toll plaza lanes and current toll collection configuration are sufficient in the 2040 No--Build condition. However, the lanes exiting the toll plaza approach capacity during the weekday PM peak hour.

Changes in traffic volumes on NJ Route 168 are anticipated to be almost flat between the 2019 Base Year and the 2040 Design Year because of the degree of congested conditions along the roadway. Similarly, traffic volume differences between the Design Year No-Build and IPA conditions are also very small (Section 2.5.4). On that basis, only the 2019 Base Year and 2040 Design Year Build analysis results are discussed in this chapter.

Interchange 4. Similar to the 2019 Base Year, single-lane Ramps NT and ST would experience congestion in the 2040 No-Build Alternative. The existing measure to address recurring ramp congestion during the weekday AM peak hour would remain in place: existing signing on Ramp NT, which permits use of the right shoulder of the ramp if the ramp lane is congested.

Regarding toll plaza operations, the existing number of toll plaza lanes and current toll collection configuration would be sufficient for traffic volumes passing through the toll plaza at Interchange 4 in the 2040 No-Build Alternative.

NJDOT's NJ Route 73 improvement project is assumed to be operational by 2040. NJDOT proposes to grade separate the NJ Route 73/Church Road intersection south of Interchange 4 and to widen NJ Route 73 in both directions northward toward its interchange with I-295. Under this NJDOT program, northbound left turns would be prohibited at the Fellowship Road intersection, with affected traffic making a right turn onto Fellowship Road and using a roundabout to U-turn on Fellowship Road to complete the "left" turn. This proposed improvement would eliminate the traffic weave movement from Ramp TW across the two-lane width of NJ Route 73 northbound and would substantially reduce the queue on Ramp TW, such that the average vehicular queue would extend 100 to 200 feet from the Ramp TW connection with NJ Route 73.

3.5.3 No-Build Alternative Safety Conditions

Growth in traffic volumes on the mainline and at Interchanges 2, 3, and 4 in the 2040 No-Build Alternative would increase traffic congestion as described in Section 3.51 (No-Build Alternative Traffic Conditions – Mainline) and Section 3.52 (No-Build Alternative Traffic Conditions – Interchanges 2, 3, and 4). Because no improvements to the mainline or at Interchanges 2, 3, and 4 would occur in the 2040 No-Build Alternative to reduce congestion, and because traffic congestion can be correlated with crash incidents, it is likely that crash rates would be higher than in the 2019 Base Year.

3.5.4 IPA Traffic Conditions

This section describes traffic conditions under the 2040 IPA, including long-term operational effects and short-term construction effects.

3.5.4.1 Long-Term Operational Effects - Mainline

Traffic Volumes and LOS

Design Year 2040 IPA traffic volumes were developed by applying the growth rates in daily traffic to Base Year 2019 volumes for each section of the mainline, as determined by the DVRPC TIM. The highest volume categories, previously analyzed for 2019 Base Year and 2040 Design Year No-Build Alternative, were considered for this analysis. The 2040 IPA traffic volumes would increase by a range of 2 to 11 percent over the 2040 No-Build Alternative traffic volumes during both the weekday peak hours and the summer Friday peak hour. The higher growth in mainline volumes with the IPA reflects a change in traffic equilibrium that would occur in the secondary traffic study area because of increased capacity on the Turnpike mainline. The three major routes between the Wilmington, Delaware area and central New Jersey (i.e., Interchanges 6 to 7A area) are I-95, I-295, and the Turnpike. Increased capacity on the Turnpike mainline would result in changes in route choice from I-295 and I-95 to the Turnpike.

Small changes in traffic volumes between the 2040 No-Build Alternative and the 2040 IPA are observed on roads intersecting the mainline at the interchanges. These small changes, in comparison to the equilibrium shift that would occur among the three major routes, suggest that the mainline traffic volume increase would be primarily through traffic.

Only the Maximum Recorded Volumes were analyzed for the 2040 Design Year IPA because these volumes are generally higher than the traffic volumes in the other categories. The analysis results shown in **Table 3.5-5** demonstrate a LOS C for all mainline sections within the Program limits.

Table 3.5-5: Design Year 2040 IPA LOS Analysis: Maximum Recorded Volumes

N.J. Turnpike Section	Direction	Maximum Recorded Volumes				
		2040 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	3,626	3.4	C	67.9	19.6
	SN	3,513	2.8	C	68.1	18.8
Between Interchanges 2 - 3	NS	3,784	13.3	C	66.7	22.8
	SN	3,733	2.9	C	67.8	20.1
Between Interchanges 3 - 4	NS	3,763	3.1	C	67.7	20.3
	SN	3,625	2.6	C	68.0	19.4
North of Interchange 4	NS	4,502	2.9	C	65.4	25.1
	SN	4,468	4.3	C	65.3	25.3

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

Traffic Operations During Incident Response

The additional travel lane provided by the IPA in each direction of the mainline would improve traffic operations during incident management. As described in Sections 3.4.1 (2019 Base Year Traffic Conditions - Mainline), 3.5.1 (No-Build Alternative Traffic Conditions) and 3.5.4 (IPA Traffic Conditions), three traffic control outcomes are possible in the 2019 and 2040 No-Build condition: move the incident off the travel way (no travel lanes are closed), partially block the travel way (one lane and/or shoulder are closed), and full closure of the travel way (all travel lanes and shoulders are closed). One lane closed in the 2019 and 2040 No-Build condition would result in at least a 50 percent reduction in roadway capacity for the duration of the incident.

The addition of a third travel lane in the IPA would facilitate traffic management during an incident. The third lane would reduce the chance of a full roadway closure during a major incident; yet if a full closure occurred, the third lane would allow for reopening a single travel lane more quickly. Compared to the 50 percent reduction in roadway capacity during an incident in the 2019 Base Year and 2040 No-Build condition with a two-lane roadway, a one-lane closure on a three-lane roadway would reduce roadway capacity by at least 33 percent.

Program Effect on Traffic Balance - Turnpike, I-95, and I-295

As described in Section 1.3.3 (2040 Truck Freight Movements on the Turnpike), the Turnpike is one of three north-south parallel roadways in the region: I-95, I-295, and the Turnpike. Because of the proximity of these roadways to one another, driver choice of which roadway to use is based in part on the operating conditions of each roadway at the time a driver sets out on a trip. The reasons for this decision are typically based on the driver's perception of travel time, the desire for the shortest travel time possible, and in the case of the Turnpike, willingness to pay the toll. An incident or other operational issue on one roadway would shift some traffic from the affected roadway to one of the other roadways. Oftentimes, this shift is temporary until the issue on the affected roadway is resolved.

The NJTA analyzed the potential for traffic volumes to permanently shift between the Turnpike, I-95, and I-295 because of the Program improvements. This analysis found a combined increase in traffic volumes of no more than 0.5 percent across the three roadways between the 2040 No-Build Alternative and 2040 IPA forecasts. This change in traffic volume due to the Program improvements would not significantly impact the total forecasted traffic volume on the three roadways.

3.5.4.2 Long-Term Operational Effects – Interchanges 2, 3, and 4

Interchange 2. 2040 IPA traffic volumes in Interchange 2 and on local roadways include new traffic generated by several proposed developments in the Interchange 2 area. This additional traffic volume would result in vehicular queuing from the traffic signal at the US Route 322 intersection into, and possibly through, the toll plaza area. Analysis of the 2040 Design Year IPA traffic volumes at Interchange 2 shows LOS D or better for all Turnpike ramp approaches during the weekday AM and weekday PM peak hours. As in the 2040 No-Build Alternative, the maximum queue for the Turnpike ramp approach during the weekday PM peak hour would increase to a point that exceeds the 500-foot distance between the toll plaza area and the US Route 322 intersection approach stop line.

Given this result, geometric improvements are required at the US Route 322 intersection to reduce vehicular queues on the Turnpike ramp approach and prevent impacts to toll plaza operations. These proposed improvements are under review by the NJTA in coordination with the Township of Woolwich and NJDOT and would be the subject of a separate environmental review.

Interchange 3. As in the 2040 No-Build Alternative, growth in traffic volumes within the interchange area would occur in the 2040 IPA. The resulting traffic growth would cause the vehicular queue length on Ramp NT to exceed the length of the single lane ramp, resulting in the queue to extend onto the mainline ramp deceleration lane. To address this issue, the IPA would widen Ramp NT to two lanes while maintaining the existing geometry outside the toll plaza. While this improvement does not directly address the source of the existing vehicular queuing at the interchange, it allows for the remaining vehicular queues to be contained within the ramp system and avoid impacting the Turnpike mainline or Ramp NT deceleration lane.

As stated in Section 3.5.2, changes in traffic volumes on NJ Route 168 are anticipated to be almost flat between the Base Year and the Design Year because of the congested roadway conditions; similarly, traffic volume differences between the Design Year No-Build and IPA are also very small. **Table 3.5-6** summarizes the traffic analysis results for the intersection of NJ Route 168 and Browning Road; and **Table 3.5-7** summarizes the traffic analysis results for the intersection of NJ Route 168 and Benigno Boulevard.

Table 3.5-6: 2040 Design Year Build LOS Analysis: N.J. Route 168 and Browning Road

MOVEMENT	WEEKDAY AM PEAK HOUR 2040 DESIGN YEAR BUILD				WEEKDAY PM PEAK HOUR 2040 DESIGN YEAR BUILD			
	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)	VOLUME (vph)	LOS	V/C RATIO	DELAY (sec./veh.)
EB L	**156**	**F**	**1.28**	**202.3**	**169**	**F**	**1.38**	**242.2**
EB T	**215**	**E**	**0.79**	**58.1**	**300**	**F**	**1.02**	**95.1**
EB R	**74**				**75**			
WB L	**116**	**D**	**0.65**	**48.7**	**83**	**E**	**0.68**	**56.4**
WB T	**308**	**F**	**1.09**	**114.3**	**348**	**F**	**1.15**	**135.2**
WB R	**91**				**78**			
NB L	71	B	0.33	12.6	**166**	**D**	**0.84**	**43.5**
NB T	**760**	**F**	**1.09**	**86.2**	**626**	**E**	**1.02**	**64.4**
NB R	**60**				**130**			
SB L	83	C	0.54	26.9	**122**	**D**	**0.78**	**50.9**
SB T	635	C	0.82	33.0	**593**	**D**	**0.88**	**38.4**
SB R	71				**124**			

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

Table 3.5-7: 2040 Design Year Build LOS Analysis: N.J. Route 168 and Benigno Boulevard

MOVEMENT	WEEKDAY AM PEAK HOUR DESIGN YEAR 2040 BUILD				WEEKDAY PM PEAK HOUR DESIGN YEAR 2040 BUILD			
	VOLUME	LOS	V/C RATIO	DELAY	VOLUME	LOS	V/C RATIO	DELAY
EB L	**126**	**F**	**0.93**	**103.0**	**136**	**F**	**1.02**	**124.0**
EB T	1				4			
EB R	272	B	0.68	13.6	142	B	0.50	12.8
WB L	**4**	**D**	**0.03**	**38.8**	**3**	**D**	**0.03**	**38.8**
WB T	**1**				2			
WB R	6	A	0.03	0.2	8	A	0.04	0.2
NB L	261	A	0.64	9.3	320	B	0.76	14.4
NB T	759	A	0.69	9.6	778	B	0.70	10.0
NB R	2				2			
SB L	5	A	0.01	7.4	11	A	0.03	7.6
SB T	681	B	0.66	15.5	654	B	0.63	14.8
SB R	139	A	0.16	1.7	86	A	0.10	1.9

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.
Note: Bolded values indicate a LOS level below C.

Interchange 4. Analysis of ramp operations within the Interchange 4 area indicates the need to widen Ramp TN and Ramp NT to two lanes each to address the high traffic volumes to and from the north in the 2040 IPA. However, the existing number of toll plaza lanes and current toll plaza configuration would be sufficient for 2040 IPA traffic volumes passing through the toll plaza.

As in the 2040 No-Build condition, NJDOT's proposed NJ Route 73 improvement project is assumed to be in operation, which involves widening the highway between the intersections with Church Road south of the Turnpike interchange and I-295 north of the Turnpike interchange. Under this NJDOT project, northbound left turns would be prohibited at the Fellowship Road intersection. Affected traffic would be required to make a right turn onto Fellowship Road and then use a roundabout to U-turn on Fellowship Road to complete the "left" turn. This proposed improvement would eliminate the traffic weave movement from Ramp TW across the two-lane width of NJ Route 73 northbound and would substantially reduce the queue on Ramp TW; the average vehicular queue on Ramp TW would be reduced to 100 to 200 feet from the ramp connection with NJ Route 73.

3.5.4.3 Short-Term Construction Effects – Mainline

Construction of the Program would be undertaken by the NJTA and its contractors using lane shifts to enable construction activity while maintaining traffic operations. During subsequent design, the NJTA would develop construction and maintenance and protection of traffic (MPT) plans that identify the planned sequence of construction and staging details for the construction phase. The construction and MPT plans would be implemented by the NJTA and its contractors for the duration of the Program construction phase.

In its MPT planning, the NJTA would strive to avoid the potential of temporarily increasing traffic congestion in work areas along the mainline. However, the temporary reduction in travel lanes and travel lane widths, use of lane shifts, and reduced travel speeds in Program work areas may temporarily increase overall travel times for Turnpike users in the mainline area.

3.5.4.4 Short-Term Construction Effects – Interchanges 2, 3, and 4

At the interchanges, work to replace bridges would occur in stages, allowing traffic to operate on one half of each bridge while the other half is rebuilt. This way, traffic operations would be maintained on part of each bridge, thereby minimizing impacts to traffic during the construction phase. Likewise, the ramps would be realigned in phases, allowing traffic operations to be maintained to the maximum extent possible while the realigned ramps are built. During subsequent design, the NJTA would develop construction and MPT plans that identify the planned sequence of construction and staging details. The construction and MPT plans would be implemented by the NJTA and its contractors for the duration of the Program construction phase. During subsequent design, the NJTA would coordinate with NJDOT concerning construction and MPT along Swedesboro Road (Interchange 2), and NJ Route 168 (Interchange 3), and NJ Route 73 (Interchange 4).

Similar to temporary mainline traffic effects, the NJTA would strive to avoid the potential for temporarily increasing traffic congestion in work areas at Interchanges 2, 3, and 4. However, the use of lane shifts to build the new bridges and ramp realignment and reduced travel speeds in Program work areas may temporarily increase overall travel times for Turnpike users at each interchange.

3.5.5 IPA Safety Conditions

3.5.5.1 Long-Term Safety Effects – Mainline and Interchanges 2, 3, and 4

The IPA would address roadway congestion, operational capacity needs, maintenance requirements, and safety conditions along the mainline and at Interchanges 2, 3, and 4 in the Program area. The outcome would be improved LOS and a reduction in crash incidents.

During subsequent design, the NJTA would evaluate and design appropriate operational safety elements, modify existing incident management plans, coordinate with emergency response personnel, and develop operational protocols and procedures to be followed in the Program area. During operations, the NJTA would implement its operational safety elements, plans, protocols, and procedures.

3.5.5.2 Short-Term Safety Effects – Mainline and Interchanges 2, 3, and 4

During subsequent design, the NJTA would develop and implement construction protocols and procedures prior to the start of construction with the goal of providing a safe and secure environment in and near the Program construction site. The protocols and procedures would be Program-specific and focus on worker and public safety and securing work and staging areas including equipment, materials, and permanent elements of the Program. Temporary fencing with locking gates around construction staging areas is an example of a typical technique to secure a work area. The NJTA would incorporate its standard worksite safety procedures into the Program-specific plan. The NJTA would also work with law enforcement personnel and emergency service providers to develop and implement its Program safety plan and to ensure it is consistent and coordinated with local safety and emergency response procedures, including monitoring and reporting. The NJTA's contractor(s) would be required to adopt the NJTA's procedures and protocols, including monitoring and reporting.

Environmental Impact Statement

Chapter 4 Environmental Consequences

June 2024

Prepared for

Prepared by

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4 ENVIRONMENTAL CONSEQUENCES

This section provides a description of the existing environmental resources and conditions in the vicinity of the study area for the Program. The study area used for most resources is shown in the figures titled, Program Location Map, in Appendix A. Environmental resources described herein are based on existing conditions in 2021-2022, depending on the specific date of the field work performed and/or the secondary data sources used for assessing each resource.

The descriptions of existing conditions presented in this section provide the context for assessment of the environmental consequences of the Program. This section identifies the direct, indirect, and cumulative consequences of the Program as required by EO 215. Cumulative consequences are assessed by the assumptions that 1) the 2045 No-Build Alternative includes completion of all other planned projects described in **Table 2.4-1** without the Program, and 2) the IPA assumes the conditions of the 2045 No-Build Alternative with the Program. The following environmental disciplines are presented in this section:

- Land Use Patterns, Zoning, and Consistency with Plans
- Economic Development
- Property Acquisitions and Displacements
- Community Cohesion and Community Facilities
- Parks, Recreation Areas, and Open Space
- Historic and Archaeological Resources
- Visual and Aesthetic Effects
- Air Quality
- Noise
- Soils and Geology
- Surface Water Resources
- Coastal Zone Considerations
- Floodplains and Riparian Zones
- Navigability
- Wetlands
- Ecology and Wildlife
- Terrestrial Vegetation
- Groundwater Resources
- Utilities
- Contaminated Materials, Hazardous Waste, and Solid Waste
- Sustainability and Resiliency
- Environmental Justice
- Environmental Permits

This chapter is subdivided into separate sections based on each of the above-stated environmental disciplines. In turn, each section is further organized into subsections that provide a description of the methodology used and data sources and the actual existing conditions within the study area. The assessment of the consequences to each resource is presented for the No-Build Alternative as well as the IPA and any proposed minimization/mitigation for those impacts. Section 4.24 (Summary of EIS Findings) provides a summary of the EIS findings.

4.1 LAND USE PATTERNS, ZONING, AND CONSISTENCY WITH PLANS

4.1.1 Methodology and Data Sources

This section assesses the benefits and impacts of the No-Build Alternative and the IPA regarding land use and the consistency of these alternatives with existing regional and local land use plans and zoning requirements. The study area for examining land use and zoning is defined as the area extending 500 feet from either side of the existing Turnpike ROW and 100 feet from the existing edge of local road crossings. Both direct and indirect impacts were assessed. Direct impacts occur when land is acquired for new ROW or other purposes, or if an easement is purchased on a portion of a parcel for such purposes as embankments, drainage, construction staging, or utility relocation. An indirect impact is defined as an impact resulting from a project at a later point in time or farther removed in distance (40 CFR 1508.8[b]).

Land use is generally regulated by the local county or municipal government. Tools such as comprehensive master plans and municipal development codes, zoning regulations, and regional development and redevelopment plans are used to regulate land use. The compatibility of the Program with surrounding land uses and its consistency with local zoning and master plans were evaluated. Camden, Gloucester, and Salem County master plans, the local municipal plans, zoning maps, and 2020 aerial maps accessed from the New Jersey Geographic Information Network (NJGIN) were reviewed for this assessment. Reports from the DVRPC and the SJTPO were referenced to determine employment and population forecasts. Geographic Information System (GIS) data from the NJGIN Open Data portal was analyzed to determine existing land uses, current as of 2015, within the study area. Additionally, land designated as preserved or targeted to be preserved farmland was assessed.

Land designated as preserved farmland, targeted to be preserved, or included in an Agricultural Development Area (ADA) was investigated. New Jersey first began preserving farmland with the Agriculture Retention and Development Act of 1981. The preservation program is administered by the State Agriculture Development Committee (SADC) which coordinates with County Agriculture Development Boards (CADB), municipal governments, non-profit organizations, and landowners in the development of preservation plans that best meet the needs of individual landowners. This assessment used the New Jersey Farmland Preservation Program (NJFPP) GIS dataset managed by the SADC, current as of September 28, 2022. Included in this dataset are all farms that have been preserved, or those with an agricultural preservation easement recognized by the NJFPP, including state, county, local, and non-profit agencies. In addition to examining currently preserved farmland, the Planning Incentive Grant (PIG) Program GIS data sets were reviewed at the county and municipal levels to assess what working farms may be strategically targeted for preservation efforts and the county ADAs GIS data set was reviewed to assess lands identified for agricultural development by CADBs and certified by the New Jersey SADC.

4.1.2 Affected Environment

This section presents a description of the land use in and near the Program area. The figure titled, Existing Land Use 2015 Map (Appendix B), shows the existing land uses found within the study area.

4.1.2.1 Historical growth patterns

The study area traverses four counties (i.e., Salem, Gloucester, Camden, and Burlington) and a total of 18 municipalities. The southernmost portion of the Program is located within Salem County. In this section of Salem County, the economy has historically been reliant upon the manufacturing industry provided by E.I. DuPont de Nemours and Company (DuPont), though much of the county's economy is reliant upon agriculture. This is reflected in the land use patterns, which are a mix of commercial, industrial, agricultural, and residential. To the north of Salem County lies Gloucester County. Historically, Gloucester County's economy has been reliant upon agriculture and not until the last 100 years has Gloucester County experienced a period of population and housing growth, as only 11.4 percent of the current housing was built prior to 1939.

Growth in Camden County has historically been dependent upon transportation accessibility, first via rail and ferry lines which connected the county to other portions of New Jersey and neighboring Philadelphia, followed by the post-World War II interstate highway construction boom. After the construction of the Turnpike, growth sprawled out from the City of Camden to more rural parts of the county. The northern terminus of the study area is located within Mount Laurel Township of Burlington County. Mount Laurel is an established and built-out suburb of Philadelphia with a population of 44,633, according to the 2020 census. The study area includes established communities with land use patterns that are industrial or residential, depending on location.

4.1.2.2 Existing Conditions

Mainline Improvements

Salem County

The southernmost terminus of the Program extends briefly into Carneys Point Township, Salem County. Land use within Carneys Point Township is residential, forested, and agriculture, aside from a commercial establishment along Harding Highway. West of Harding Highway, the land is zoned for general commercial, open space, and agricultural use while east of Harding Highway it is zoned for residential use; aside from a sliver of land zoned as open space. The figure titled, Preserved Farmlands Map (Appendix B) and **Table 4.1-1** show the preserved farmlands in the study area. ADAs are present within the study area throughout Gloucester County until MP 20.0. Fourteen parcels of land targeted for preservation through the county PIG program are located within Carneys Point and extend into Oldmans Township between MP 4.5 – 7.0, and one parcel targeted for preservation through the municipal PIG program is located along the northbound lanes at MP 7.0.

Table 4.1-1: Preserved Farmlands Located within Study Area

Design Element	Municipality	Property Owner	Block	Lot	Approximate Location (MP)
Mainline	Oldmans Township	Kelly, Dennis J., Jr. & Dennis J., Sr. (E & D Farms)	22	3	5.1 – 5.3 SN
Mainline	Oldmans Township	Kelly, Dennis J., Jr. & Dennis J., Sr. (E & D Farms)	22	4	5.2 – 5.7 SN
Mainline	Oldmans Township	Dubois, H. & J. & Estate	22	10	6.1 – 6.5 SN
Mainline	Oldmans Township	Byrnes, Edward L., & Barbara Lee	21	1	6.1 - 6.3 SN
Mainline	Woolwich Township	King, David & Feucht, Caroline	43	3	10.2 – 10.5 SN
Mainline	Woolwich Township	Hidden Valley Land Co., Inc.	45	12	10.2 – 10.5 NS
Mainline	Woolwich Township	Hidden Valley Land Co., Inc.	45	13	10.4 – 10.5 NS
Mainline	Woolwich Township	Hidden Valley Land Co., Inc.	45	10	10.4 – 10.7 NS
Mainline	Woolwich Township	Davidson Farm	46	6	10.4 – 10.8 SN
Mainline	Woolwich Township	Hidden Valley Land Co., Inc.	45	11	10.5 – 10.8 NS
Mainline	Woolwich Township	Davidson Farm	46	8	10.6 – 10.9 SN
Mainline	Woolwich Township	Westrum Swedesboro LLC	45	9	10.6 – 11.1 NS
Mainline	Woolwich Township	Westrum Swedesboro LLC	45	9.01	10.7 – 10.8 NS
Mainline	Woolwich Township	Estate of Anna Cali	46	3.01	10.8 – 11.4 SN
Mainline	Woolwich Township	Viereck, David W. & Larry E.	55	1	11.5 – 12.1 SN

Design Element	Municipality	Property Owner	Block	Lot	Approximate Location (MP)
Mainline/ Interchange 2	Woolwich Township	Dersch, Dan	54	16.01	12.2 – 12.5 NS
Interchange 2	Woolwich Township	Putorti, Antonio	59	3	12.7 – 13.1 SN
Mainline	Woolwich Township	Tuting Farm	59	7	12.9 – 13.2 SN
Mainline	East Greenwich Township	Leone, Samuel M.	1202	10	14.4 – 14.6 SN
Mainline	East Greenwich Township	Leone, Samuel M.	1202	9	14.5 – 14.9 SN
Mainline	East Greenwich Township	Carpenito, Lynda Juall	1107	6	14.7 – 14.9 NS
Mainline	East Greenwich Township	Leone, Samuel M.	1202	8	14.7 – 14.9 NS
Mainline	East Greenwich Township	Leone, Samuel M.	1107	9	14.9 – 15 NS
Mainline	East Greenwich Township	Berz Home, LLC	1203	3.19	15.0 – 15.1 SN
Mainline	East Greenwich Township	Leone, Samuel M.	1203	1	15.0 – 15.4 SN
Mainline	East Greenwich Township	Leone, Samuel M.	1004	30	15.0 – 15.4 NS
Mainline	East Greenwich Township	Berz Home, LLC	1203	3.26	15.1 – 15.5 SN
Mainline	East Greenwich Township	Leone, Samuel M.	1203	6	15.3 – 15.5 SN
Mainline	East Greenwich Township	Pool Farm	1207	6	15.3 – 15.8 SN
Mainline	East Greenwich Township	Pool Farm	1204	5	15.6 – 15.8 SN
Mainline	East Greenwich Township	Pool Farm	1204	2	15.6 – 15.8 SN
Mainline	East Greenwich Township	Peaslee, *et al.*	1006	1	15.9 – 16.3 NS
Mainline	East Greenwich Township	Peaslee, *et al.*	1005	12	15.9 - 16.6 SN
Mainline	East Greenwich Township	Mihlebach, Charles & Catherine	1005	2.02	16.3 – 16.5 NS
Mainline	East Greenwich Township	Cohawkin Road LLC	1304	2	16.6 – 16.9 SN
Mainline	Deptford Township	Deptford Township/Andaloro Farm	27	1	23.7 – 23.9 NS
Mainline	Deptford Township	Deptford Township/Andaloro Farm	ROW	ROW	23.7 – 23.9 NS
Mainline	Deptford Township	Deptford Township/Andaloro Farm	23	1	23.7 – 23.9 NS

Source: New Jersey State Agriculture Development Committee, 2022.

As the Program continues north into Oldmans Township, the land use is primarily agricultural, forested, and residential, consistent with the purposes for which it is zoned: residential and agricultural. Three parcels of preserved farmland are located within the study area in Oldmans

Township between MP 5.0 – 6.4 along the SN roadway. The Program briefly extends through Pilesgrove Township where the land is zoned for single family residential use north of the mainline and an age-restricted residential cluster of affordable housing south of the mainline before entering Gloucester County.

Gloucester County

In Gloucester County, the Program first enters Woolwich Township. In 2008, Woolwich Township enacted Transfer of Development Rights (TDR) to control the location and process of land development. As a result, landowners who own parcels in designated sending areas have the option to send their development rights to designated receiving areas within the regional center. Along the Turnpike are lands designated as both sending and receiving districts for development and one of the main gateways to and from the Regional Center is Interchange 2; therefore, the enhanced capacity provided by the Program would likely benefit this area.

Within the southern section of Woolwich Township, the land is used for agricultural and residential purposes. There is a cluster of preserved farmlands straddling the northbound and southbound sides of the Turnpike between MP 10.2 and MP 12.3, including eleven parcels located within the study area. An additional ten farmland parcels are targeted for preservation through a municipal or county PIG program within Woolwich Township. The land throughout this section is primarily zoned for residential use, aside from a small area zoned for light industry office near MP 10.25, until encountering Interchange 2 where the land is zoned for commercial use. The land use and zoning surrounding Interchange 2 is more specifically discussed in the next subsection.

Following Interchange 2, the Program briefly enters Harrison Township where the surrounding land is zoned for a planned industrial district to the north and a flexible planned industrial/commercial district to the south; however, the land use is currently agricultural, including ADA land and one parcel targeted for preservation through the county PIG program. Within East Greenwich Township, the land continues to be used for agricultural purposes with forests and residential developments interspersed. Twenty-one preserved farmland parcels are located along the northbound and southbound lanes between MP 14.4 and MP 17.0 within the study area in East Greenwich Township. The study area here and extending into West Deptford Township is zoned for rural residential, which is characterized as a mix of single-family residential developments located within large lots of open space and farmland, and more high-density concentrated residential and multifamily districts. The land use shifts away from agricultural within West Deptford to residential, commercial, and forested; this trend continues for the remainder of Gloucester County. Three parcels of preserved farmland are located within Deptford Township, and no preserved farmlands, ADA, or parcels targeted for farmland preservation through a municipal or county PIG program are located anywhere within the study area north of MP 24.0. The study area in Deptford Township is zoned for institutional, multi-family, age-restricted, and medium density residential, and business center.

Camden County

As the Turnpike enters Camden County, it first passes through Bellmawr Borough at MP 24.6 where the land on either side of the Turnpike is zoned for heavy industrial, though it is only used as industrial along the NS roadway since the SN roadway abuts wetlands, and once again at MP 26.0 and Interchange 3, where the land is zoned as business and residential, which is its current use. The Turnpike then enters Runnemede Borough, where the zoning patterns are diverse, ranging from residential housing, commercial, special economic development, to public lands. The land use and zoning patterns remain similarly diverse within Barrington Borough, where there is a mix of industrial, manufacturing, and residential uses.

North of Barrington is the Borough of Lawnside where the land is zoned for residential and business until MP 28.5 where the Turnpike straddles two redevelopment zones, the Bell Avenue Redevelopment Zone along the NS roadway and the Oak Avenue Redevelopment Zone along the SN roadway. Within the Boroughs of Tavistock and Haddonfield, the land is used for recreational and residential purposes. Wetlands and forests are also found within these boroughs and are further discussed in Sections 4.15 (Wetlands) and 4.17 (Terrestrial Vegetation), respectively.

The final municipality the Turnpike traverses within Camden County is Cherry Hill Township. Along the NS roadway, the study area consists almost entirely of a strip of land between the Turnpike and I-295 which is characterized by industrial, commercial, and institutional land-use and zoning. Along the SN roadway, the land is characterized primarily by industrial and institutional land uses, yet single-family residential and commercial businesses uses are also present. Within the study area at MP 30.5, the land on both sides of the Turnpike is used and zoned for educational purposes. Section 4.4 (Community Cohesion and Community Facilities) discusses the impacts to such community institutions.

Burlington County

Within Mount Laurel Township, Burlington County, the existing land use patterns are primarily industrial in nature, aside from residential communities located at approximately MP 35.0 to MP 35.5 and MP 36 to MP 36.5.

Interchange 2 - MP 12.9

The land surrounding Interchange 2 is used primarily for agricultural purposes, including a parcel of preserved farmland located along the SN roadway between MP 12.7 – MP 13.0 and two parcels targeted for preservation through the county PIG program located along the NS roadway between MP 12.5 – MP 12.8. Additionally, there is ADA land throughout the study area of Interchange 2. Other land uses include forested, built-up land, and some commercial and residential parcels. In 2016, Woolwich Township published its Land Use Plan within which the area north of Interchange 2 is zoned for big box retail (BBR) or large format retail as well as corridor commercial, such as new car dealers, car washes, auto stores, food stores, pharmacies, convenience retail and small-scale office parks and flex space. The purpose of the BBR zone is to provide the opportunity for a large format, regionally based retail center which would be attractive to national chains and large anchor stores. Also included in this area is land zoned for, and already in use as, medium-density residential. Similarly, south of Interchange 2, the land is zoned for corridor commercial and single-family residential.

Interchange 3 - MP 26.1

Interchange 3 is within the Boroughs of Runnemede and Bellmawr. In Runnemede, the land surrounding Interchange 3 on the south is zoned for special economic development, public/quasi-public, and residential uses; which presently matches its current use. Examples of uses permitted within the special economic development (SED) district are professional offices, bulk commerce, light industry, and used automobile businesses. Additionally, the 2018 Runnemede Borough Master Plan highlighted the SED district to be used for senior housing and solar power installation. No preserved farmlands, ADAs, or parcels targeted for farmland preservation through a municipal or county PIG program are located within the study area of Interchange 3.

The Turnpike extends through Bellmawr Borough at two locations surrounding Interchange 3: first at MP 25.0 followed by MP 26.5. At MP 25.0, the land is zoned for heavy industrial use which is reflected in its current land use status. This section of land is the site of businesses located within Interstate Business Park, the US Postal Service, the shipping service US Logistics, and the International Paper Company, among others. This site benefits from direct access to the Turnpike via Interchange 3. Sandwiched between the heavily industrial zone and the business district is a large lot of land zoned for light industrial use. Along Ramp ST, the land is zoned as business before transitioning to residential, which is its current usage. The business district is directly adjacent to Ramp ST and the purpose of this district is to permit commercial development of a retail nature.

Interchange 4 - MP 34.54

Interchange 4 is within Mount Laurel Township, Burlington County. The land surrounding Interchange 4 is zoned exclusively for industrial and business use. No preserved farmlands, ADAs, or parcels targeted for farmland preservation through a municipal or county PIG program are located within the study area of Interchange 4. The current use reflects these zoning regulations as the area is the site of many hotels, restaurant and fast-food establishments, the Century Corporate Center, and big box retail, such as Walmart.

4.1.2.3 Foreseeable Future Conditions

In 2021, the DVRPC adopted projections for future population and employment forecasts made at both the county and municipal levels. These projections were analyzed to forecast future conditions within Gloucester, Camden, and Burlington Counties. In 2021, the SJTPO adopted population and employment forecasts at the county level. These projections were analyzed to forecast future conditions within Salem County. **Table 4.1-2** summarizes the employment and population forecasts within the counties found within the study area and municipalities found within the DVRPC region.

Salem County

By the year 2050, Salem County's population is expected to decrease by 11.39 percent, a decrease of 7,132 residents. Employment is also projected to decrease. Population and employment projections at the municipal level describe a similar trend as all the other municipalities through which the Program traverses are expected to see decreases between the years 2015 and 2040. Carneys Point Township and Oldmans Township are located within a New Jersey State Smart Growth Zone, a region recommended for development because growth in these areas will promote economic development while increasing quality of life. According to the 2016 Salem County Master Plan, future growth should be directed toward the western portion of the county where infrastructure and major roadways already exist. Therefore, though a downward trend in employment and population values are forecasted within the county and municipalities as a whole, the specific areas abutting the Program are well positioned to experience positive growth.

Gloucester County

By the year 2050, Gloucester County is expected to experience the greatest population increase out of all the counties within the study area. As summarized in **Table 4.1-2**, the county-level forecast is estimated to be an absolute growth of 36,517 residents, resulting in a 12.54 percent increase, between the years 2015 – 2050. Among the study area municipalities, Woolwich Township is forecasted to experience the greatest absolute and percent increase of both population and employment.

Table 4.1-2: Population and Employment Forecasts, 2015 (2020) – 2050

	2015 Population	2050 Population	Change in Population *Absolute (Percentage)*	2015 Employment	2050 Employment	Change in Employment *Absolute (Percentage)*
Salem County (a)	62,607*	55,475	-7,132 (-11.39%)	26,328**	23,482	-2,846 (-10.81%)
Gloucester County	291,091	327,608	36,517 (12.54%)	116,906	151,891	34,985 (29.93%)
Woolwich Township	12,257	21,655	9,398 (76.67%)	2,898	5,482	2,584 (89.16%)
East Greenwich Township	10,310	10,744	434 (4.21%)	2,622	3,746	1,124 (42.87%)
West Deptford Township	21,330	23,404	2,074 (9.72%)	12,266	15,167	2,901 (23.65%)
Woodbury Heights Township	2,999	3,007	8 (0.27%)	1,826	2,028	202 (11.06%)
Deptford Township	30,519	31,623	1,104 (3.62%)	14,312	17,860	3,548 (24.79%
Camden County	507,692	519,476	11,784 (2.32%)	235,055	263,284	28,229 (12.01%)
Bellmawr Borough	11,429	11,446	17 (0.15%)	4,655	5,621	966 (20.75%)
Runnemede Borough	8,303	8,343	40 (0.48%)	2,970	3,166	196 (6.60%)
Barrington Borough	6,758	6,736	-22 (-0.32%)	2,931	3,158	227 (7.74%)
Tavistock Borough	4	6	2 (50.00%)	50	52	2 (4.00%)
Lawnside Borough	2,907	2,904	-3 (-0.10%)	1,734	1,835	101 (5.82%)
Cherry Hill Township	70,843	76,069	5,226 (7.38%)	52,013	55,220	3,207 (6.17%)
Burlington County	446,863	477,884	31,021 (6.94%)	243,773	272,016	28,243 (11.59%)
Mount Laurel Township	41,823	45,947	4,124 (9.86%)	38,643	39,471	828 (2.14%)

Source: Data provided is derived from DVRPC 2050 Municipal-Level Population and Employment Forecasts in Five-Year Increments, adopted June 24, 2021. (a) South Jersey Transportation Planning Organization, Regional Transportation Plan 2050, 2021.

***** 2018 estimate

**2020 estimate

Camden County

Camden County is expected to experience continued growth in population and employment through the year 2050. To accommodate an increased population and growing job market, the Camden County Land Use Master Plan of 2014 confirmed a commitment to relying upon existing infrastructure. More specifically, the study area is located in a region identified in the Master Plan as a priority growth investment area (PGIA), which is a designated area wherein development and redevelopment is preferred and should be prioritized.

Burlington County

Burlington County has grown by more than 50,000 residents and 25,000 jobs since 1989 and it is projected to continue the growth trend in the coming decades. By 2050, the county is expected to be home to 477,884 residents, a 6.94 percent increase and absolute change of 31,021 since 2015. Within the Township of Mount Laurel, the population has remained stagnant in the years following the economic downturn of 2009; yet population projections forecast an increase of 4,124 residents, a gain of 9.86 percent. This increase is coupled with the projected addition of 848 jobs during the same time, an increase of 2.14 percent.

4.1.3 Environmental Consequences

4.1.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes. Consequently, there would be no direct or indirect impacts to existing land use patterns, although proposed and approved developments within or near the Program are expected to be completed by the year 2040, whether or not the Program is undertaken.

4.1.3.2 Initially Preferred Alternative

The Program would support existing land use patterns and zoning by increasing mainline capacity and improving traffic operations at Interchanges 2, 3, and 4. The Program would not preclude the ability of municipalities to undertake their planned land use and zoning designations. Likewise, NJTA has no influence on the land use and zoning decisions made by municipalities and their governing bodies.

Direct land use impacts from the Program would result from property acquisitions for additional Turnpike ROW, property acquisitions to relocate local roads that pass over the Turnpike, land acquired for the construction of stormwater detention basins, and land acquired for utility relocations. The impacts of property acquisitions, including farmland, are discussed in Section 4.3 (Property Acquisitions and Displacements). Indirect impacts from the Program could result if land development activity is encouraged by the Program improvements.

Mainline and Interchange Improvements

The Turnpike is an existing, limited access highway; therefore, aside from property acquisitions, the Program would not create any new access points and there would be no direct or indirect impacts to the land use and zoning within the host municipalities.

Section 4.2.3.2 assesses the potential of additional development to occur at Interchanges 2, 3, and 4. This section notes that there are a variety of factors that control whether land use changes may occur at interchange locations, including zoning regulations and land available for development/redevelopment. These items are necessary conditions for development, while any potential indirect impacts of the Program would be contributory. Further, there is currently a significant volume of planned and under construction developments along the Program corridor, many of which were conceived prior to the start of the 1-4 Capacity Enhancements Program

and will be in operation prior to the completion of Program improvements in those locations. It is anticipated that the Program improvements will follow and accommodate existing land use trends at the interchanges rather than drive them, and as such indirect land use impacts are anticipated to be limited.

4.1.4 Minimization and Mitigation

To accommodate the Program, property acquisitions would occur. Section 4.3 (Property Acquisitions and Displacements) details the properties to be acquired and the minimization and mitigation measures associated with these acquisitions. However, it should be noted that the 18 municipalities in the Program area can require that buffer areas be provided between the Turnpike and any future developments as part of their subdivision and site plan review processes. The proper exercise of this power would reduce the potential for future land use incompatibilities resulting from the Program.

4.2 ECONOMIC DEVELOPMENT

4.2.1 Methodology and Data Sources

This section assesses the benefits and impacts of the IPA and the No-Build Alternative regarding economic development activity. The study area for assessing these impacts is defined as 500 feet from the Turnpike ROW and 100 feet from the existing edge of local road crossings. To assess the economic and socioeconomic impacts of the Program, qualitative and quantitative data from the Camden, Gloucester, and Salem County Master Plans, municipal zoning maps, and aerial maps were reviewed. Population, racial characteristics, and income and labor force characteristics were compiled from the American Community Survey five-year data (2016-2020). Population and employment forecasts were obtained from the DVRPC 2021 Long Range Plan, Connections 2050 (DVRPC Plan) and the SJTPO Regional Transportation Plan 2050 (SJTPO Plan). Population trends and employment forecasts found in this section reference data previously stated in Section 4.1.2.1 (Land Use, Zoning, and Consistency with Plans).

Investigation of the planned and approved developments within the study area was conducted by reviewing municipal data on the site plan approval process, such as municipal planning board meetings minutes, during a 12 month period. These data are preliminary and subject to change as additional municipal applications for site plan approvals occur in the timeframe of the Program environmental and design phase processes. The five-year NEWMARK's Q3 2021 Greater Philadelphia Industrial Market report was used to further analyze the economic environment and construction of industrial space within the study area.

The impact of property acquisitions and displacements on municipal tax revenue was investigated using data collected from municipal tax or financial records. Data from 2021 was used from this analysis, with the exception of Pilesgrove Township and Lawnside Borough for which only 2020 data was available.

4.2.2 Affected Environment

4.2.2.1 Race/Ethnicity

Located in the southern portion of the state, the counties of Salem, Gloucester, Camden, and Burlington account for 14.6 percent of the population of the entire state. According to the U.S. Census, an estimated 1.3 million persons lived within the counties crossed by the Program in 2020. The 2020 population and racial characteristics of these counties are summarized in **Table 4.2-1**.

As **Table 4.2-2** illustrates, Burlington County had the highest household median income of all the study area counties ($90,329), followed by Gloucester County ($89,056), Camden County ($70,957), and Salem County ($64,234).

Table 4.2-1: Population and Racial Characteristics

	Salem County		Gloucester County		Camden County		Burlington County	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Total Population	62,754		291,745		506,721		446,301	
Total Households	24,414		106,376		190,660		168,195	
White	46,227	73.7%	227,276	77.9%	283,475	55.9%	297,157	66.6%
Black or African American	8,400	13.4%	29,300	10.0%	92,377	18.2%	71,728	16.1%
Hispanic or Latino	5,942	9.5%	18,922	6.5%	87,299	17.2%	37,264	8.3%
Asian	595	0.9%	8,942	3.1%	29,368	5.8%	22,806	5.1%
American Indian	181	0.3%	235	0.1%	364	0.1%	132	0.0%
Native Hawaiian	18	0.0%	0	0.0%	98	0.0%	163	0.0%
Some other Race	94	0.1%	301	0.1%	2,394	0.5%	1,537	0.3%
Two or more races	1,297	2.1%	6,769	2.3%	11,346	2.2%	15,514	3.5%

Source: (a) U.S. Census Bureau, Census 2020 and American Community Survey, 5-year average 2016-2020; numbers are rounded and may not total 100 percent. In the U.S. Census, Hispanic is a separate ethnic category from race (in this area including White, Asian, Black, and Other).

Table 4.2-2: Income and Labor Force Characteristics

	Salem County	Gloucester County	Camden County	Burlington County
Median Household Income	$64,234	$89,056	$70,957	$90,329
Median Family Income	$85,217	$108,479	$89,417	$108,248
Households Earning > $100,000 (%)	32.3%	44.5%	34.4%	44.7%
Employed (%)	56.3%	64%	66.1%	65%
Not in Labor Force (%)	39.5%	32.3%	33.9%	33.5%
Management, Business, Science, and Arts (%)	39.9%	43.7%	40.1%	45.5%
Sales (%)	22.5%	22.4%	23.4%	23%
Services (%)	15.3%	14.0%	16.6%	14.1%
Production (%)	15.9%	11.2%	12.9%	10.7%
Natural Resources, Construction, and Maintenance (%)	10.4%	8.6%	7%	6.8%

Sources: (a) U.S. Census Bureau, Census 2020 and American Community Survey, 5-year average 2016-2020; numbers are rounded and may not total 100 percent. (b) Salem County Economic Development Vision and Action Plan, 2021. (c) NJ Department of Labor & Workforce Development, estimate from June 2021.

An investigation of the employment data by industry sector reveals a concentration of employment within management, business, science, and arts sectors within all counties in the study area. A detailed breakdown of income and employment sector data per county is summarized in **Table 4.2-2**.

4.2.2.2 Population and Employment Trends and Forecasts

Salem County

As **Table 4.1-2** demonstrates, the SJTPO Plan forecasts an approximately 11 percent loss of population in Salem County by 2040. Employment decline is also forecasted in Salem County at a rate of approximately 11 percent. While several sectors including trade, transportation, and utilities, education and health services, and professional and business services have declined, and these declines are expected to continue, the numbers of jobs in manufacturing, leisure, and hospitality are growing. The SJTPO Plan points out that transportation and warehousing are two of the more prominent industries within Salem County. The need for warehouses to support ecommerce is leading to development and construction of new warehouses within Salem County and throughout the counties within the study area.

The proposed Salem Offshore Wind Terminal development has the potential to positively impact the jobs sector in lower Salem County as the project will generate an estimated 400 full-time equivalent (FTE) job years during the revitalization of the port and up to another 500 FTEs over the first five years of operation, resulting in a total of 900 FTE job years.

Gloucester County

Gloucester County has experienced rapid growth in the past two decades, growing by 13 percent between 2000 and 2010. The DVRPC Plan forecasts population growth within Gloucester County of 7.2 percent by 2040, with employment growth of 19.2 percent. Within Gloucester County, Woolwich Township's population is expected to reach 19,859 by 2040, a 25 percent change from 2015. Population growth correlates to housing need and, as described in the Real Estate Market Analysis section of the 2016 Master Plan Update, because of increasing population, Woolwich faces strong development pressure. These pressures informed the Township's decision to incorporate a TDR element into their Master Plan, for which the area surrounding Interchange 2 is a designated residential receiving area, as previously discussed in Section 4.1.2.2 (Land Use Patterns, Zoning, and Consistency with Plans). To accommodate the forecasted population growth, Woolwich Township would require the construction of more than 5,800 units during the 2015 to 2040 period.

As Woolwich Township increases in population, the forecasted employment opportunities are also expected to increase, with an absolute change of 4,338 employment opportunities or 164 percent growth in such opportunities.

Camden County

Camden County, with a population of 506,721, is the most populous county within the study area. The DVRPC Plan forecasts population growth within Camden County of two percent by 2040, with employment growth of 11.8 percent. Of the seven municipalities within the study area, only Bellmawr Borough and Cherry Hill Township are forecasted to increase in employment and population. Nonetheless, the Camden County Land Use Vision Map identified all municipalities within the study area as Priority Growth Investment Areas (PGIAs). Though this designation does not change zoning regulations, it does provide a guide to direct future growth, and it could impact population and employment numbers in a way that was not captured in the forecasted estimates.

Burlington County

Burlington County is the home of 446,301 residents and the population is expected to increase by 6.5 percent by 2040, with employment growth of 11 percent. Within the county, the study area is within Mount Laurel Township, which also shows positive population and employment forecasts; 9.86 percent and 2.14 percent, respectively.

4.2.2.3 Proposed and Approved Developments

Table 4.2-3 summarizes a selection of proposed and approved developments within the study area that were identified from the minutes of municipal planning board meetings in 2021. This table provides examples of the types of development taking place within the study area. However, these data are preliminary and subject to change as additional municipal applications for site plan approvals would occur throughout the program environmental and design phase processes. The figure titled, Proposed and Approved Developments Map (Appendix B), shows proposed and approved developments and locations designated as Areas in Need of Redevelopment.

The selection of proposed and approved developments located within the study area includes eight proposed and approved developments in Gloucester and Camden Counties. In addition, the NJTA's outreach activities and coordination with NJDOT Major Access have identified additional planned development that are not included in **Table 4.2-3**, including 14 development sites in Woolwich Township in the vicinity of Interchange 2 and a series of warehouse developments along Routes 40 and 48 in Salem County. The Interchange 2 area sites include 9 million square feet of planned warehouse space, 610,000 square feet of retail, and 1,507 residential units. The Salem County sites include approximately 5.4 million square feet of warehouse space in Carneys Point Township and 4.7 million square feet in Pilesgrove Township.

Within the counties of the study area, the need for warehouse space to support ecommerce has led to the development and construction of new warehouses. While not located specifically within the study area, the following developments are discussed to offer an example of the scale of the growing warehouse industry within the region.

According to NEWMARK's Q3 2021 Greater Philadelphia Industrial Market report, there were nearly 8 million square feet of warehouse under construction within Salem, Gloucester, Camden, and Burlington Counties at that time. This construction activity will support the industrial market and address the market-wide decrease in industrial space vacancy rate, which fell from 4.9 percent to 4.4 percent year over year. Salem County has the lowest amount of warehouse inventory (5,428,569 square feet) and 1,600,500 square feet under construction. Gloucester County has 30,060,671 square feet of total inventory with the greatest amount under construction, 3,313,356 square feet. Camden County has 33,094,135 square feet of inventory with 201,250 square feet under construction. Burlington County is one of the most desirable industrial markets in the country with 54,682,500 square feet of total inventory and 2,883,540 square feet under construction.

Table 4.2-3: Summary of Select Proposed and Approved Developments

Municipality	Address	Development Block and Lot	Type
Woolwich Township, Gloucester County	U.S. Route 322 / Swedesboro Road	Block 59, Lots 6, 6.01, 6.02, 8 and 10 and Block 62, Lots 2 and 3	Warehouse development
East Greenwich Township, Gloucester County	North side of Mantua-Paulsboro Road	Block 1404, Lot 1 and 1.01	121-unit residential townhouse development
Woodbury Heights Borough, Gloucester County	Glassboro Road	Block 38 Lots 2, 3, 10.01, and 11	Self-storage facility
Runnemede Borough, Camden County	Roughly bounded by Bowers Avenue, NJ Route 41, and Central Avenue	Entirety of Blocks 40-52; 32-39; 21-23; 25; and 27-29.	Approved non-condemnation plan
Barrington Borough, Camden County	636 Clements Bridge Road	Block 11, Lot 5.01	Personal Use Storage Building
Lawnside Borough, Camden County	301 Oak Avenue	Block: 405; Lot: 1	Site Improvements
Cherry Hill Township, Camden County	1701 Route 70 East	Block 500.02, Lot 2	Bulk Variance
	1490 Haddonfield-Berlin Road	Block 433.01, Lot 2	Bulk Variance

Source**:** Municipal planning board meeting minutes, 2021.

4.2.3 Environmental Consequences

4.2.3.1 No-Build Alternative

Economic Impacts

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration, with no land being acquired for Program purposes and no new construction activity taking place. Consequently, there would be no beneficial impact of Program-related construction spending and its related multiplier effects to the area's economy.

Fiscal Impacts

The No-Build Alternative would have no Program-related impact on municipal property tax revenues as no property would be acquired.

Demographic Impacts

The No-Build Alternative would result in adverse effects on socioeconomic conditions, as increasing travel time required for work commutes and the movement of goods and services in the region would increase the cost of doing business, and ultimately make the region a less desirable location to live and work.

4.2.3.2 Initially Preferred Alternative

Economic Impacts - Mainline

According to the *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program, Preliminary Design Report* (AECOM, 2022), the Program's estimated construction cost is approximately $2.08 billion in 2023 dollars, a value which includes a 12 percent contingency cost. Construction of the Program would have a direct beneficial economic impact as it would bring about both jobs and material purchases in the region. In addition to the jobs directly attributable to the Program's construction, indirect employment would occur from the construction expenditure, including manufacturing jobs for construction materials. Therefore, the total economic impact of the Program incorporates what is known as the multiplier effect, which is composed of the direct, indirect, and induced effects, as described below. The multiplier effect includes the successive rounds of economic activity stimulated by the initial construction spending. Expressed numerically, a multiplier of 1.5 for example, indicates that for every dollar directly generated by the industry under study, an additional $0.50 of ripple effects are felt within the local region, for a total impact of $1.50. The Program's total impact includes these three effects:

- **Direct Effect** corresponds to the initial changes in final demand generated by the Program.
- **Indirect Effect** includes the consecutive rounds of industry spending that are triggered by the initial change in final demand. Local contractors and their employees typically purchase some of their materials and services from local businesses, which then purchase from their local suppliers, and so on.

- **Induced Effect** refers to the impact triggered by increased household spending by employees of the indirectly affected businesses. Employees spend part of their earnings at local establishments, which then purchase some of their input materials and services locally to satisfy this demand, and so on.

Conversely, construction activities would involve some temporary disruption to the nearby businesses and residents as a result of construction traffic, noise at construction staging sites, and the need for the temporary use of private property for construction activities. The disruption to businesses would not be uniform, rather it would more strongly impact discretionary services, such as gas stations, convenient stores, and restaurants. Due to construction disruptions, primarily traffic, fewer riders typically travel on impacted roadways, thereby reducing the customers accessing the goods and services. However, businesses which are professional in nature, such as medical establishments, law offices, and other businesses with an established client base are less likely to be impacted by construction disruptions. Customers are likely to remain loyal to their professional establishments, even when a delay or other construction related inconvenience is experienced.

In the long-term, improved transportation provided by the Program would support local, regional, and national economic development, as it would support a more effective and speedy transfer of goods. The Program would allow for customers to access local businesses, specifically surrounding the interchanges. The long-term secondary impacts of the Program were assessed using an analysis from *Secondary Impacts of Transportation and Wastewater Investments: Research Results* (Bascom *et al*., 1975). Using this analysis, a qualitative assessment was made on an interchange-specific basis to determine the degree to which development in the vicinity of each interchange is likely to occur; which the Program improvements could accommodate and thereby support the resulting economic activity. The focus of the analysis, which is summarized in **Table 4.2-4**, was on commercial and industrial development. The following methodology was used. The findings of this assessment are provided after the methodology section.

- ***Level of existing development*** – Existing commercial/industrial development near an interchange indicates that factors are favorable to development. A low score indicates no development or a lone existing commercial/industrial development, a medium score indicates several individual commercial/industrial developments, and a high score indicates a cluster of commercial/industrial developments occurs near the interchange.
- ***Accessibility to properties fronting intersecting roadways*** – The ability to access a property fronting an intersecting road directly from that road indicates development potential for many commercial uses. A low score was used for intersecting roads that are limited-access facilities (e.g., interstate highways) where access to properties in the vicinity is extremely indirect. A medium score was applied to intersecting roads that are limited-access facilities but where access to the properties in the vicinity of the interchange is moderately indirect. A high score was used for intersecting roads having little or no access limitations to fronting properties.
- ***Location of the interchange with respect to existing commercial activity centers*** – Over time, development tends to occur along distinct paths from a concentrated core (activity node). Similar establishments often appear in clusters to create an identifiable destination for consumers. Meanwhile, establishments that supply or service these clusters

tend to be located nearby. A low score for this attribute was given if the interchange is not located nearby (greater than ten-minute drive time) or within the apparent path of recent development. A medium score was given if the interchange is located nearby (less than ten-minute drive time) and within the apparent path of urbanization. A high score was given if the interchange is either within a recently developed commercial activity center or between and within a ten-minute drive time of two recently developed activity centers.

- ***Available/planned water and sewer service*** – Public water and sewer are needed to support higher densities of commercial development, as well as industrial development. A low score was given if an interchange is not within an area served or planned to be served by water and sewer. A medium score was given if an interchange is within an area served by water or sewer but not both. A high score was given if an interchange is in an area served by both water and sewer.
- ***Zoning*** – Zoning is the tool used by local municipalities to guide the location of development, the type of development, and the scale of development. Zoning ordinances are based on a comprehensive planning process which is often periodically updated. A low score was assigned to those interchanges that are in areas not zoned for commercial or industrial development and not planned for growth based on the local master plans. A medium score was given to areas with a moderate amount of commercially or industrially zoned property in the vicinity of an interchange. A high score was assigned to those interchanges with a high density of commercially, industrially, and/or high density residential zoned land nearby.
- ***Available land*** – Even if all the other attributes are in place, development would be limited if developable land (generally vacant land of suitable topography and size) is not available in the vicinity of an interchange. A low score was assigned if there is a lack of developable land in the vicinity of an interchange. A medium score was ascribed if there is a moderate amount of developable land in the vicinity of an interchange. A high score was designated if there is a large amount of available land in the vicinity of an interchange.

Table 4.2-4: Development Potential Matrix

Interchange	Level of Existing Development	Accessibility to Abutting Properties	Proximity to Activity Center(s)	Available /Planned Water and Sewer	Appropriate Zoning	Available Land	Overall Development Potential
2	o	✺	●	✺	●	✺	✺
3	✺	✺	✺	✺	●	o	o
4	✺	●	✺	✺	✺	●	●

o Low
● Medium
✺ High

Source: AECOM 2022.

Economic Impacts - Interchange 2

Along the NS roadway and Ramp NT, the properties are zoned for big box retail (BBR), regional hotel/office, corridor commercial, and residential. The land adjacent to the SN roadway and Ramp TN is zoned for corridor commercial and single-family residential. As discussed in Section 4.2.2.3 (Proposed and Approved Development), substantial development is planned for the area surrounding Interchange 2, including 9 million square feet of warehouse space, 610,000 square feet of retail, and 1,507 residential units, and significant development has

already occurred along the Route 322 corridor that is accessing Interchange 2. Much of the proposed development in the immediate vicinity of Interchange 2 is also anticipated to be under construction or completed prior to the Program improvements in this area based on the current schedule. The potential for development in this area is high.

Economic Impacts - Interchange 3

Surrounding the NS roadway and Ramp NT, the land is zoned for heavy industrial, light industrial, business, commercial, and residential. The land adjacent to the SN roadway and Ramp TN is zoned for special economic development and commercial use. Within one mile of Interchange 3, the land is mainly developed, with little remaining developable land. Consequently, the potential for additional development in this area is low.

Economic Impacts - Interchange 4

The land surrounding both the SN and NS roadways at Interchange 4 is zoned exclusively for industrial and business use. While the area adjacent to Interchange 4 is highly developed, the interchange intersects Route 73 which provides access to land available for industrial and warehouse development and that is supported by applicable zoning regulations. Additionally, a swath of land outside the study area along the NS roadway is designated as an area in need of redevelopment. As a result, the potential for additional development in this area is medium.

Fiscal Impacts - Program

Implementing the Program would require acquisition of property to create the ROW for the proposed roadway configuration. A preliminary estimate of the reduction in municipal property tax revenue is approximately $122,254, based on 2021 tax values for the affected properties and municipal tax revenue reports for the impacted municipalities. The table titled, Preliminary Right of Way Acquisition Estimates (Appendix D), summarizes this assessment. The loss of a minor amount of revenue and is not expected to present a fiscal hardship to the municipalities. Additional information on the impacts resulting from property acquisitions can be found in Section 4.3 (Property Acquisitions and Displacements).

Demographic Impacts - Program

It is estimated that implementation of the Program would result in the partial acquisition of 40 residential properties and the full acquisition of 6 residential properties. The number of potential property impacts are preliminary and subject to further evaluation during the Program's Final Design process. Removal of residential uses would diminish the sense of community and cohesion, as further discussed in Section 4.4 (Community Cohesion and Community Facilities), and additional assessment of the potential impacts on Environmental Justice communities is discussed in Section 4.22 (Environmental Justice).

4.2.4 Minimization and Mitigation

4.2.4.1 Economic Impacts

As described in Section 4.2.3.2 (IPA), implementation of the Program would result in beneficial impacts to the region's economy; therefore, no mitigation measures are necessary. During construction of the Program, site access points would be established where workers, materials, and equipment would enter the Program work area and where equipment and unwanted materials would leave the Program work area. Where reasonably feasible, access points would be selected to reduce the need for additional movements of material and equipment. By limiting access points to specific locations, the NJTA would minimize potential impacts to surrounding properties and businesses. Importantly, the NJTA and its contractors would maintain private driveway access, private parking, and pedestrian access to businesses during construction through coordination with affected businesses during the construction planning phase.

4.2.4.2 Fiscal Impacts

As described in Section 4.2.3.2 (IPA), implementation of the Program would not result in a substantial adverse impact to the tax base of the municipalities within the study area; therefore, no mitigation measures are necessary.

Means to avoid business and residential impacts resulting from acquisitions and displacements would be further examined during the Program's Final Design phase. Where impacts are found to be unavoidable, efforts would be undertaken to minimize negative effects. Where commercial and/or residential displacements cannot be avoided, an acquisition and relocation program would be implemented in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as further discussed in Section 4.3.4 (Property Acquisitions and Displacements).

4.2.4.3 Demographic Impacts

As described in Section 4.2.3.2 (IPA), implementation of the Program would not result in any changes to the study area's demographic characteristics; therefore, no mitigation measures are necessary. Minimization and mitigation measures addressing the impact of the Program on Environmental Justice and overburdened communities is discussed in Section 4.22 (Environmental Justice).

4.3 PROPERTY ACQUISITIONS AND DISPLACEMENTS

4.3.1 Methodology and Data Sources

Property acquisitions and displacements were identified based on the Preliminary Design of the Program, which includes the Turnpike mainline and interchange improvements, improvements along local road crossings of the Turnpike, and proposed utility relocation work. All identified acquisition and ROW needs have been developed to a preliminary engineering level of detail. Parcels that require a partial or full fee acquisition are considered to be permanent property impacts. This section does not discuss impacts considered to be temporary, specifically parcels

that would require a slope easement. Refinements to the required ROW parcels will occur during Final Design; therefore, the acquisitions and displacements presented in this section are preliminary and subject to change.

Existing ROW and property lines were established from record drawings, NJTA Parcel Property Maps, and municipal tax maps. Land uses, including preserved lands, commercial businesses, and housing units, were identified via various sources including aerial photography, field inspection, tax records, and GIS data from the NJDEP and SADC data. For the purposes of this assessment, a study area extending 500 feet from either side of the Turnpike ROW and 100 feet from the existing edge of local road crossings was defined.

Full property acquisitions are those that the NJTA would permanently acquire for the construction of the Program. Full property acquisition would result in displacement of the existing occupier of the affected property. Partial property acquisitions are those where the NJTA would acquire a portion of the property for the Program. Partial property acquisitions would not result in displacement of the existing occupier of the affected property.

The existing use of each property was determined using municipal tax information. Residential displacements were assessed to identify the number of housing units and the approximate number of persons that would potentially be displaced by the Program. The Program's Preliminary Design plans were examined to determine the location of the residential properties that could be impacted by ROW acquisition for the Program. To better understand the characteristics of the persons who would be affected, U.S. Census data were used. Based on the Census data, the approximate number and characteristics of potentially displaced people were estimated based on the reported averages within individual census blocks.

4.3.2 Affected Environment

The Turnpike ROW adjoins various private and public land uses; however, as a limited access highway, the adjacent land does not always have direct access to the Turnpike. Prior to initial construction of the Turnpike in the 1950's, the study area was comprised mainly of farmland and residential properties. Much of the land in the study area was developed subsequent to the construction of the Turnpike.

In the southern sections of the study area, the dominant adjacent land uses include undeveloped wetlands, agriculture, and rural residential uses. Proceeding northward, surrounding land uses become increasingly developed mainly with tract housing and some intervening commercial land. A more detailed description of the land use patterns throughout the Program study area can be found in Section 4.1 (Land Use Patterns, Zoning, and Consistency with Plans). The ROW also traverses four active freight rail lines and the Delaware River Port Authority's PATCO rail corridor. Various utility installations occur along or pass through the Turnpike ROW, as documented in Section 4.19 (Utilities).

4.3.3 Environmental Consequences

4.3.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes. Consequently, there would be no Program-related residential or business displacements and no physical disruption to existing neighborhoods bordering the Turnpike.

4.3.3.2 Initially Preferred Alternative

The IPA would require the full acquisition of 11 property parcels and the partial acquisition of 113 parcels, resulting in a total impact to parcels. **Table 4.3-1** provides a summary of the proposed permanent property acquisitions to accommodate the Program, and the Preliminary ROW Acquisition Estimates table in Appendix D provides a full summary of the potential acquisitions.

Table 4.3-1: Summary of Potential Permanent Property Acquisitions

Acquisition Type	Program Element				
	Mainline	Interchange 2	Interchange 3	Interchange 4	
Full Acquisitions	**Number of Properties**				**Total**
Residential	5	0	1	0	6
Commercial	1	0	0	0	1
Industrial	0	0	0	0	0
Institutional	1	0	0	0	1
Vacant	3	0	0	0	3
Farm	0	0	0	0	0
Preserved Farm	0	0	0	0	0
Partial Acquisitions	**Number of Properties**				**Total**
Residential	40	0	0	0	40
Commercial	13	0	1	0	14
Industrial	2	0	0	0	2
Institutional	14	0	0	0	14
Vacant	24	0	0	0	24
Farm	13	1	0	0	14
Preserved Farm	4	1	0	0	5
Total	**120**	**2**	**2**	**0**	**124**

Source: AECOM 2022.

Notes: 1) Full property acquisition means that the NJTA would permanently acquire an entire property for the Program. Full property acquisition would result in displacement of the existing occupier of the affected property.
2) Partial property acquisition means that the NJTA would acquire a portion of a property for the Program. Partial property acquisition would not result in displacement of the existing occupier of the affected property.
3) Mainline acquisitions include the widening, raising and/or replacement of overpassing roadway bridges that intersect the Program ROW.

Most of the construction required for the Program would occur within the existing Turnpike ROW. The vast majority of the required acquisitions are related to the interchange improvements or are associated with local roadway crossings, which must be reconstructed to accommodate the Program improvements. In addition, various parcels must be acquired to relocate various utilities to accommodate the Program improvements. Most partial acquisitions would consist of a strip take from the outer edge of properties. With the exception of properties which require a full property acquisition, the extent of land to be acquired from the partial acquisition properties would not alter the present or future function of the affected parcel.

The 11 full property acquisitions would result in the permanent displacement of 6 residential units, 1 commercial property, 1 institutional property, and 3 vacant properties. The locations of these displacements are presented in **Table 4.3-2** by Program element. These proposed impacts are considered to be preliminary; the NJTA would further evaluate ROW needs during Final Design.

Table 4.3-2: Summary of Potential Permanent Displacements

Program Element	Full Residential Displacements	Full Commercial Displacements	Full Institutional Displacements	Full Vacant Displacements	Full Industrial Displacements
Mainline Improvements	5	1	1	3	0
Interchange 2	0	0	0	0	0
Interchange 3	1	0	0	0	0
Interchange 4	0	0	0	0	0
Total	**6**	**1**	**1**	**3**	**0**

Notes: 1) Full property displacement means that the NJTA would permanently acquire the entire property for the Program; therefore, displacing the person/persons; and 2) This chart does not include properties with significant takings, which could also cause additional displacements.

Greater detail on the preliminary permanent residential displacements and an estimate of the number of persons displaced to accommodate the Program is presented in **Table 4.3-3** by municipality and design element.

Table 4.3-3: Summary of Permanent Residential Displacements

Municipality	Design Element	No. of Residential Units Displaced	Block and Lot	Census Tract/Block	Average Household Size	Estimate of Persons Displaced
Woolwich	Mainline	1	54/16	5022.04.1	3.3	3
Deptford	Mainline	1	121/11 & 12	5011.05.2	2.4	2
Runnemede	Interchange 3	1	135/30	6072.2	2.4	2
Lawnside	Mainline	1	1001/23	6065.2	2.2	2
Lawnside	Mainline	2	1004/1	6065.2	2.2	4
		6				**13**

Source: American Community Survey (ACS) 2020 5-Year Estimates, Table B25010 - Average Household Size.

Note: The residency at Block 1004 Lot 1 contains at least two apartments, though further investigation may identify more apartments on the property.

Mainline Improvements

For the mainline, the entirety of the capacity improvements would occur within the Turnpike's existing ROW and would not create new physical or visual barriers or physically divide neighborhoods in the vicinity of the Turnpike mainline. However, the mainline capacity improvements would require replacement of multiple bridges that cross over the Turnpike; these improvements would require full property acquisitions (10) and partial property acquisitions (110). These acquisitions would result in the displacement of 5 residential units and, based on U.S. Census estimates of average household size by Census block, approximately 11 persons may be displaced by the acquisition of these residences. One institutional displacement and 1 commercial displacement, discussed below, would result to accommodate mainline improvements. Four (4) preserved farmland parcels will be partially impacted including Block 21 Lot 1 in Oldmans Township, and Block 1004 Lot 30, Block 1005 Lot 12, and Block 1202 Lot 8 in East Greenwich Township. Impacts to these parcels will be minimized to the maximum extent possible. Temporary or permanent displacements of community facilities are not expected to occur as a result of the mainline improvements.

Examples of property acquisitions are in the Borough of Lawnside where the full acquisition of 4 parcels, 2 residential and 2 vacant, and partial acquisition of 8 parcels would be required. These acquisitions would result in the commercial displacement of the Personal Touch Barber Shop, located on Block 1004 Lot 1, to accommodate the Warwick Road (CR 669) bridge replacement. The displacement would affect approximately 6 jobs, an estimate derived using barber shops of similar size. The total ROW acquisition from the Warwick Road (CR 669) bridge replacement within the Borough of Lawnside would be approximately 0.85 acres across the 10 parcels, resulting in approximately 2 residential displacements.

Interchange 2

Partial ROW acquisition for the improvements at Interchange 2 would be approximately 1.75 acres across 4 parcels of farmland within the municipality of Woolwich Township, including 1 acre of preserved farmland/ADA land. The impacted preserved farmland parcel is Block 59, Lot 3 in Woolwich Township. Several farmland parcels have been acquired by WH Development (Russo) for development in the vicinity of Interchange 2. Temporary or permanent displacements of community facilities would not occur.

Interchange 3

The ROW impacts within the Interchange 3 study area are influenced by the need to relocate Ramps ST and TN based on the mainline capacity improvements, and the need to relocate the two petroleum pipelines outside of proposed Turnpike ROW.

The Interchange 3 improvements would require the full acquisition of 1 residential parcel and the partial acquisition of 1 commercial parcel, resulting in the total ROW acquisition of 2.01 acres between 2 parcels within the Borough of Runnemede. This alignment avoids the potential displacement of industrial properties as well as additional residential displacements.

The partial commercial acquisition is that of a vacant hotel (Block 135, Lot 32) which was sold to HDDA RLD Runnemede LLC on February 14, 2023; however, the Program's ROW needs are not expected to result in a full acquisition of the property, thereby allowing the Borough of Runnemede to further discuss the future of the parcel for economic revitalization. Temporary or permanent displacements of community facilities would not occur as a result of the improvements to Interchange 3.

Interchange 4

No ROW acquisition would be required to build the Interchange 4 improvements. Temporary or permanent displacements of community facilities are not expected.

4.3.4 Minimization and Mitigation

The mainline capacity improvements are not anticipated to impact community facilities adjacent to the mainline. ROW acquisition for new or improved interchanges is not expected to result in the temporary or permanent displacement of any community facilities.

During Final Design, the NJTA would refine the Preliminary Design of the Program and consider means to minimize the need for additional ROW. At that time, the NJTA would coordinate with affected property owners regarding ROW acquisition and potential displacement of property occupiers.

All acquisitions would be conducted in conformance with relevant Federal and state statutes, regulations, and executive orders. Adherence to these regulations would ensure property owners are compensated for use of their properties, including temporary disruptions during construction. Acquisitions and relocation assistance for the Program would follow the relevant procedures set forth in:

- Uniform Relocation and Real Property Acquisitions Policies Act of 1970 (codified in Chapter 61 of Title 42 of the United States Code) as amended (the Uniform Act): All activities related to acquisitions and displacements for the Program would be conducted in conformance with this Act. The Uniform Act provides for uniform and equitable treatment for persons displaced from their homes and businesses and it establishes uniform and equitable land acquisition policies.
- Public Law 105-117: These statutes require that certain relocation services and payments be made available to eligible residents, businesses, and non-profit organizations displaced as a direct result of projects undertaken by a Federal agency or with Federal financial assistance.

Proposed ROW acquisition from ADA lands and preserved farmlands would differ from that of residential and commercial ROW acquisitions. To obtain an easement on either of these types of property, the NJTA would coordinate with the applicable County Agriculture Development Board (CADB). A formal process would be followed including the potential for public hearings. The process would conclude with approval from the Governor's office for use of these lands.

4.4 COMMUNITY COHESION AND COMMUNITY FACILITIES

This section assesses the potential for the Program to impact community cohesion and community facilities. Community cohesion is the sense of community or neighborhood character within an area. It is formed by the social interaction and physical connection among people and access to community facilities. Community facilities include schools, religious institutions, public libraries, police stations, firehouses, emergency medical services (EMS) stations, post offices, public healthcare facilities, and cemeteries.

4.4.1 Methodology and Data Sources

For the purposes of this assessment, a study area extending 500 feet from either side of the Turnpike ROW and 100 feet from the existing edge of local road crossings was defined. In some locations, the study area extended beyond this general boundary for facilities that provide services along the Turnpike (e.g., hospitals, police, and fire services).

The assessment consisted of a qualitive evaluation of the effects of the Program and whether these effects have the potential to create, change, or eliminate barriers within the communities located within the study area. Information used in this analysis included assessing land use patterns, reviewing property acquisitions as a result of the Program, and determining impacts to Environmental Justice communities, which are discussed in Section 4.1 (Land Use, Zoning, and Consistency Plans), Section 4.3 (Property Acquisitions and Displacements), and Section 4.22 (Environmental Justice), respectively.

The data generated and presented in Section 4.3 (Property Acquisitions and Displacements) was utilized for community cohesion and community facilities impacts. Direct and indirect impacts were assessed in this analysis. Direct impacts are those that result in the displacement of an existing facility building, disruption to the physical boundaries of a facility, or changes in access to a facility. Indirect impacts may include changes to the service area or function of the facility, the creation of visual or noise or intrusions (described in Section 4.7 [Visual and Aesthetic Effects] and Section 4.9 [Noise], respectively). These changes have the potential to affect future service or operations of the facility (e.g., changes to the local road network that may increase emergency response times or restrict the purpose of a community facility), or residential displacements that could affect the composition of the user groups for a particular facility.

4.4.2 Affected Environment

Communities in the study area consist of residential developments, villages, and towns. The sense of community in these areas is derived from social and physical characteristics, such as history, geographic proximity, physical separation from other communities, land use patterns, and human relationships. An example of a community in the Program area is Oak Ridge, which is a residential development on the west side of the Turnpike in Mt. Royal, Camden County. Access to the Oak Ridge community is from Mantua Road and the community boundaries are defined by the Turnpike to the east and Mantua Creek to the north, west, and south.

A total of 31 community facilities are located within the study area, of which 30 are within the mainline study area, and one is within the Interchange 3 study area. A summary of the community facilities identified within the study area is shown in **Table 4.4-1** and depicted in the figure titled, Community Facilities Map (Appendix B).

Table 4.4-1: Community Facilities

Design Element	Municipality	Approximate Location	Site Name	Facility Type	Vehicular Access Point
Mainline	Woolwich Township	MP 8.6 – MP 9.0 NS	General Charles G. Harker School	School	Via Oldmans Creek Road
Mainline	Woolwich Township	MP 10.1 – MP 10.2 NS	Gloucester County EMS Station	EMS	Via Woodstown Road
Mainline	East Greenwich Township	MP 17.4 – MP 17.5 NS	Shady Lane Child Development Center	School	Via County House Road and Institution Road
Mainline	East Greenwich Township	MP 18.0 – MP 18.1 SN	Gates of Heaven Cemetery	Cemetery	Via Mantua Road
Mainline	Woodbury Heights Borough	MP 20.4 – MP 20.5 SN	Infant Jesus Parish/Saint Margaret School	Religious Institution/ School	Via 3rd Street
Mainline	Woodbury Heights Borough	MP 20.6 – MP 20.7 SN	First Presbyterian Church	Religious Institution	Via Elm Avenue
Mainline	Woodbury Heights Borough	MP 21.0 – MP 21.1 NS	New Beginnings Bible Fellowship	Religious Institution	Via Glassboro Road
Mainline	Deptford Township	MP 21.2 – MP 21.4 SN	Lake Tract School	School	Via Highland Road
Mainline	Deptford Township	MP 21.5 – MP 21.6 NS	Green Cemetery	Cemetery	Via Maple Road
Mainline	Deptford Township	MP 21.5 – MP 21.6 SN	Deptford Fire Department – Fire Company Number 1	Firehouse	East of Tanyard Road
Mainline	Deptford Township	MP 21.5 – MP 21.6 SN	Lake Tract Bible Church	Religious Institution	Via Tanyard Road and Maple Road
Mainline	Deptford Township	MP 21.6 – MP 21.7 SN	Cemetery	Cemetery	Via Maple Road
Mainline	Deptford Township	MP 21.7 – MP 21.9 SN	Deptford Free Public Library	Library	Via Highland Road
Mainline	Deptford Township	MP 22.2 – MP 22.3 NS	Brightview Woodbury Lake – Senior Assisted Living	Assisted Living	Via Kelly Drive
Interchange 3	Runnemede Borough	MP 25.8 – MP 25.9 SN	Runnemede Public Library	Library	Via Broadway and Constitution Drive
Mainline	Barrington Borough	MP 26.9 SN	Grace Bible Presbyterian Church	Religious Institution	Via Cleveland Avenue

Design Element	Municipality	Approximate Location	Site Name	Facility Type	Vehicular Access Point
Mainline	Barrington Borough	MP 27.3 – MP 27.7 SN	Good News Outreach	Religious Institution	Via Shreve Avenue
Mainline	Lawnside Borough	MP 27.9 – MP 28.0 SN	Mount Zion Church	Religious Institution	Via West Oak Avenue
Mainline	Lawnside Borough	MP 28.1 – MP 28.2 NS	Chapel of the Annunciation	Religious Institution	Via Warwick Road
Mainline	Lawnside Borough	MP 28.1 – MP 28.2 SN	St. Luke Church	Religious Institution	Via Warwick Road
Mainline	Lawnside Borough	MP 28.2 NS	Emanuel Church of God in Christ	Religious Institution	Via Warwick Road
Mainline	Lawnside Borough	MP 28.2 – MP 28.3 NS	Borough of Lawnside Police and Fire Department	Police Station/ Firehouse	Via Douglas Avenue
Mainline	Lawnside Borough	MP 28.2 – MP 28.3 SN	Grace Temple Baptist Church	Religious Institution	Via Cleveland Avenue
Mainline	Cherry Hill Township	MP 29.3 SN	Life Steps Assisted Living	Assisted Living	Via Lakeside Avenue
Mainline	Cherry Hill Township	MP 29.8 SN	Cherry Hill Fire District Number 13	Firehouse	Via Burnt Mill Road
Mainline	Cherry Hill Township	MP 29.8 – MP 30.1 SN	United States Postal Service	Post Office	Via Haddonfield-Berlin Road and Browning Lane
Mainline	Cherry Hill Township	MP 30.1 – MP 30.2 SN	Cherry Hill Chinese Christian Church	Religious Institution	Via Browning Lane
Mainline	Cherry Hill Township	MP 30.4 – MP 30.6 NS	James Johnson Elementary School	School	Via Kresson Avenue
Mainline	Cherry Hill Township	MP 30.5 – MP 30.7 SN	Rosa International Middle School	School	Via Browning Lane
Mainline	Cherry Hill Township	MP 31.8 – MP 31.9 SN	Dawat-e-Hadiyah (America)	Religious Institution	Via Perina Boulevard
Mainline	Cherry Hill Township	MP 32.3 – MP 32.4 SN	High Place Church	Religious Institution	Via Marlton Pike East

Source and Notes: NJ Geographic Information Network, Salem, Gloucester, Camden, and Burlington Counties. Parcels and MOD-IV; Google Earth.

4.4.3 Environmental Consequences

This section describes the potential effects of the Program on community cohesion and community facilities. The findings of this assessment are preliminary and subject to refinement as the NJTA advances the Program into Final Design.

4.4.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. The committed transportation projects in the No-Build Alternative consist primarily of operational and safety improvements to existing roadways in the study area. Likewise, the planned, new Glassboro-Camden Line would primarily be aligned within an existing railroad corridor. These types of projects would not create new physical barriers in existing communities or cause substantial changes in community access. Thus, no effect on community cohesions would occur.

The NJ TRANSIT South Jersey Bus Rapid Transit (BRT) project would create a new park-and-ride facility adjacent to an existing residential community. Although the potential for proximity effects could occur related to traffic entering and leaving the park-and-ride, the BRT project would not change community access or create a physical barrier that would negatively affect cohesion in the community. Because the projects in the No-Build Alternative would primarily address operational and safety improvements on existing transportation facilities, the No-Build Alternative is unlikely to impact community facilities in the study area.

4.4.3.2 Initially Preferred Alternative

As described in Section 4.3 (Property Acquisitions and Displacements), the Program would primarily be undertaken within the existing ROW of the Turnpike, particularly along the mainline. In these areas, no new physical barrier would be created that could impact community cohesion. Existing roadway connections across the Turnpike would be preserved. As described in Sections 4.7 (Visual and Aesthetic Effects) and Section 4.9 (Noise), the potential exists for the Program to cause visual change and noise effects to communities adjacent to the Turnpike ROW. The NJTA is evaluating the feasibility and reasonableness of providing noise barriers to address potential noise impacts.

Section 4.3 (Property Acquisitions and Displacements) identifies locations where ROW acquisition would be required for additional Program ROW and to relocate existing utilities. These locations are adjacent to the interchanges and along local roadways that lead to and from bridges over the Turnpike, which the NJTA would replace during the Program. In most cases, ROW acquisition would take the form of small strips of private land adjacent to existing roadways. These partial property acquisitions would allow the existing property uses to remain and would preserve access to the affected properties. In these cases, a negative effect on overall community cohesion is unlikely to occur because the community would remain intact in terms of the relationship of existing land uses to one another.

The NJTA would require full property acquisition of several properties as described in Section 4.3 (Property Acquisitions and Displacements). These acquisitions would displace the existing residents and businesses that occupy the affected properties. Although the larger communities in which these uses occur would remain and continue to provide a sense of community and cohesion, removal of these uses would diminish the sense of community and cohesion. Additional assessment of the potential impacts on Environmental Justice communities is discussed in Section 4.22 (Environmental Justice).

During construction, access to communities and community facilities within and/or near the Program area may be temporarily affected. Typical access effects may include temporary vehicular and pedestrian traffic pattern adjustments such as temporary lane closures and relocation of driveways, which could result in longer travel times. Additionally, there may be temporary loss or relocation of parking. During Final Design, the NJTA would prepare a maintenance and protection of traffic plan to provide a safe work area for workers within the roadway while facilitating the safe and orderly flow of all roadway users (motorists, bicyclists, and pedestrians) through the work zone.

Construction activity also has the potential to cause temporary visual changes and noise impacts related to construction activities and storage of materials and equipment. Given the presence of police stations, firehouses, and EMS stations in the vicinity of the Program, the NJTA would analyze potential effects on emergency service response times during Final Design.

Specific assessment of the potential for the Program to impact community facilities is discussed below.

Mainline Improvements

For the mainline, the entirety of the capacity enhancements improvements would occur within the Turnpike's existing ROW and would not create new physical or visual barriers or physically divide neighborhoods in the vicinity of the Turnpike mainline. However, bridge replacements, improvements to local road overpasses/underpasses, and the installation of stormwater management (SWM) basins would encroach on community facilities.

Within Woolwich Township, 0.40 acres of the General Charles G. Harker School property would be acquired for the Program improvements to Oldmans Creek Road.

Within Barrington Borough, 0.15 acres of the Good News Outreach Church property would be acquired for the Program improvements at Shreve Avenue.

Within Lawnside Borough, portions of three church properties would be acquired for proposed improvements to Warwick Road including: 0.01 acres of the Emanuel Church of God in Christ; and 0.02 acres of the Grace Temple Baptist Church. In addition, 0.07 acres of the Borough of Lawnside Police and Fire Department property would be acquired for the Program.

Within Cherry Hill Township, 0.27 acres of the United States Postal Service property would be acquired for the proposed improvements to Haddonfield-Berlin Road. In addition, 0.22 acres of the High Place Church property would be acquired for the proposed improvements to East Marlton Pike (NJ Route 70).

Interchange 2

There are no community facilities within the Interchange 2 study area.

Interchange 3

The Runnemede Public Library and the adjacent Runnemede Youth Athletic Association baseball fields are both located within the study area of Interchange 3. The Program would not require additional ROW from these properties; however, access to these facilities could be temporarily affected during construction due to staging or equipment blocking entrance or exit points.

Interchange 4

There are no community facilities within the Interchange 4 study area.

4.4.4 Minimization and Mitigation

The findings for community cohesion and community facilities described in this EIS are preliminary and subject to refinement during Final Design. At that time, the NJTA would consider ways to reduce or eliminate impacts to community cohesion and community facilities, including refining ROW needs, construction phase planning to avoid or minimize disruption of traffic and access, and further examination of the feasibility and reasonableness of noise barriers. Sections 4.3.4 (Property Acquisitions and Displacements), 4.7.4 (Visual and Aesthetic Effects), and 4.9.4 (Noise) describe the minimization and mitigation measures to be further considered by the NJTA during Final Design. In addition, the NJTA would continue outreach to affected communities and undertake coordination with property owners affected by proposed ROW acquisition.

4.5 PARKS, RECREATION AREAS, AND OPEN SPACE

An examination of the impacts to parks, recreation areas, and open space resources was conducted to assess potential impacts of the No-Build Alternative and the IPA. Resources in this analysis include parks and outdoor recreational facilities as well as publicly owned open space resources. NJDEP defines open space as “the basic resource for the development of recreational facilities and for satisfying the recreational needs of the state’s citizens.” Open space land is left in its natural state for the enjoyment of the public and to protect biodiversity. Parks and recreational facilities typically include playgrounds, ball fields, soccer fields, bike trails, golf courses, and others. However, parks and recreational facilities can also be designated for passive recreation.

The NJDEP administers the New Jersey Green Acres Program under N.J.A.C. 7:36, which ensures residents and visitors of New Jersey have an adequate supply of public open space and conservation areas. The program provides funding to aid in the conservation of public open space and the protection of natural resources and wildlife habitats. The program also maintains procedures and standards for the maintenance of parkland resources acquired or developed with Green Acres funding.

The enabling legislation of the Green Acres Program establishes restrictions and compensation requirements for the use of all parkland resources, whether funded through Green Acres programs or unfunded resources held by local governments for recreation and conservation purposes, for anything other than outdoor recreation and/or conservation purposes. If Green

Acres funding is used to acquire and/or develop all or part of a park, recreational area or open space resource, then all of a parkland's resources, including those facilities not acquired or developed with Green Acres funding, become subject to, or "encumbered by," Green Acres restrictions and compensation requirements.

4.5.1 Methodology and Data Sources

An assessment of parks, recreation areas, open spaces, and Green Acres lands was conducted within a study area of 500 feet from either side of the Turnpike ROW and 100 feet from the existing edge of local road crossings. The analysis identifies the location of direct and indirect impacts. Parks, open space, and recreational facilities data were obtained from the Recreation and Open Space Inventory (ROSI) database maintained by the Green Acres Program and GIS data provided by the NJDEP Bureau of GIS. Additional public open spaces were identified using county parcel and MOD-IV tax list search databases.

4.5.2 Affected Environment

Parks and open spaces identified within the study area are listed below in **Table 4.5-1** and shown in the map titled, Community Facilities Map (Appendix B).

Table 4.5-1: Parks and Public Open Space

Site	Type	Owner	Approximate Location	Vehicular Access Point	Municipality
Narraticon Lake Park	Green Acres	Borough of Swedesboro	MP 11.0–MP 11.2 NS	Via Park Avenue	Woolwich Township
New Jersey Natural Land Trust	Open Space	New Jersey Natural Lands Trust	MP 11.5–MP 12.1 NS	These parcels abut residential neighborhood accessed via Franklinville Road	Woolwich Township
Thompson Park	Green Acres	East Greenwich Township	MP 15.0-MP 15.3 NS	Via East Wolfert Station Road	East Greenwich Township
Hidden Acres Township Park	Open Space	East Greenwich Township	MP 17.3–MP 17.6 SN	Via Jessups Mill Road to Turnpike overpass near MP 16.7	East Greenwich Township
Shady Lane Child Development Center	Green Acres	Gloucester County Improvement Authority	MP 17.4-MP 17.7 NS	Via County House Road	East Greenwich Township
Mantua Creek Wildlife Management Area	Green Acres	New Jersey Department of Environmental Protection	MP 18.2–MP 18.7 NS	Via Mantua Pike	West Deptford Township
West Deptford Township Green Acres	Green Acres	West Deptford Township	MP 19.4–MP 19.7 NS	Via Parkville Road	West Deptford Township

Site	Type	Owner	Approximate Location	Vehicular Access Point	Municipality
West Deptford Township Green Acres	Green Acres	West Deptford Township	MP 19.4–MP 19.7 SN	Via Mantua Pike	West Deptford Township
West Deptford Township Basketball Court	Green Acres	West Deptford Township	MP 20.1–MP 20.2 SN	Via Mantua Pike	West Deptford Township
Deptford Township Green Acres	Green Acres	Deptford Township	MP 21.5 SN	Via Tanyard Road	Deptford Township
Ward Drive Playground	Green Acres	Deptford Township	MP 21.7 SN	Via Maple Road and Iszard Road	Deptford Township
Deptford Free Public Library	Green Acres	Deptford Township	MP 21.7-MP 21.8 SN	Via Poplar Road	Deptford Township
Woodbridge Park Playground	Open Space	Deptford Township	MP 22-MP 22.5 NS	Via Cooper Street	Deptford Township
NJDEP Division of Fish and Wildlife	Open Space	New Jersey Department of Environmental Protection	MP 24.0–MP 24.3 NS	Via Almonesson Road	Deptford Township
Deptford Sports Complex	Green Acres	Deptford Township – Stauffer Fields	MP 24.0–MP 24.6 SN	Via Westville-Almonesson Road	Deptford Township
Green Acres Park	Green Acres	Borough of Runnemede	MP 24.8–MP 25.3 SN	Via Dettmar Terrace and 3rd Avenue	Runnemede Borough
Runnemede Sewerage Authority	Green Acres	Runnemede Sewerage Authority	MP 25.4–MP 25.5 SN	Via Broadway and Crescent Avenue	Runnemede Borough
Runnemede Youth Athletic Association	Green Acres	Borough of Runnemede	MP 25.7–MP 25.8 SN	Via Elm Avenue	Runnemede Borough
Runnemede Public Library	Green Acres	Borough of Runnemede	MP 25.8 SN	Via Elm Avenue and Constitution Drive	Runnemede Borough
Bellmawr Borough Green Acres	Green Acres	Bellmawr Borough	MP 26.4 NS	Via Roberts Avenue	Bellmawr Borough
Edward R. Deerr Field	Open Space	Borough of Barrington	MP 26.5–MP 26.7 SN	Via East Clements Bridge Road	Barrington Borough
Barrington Little League Field	Open Space	Borough of Barrington	MP 27.1–MP 27.3 NS	Via Shreve Avenue	Barrington Borough
Borough of Lawnside Police/Fire Department	Green Acres	Lawnside Borough	MP 28.2 NS	Via North Douglas Avenue	Lawnside Borough

Site	Type	Owner	Approximate Location	Vehicular Access Point	Municipality
Borough of Lawnside Green Acres	Green Acres	Lawnside Borough	MP 29.1–MP 29.2 SN	Via Essex Road	Lawnside Borough
Cherry Hill American Little League	Green Acres	Cherry Hill Township	MP 29.3–MP 29.5 NS	Via Haddonfield-Berlin Road	Cherry Hill Township
Cherry Hill Township Green Acres	Green Acres	Cherry Hill Township	MP 30.3–MP 30.5 SN	Via Browning Lane	Cherry Hill Township
Haddontown Tennis Courts	Green Acres	Cherry Hill Township	MP 30.4 NS	Via Plymouth Drive	Cherry Hill Township
Cherry Hill Township Green Acres	Green Acres	Cherry Hill Township	MP 31.6 NS	Via Covered Bridge Road	Cherry Hill Township
Mount Laurel Township Green Acres	Green Acres	Township of Mount Laurel	MP 36.0–MP 36.7 NS	Via Hooten Road	Mount Laurel Township
Mount Laurel Memorial Park	Green Acres	Township of Mount Laurel	MP 36.3–MP 36.8 SN	Via Mount Laurel Road	Mount Laurel Township

Source and Notes: NJDEP, ROSI, last updated August 4, 2021; NJ Geographic Information Network, Salem, Gloucester, Camden, and Burlington Counties Parcels and MOD-IV; Google Earth.

4.5.3 Environmental Consequences

Typical short-term construction effects would include increased levels of dust, vehicle emissions, noise, and vibration. Additional information on these effects can be found in Sections 4.8 (Air Quality) and 4.9 (Noise), respectively. Associated effects may also include temporary vehicular and pedestrian traffic pattern adjustments (i.e., temporary loss or relocation of parking, temporary visual impacts related to construction activities, or storage of materials and equipment).

Property acquisitions, discussed further in Section 4.3 (Property Acquisitions and Displacements) would be required for roadway improvements. NJTA will make all attempts to maximize use of their own ROW to avoid acquisition or easements of non-NJTA land for construction activities.

4.5.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes. The No-Build Alternative projects have the potential to impact parks, recreation areas and open space if additional ROW for those projects impacts such resources. The responsibility for assessing and addressing those impacts would be the responsibility of the sponsors of those projects.

4.5.3.2 Initially Preferred Alternative

This section describes the potential impacts of the Program on parks, recreational areas and open space based on Preliminary Design. As the Program advances, the NJTA would refine the design with a goal of avoiding or further minimizing impacts to these resources to the extent reasonably feasible.

Mainline Improvements

The mainline improvements have the potential to impact four properties that are designated as Green Acres lands or open space. Each potential impact is described below. **Table 4.5-2** summarizes potential impacts to Green Acres lands to accommodate mainline improvements.

Table 4.5-2: Mainline Impacts to Green Acres Lands

Owner	Block, Lot	Property Impact (Acres)	Approximate Location
Lawnside Borough	B 1216, L 2	0.074	MP 28.2 NS

Source: AECOM 2022.

The Borough of Lawnside Police Department and Fire Department are on Block 1216, Lot 2 in Lawnside Borough. Replacement of the Warwick Road bridge would require partial acquisition of this parcel. The land to be acquired would be a strip of land adjacent to the roadway. This parcel is Green Acres-encumbered, requiring the NJTA to coordinate with the NJDEP and the State House Commission.

Interchange 2

There are no parks, recreation areas, or open spaces in the study area at Interchange 2.

Interchange 3

The Bellmawr Borough Green Acres parcel and the Runnemede Youth Athletic Association baseball fields are within the study area at Interchange 3. Temporary access to the Runnemede Youth Athletic Association baseball fields and Edward R. Deerr Field may be impacted during construction due to staging or work areas at the entrance and exit points. No permanent ROW would be required from these parcels for the Program.

Interchange 4

There are no parks, recreation areas, or open spaces in the study area at Interchange 4.

4.5.4 Minimization and Mitigation

As the Program advances, the NJTA would refine the design and develop construction phase plans with a goal of avoiding or further minimizing impacts to parks, recreation areas, and open space to the extent reasonably feasible. In this regard, the NJTA would continue to coordinate with the municipalities that have jurisdiction over the affected properties. See Section 4.4.4 (Community Cohesion and Community Facilities) for more information on mitigation measures.

If the NJTA cannot avoid ROW that is encumbered Green Acres lands (e.g., conversion of land to a transportation use, or changes in access), a request for approval would be submitted to the NJDEP and the State House Commission. As part of the request for approval, the NJTA would identify the means of compensation for the land conversion, either in the form of replacement land or monetary compensation as summarized in **Table 4.5-3**.

Table 4.5-3: Table for Determining Minimum Compensation to be Provided for Major Disposals and Diversions of Parkland

		If compensation is to be provided in the form of replacement land		If compensation is to be provided in the form of monetary compensation	
		Minimum Ratios Based on Acreage[1]		Minimum Ratios Based on Market Value[2]	
Type of Diversion or Disposal	Program Sponsor	For Lands for Which Appraisals are Obtained	For Lands for Which Appraisal Waiver is Obtained	If Money is to be Used for Parkland Improvements	If Money is to be Used for Land Acquisition
Subsurface Easement Under Parkland (NJAC 7:36-26.10[i]1 and 2)	Public	1:1	1:1	2:1 $2,500 min.	2:1 $2,500 min
	Private	2:1	4:1	10:1 $2,500 min.	10:1 $2,500 min.
Surface Easement Over or Through Parkland (NJAC 7:36-26.10[i]3)	Public	1:1	2:1	4:1 $2,500 min.	4:1 $2,500 min.
	Private	4:1	6:1	10:1 $2,500 min.	10:1 $2,500 min.
Diversions or Disposals (NJAC 7:36-26.10[j]1 through 3)	Public	2:1	3:1	4:1 $5,000 min.	4:1 $5,000 min.
	Private	4:1	6:1	N/A	10:1 $5,000 min.
Legalizing Past Diversions or Disposals (NJAC 7:36-26.10[j]4)	Public	5:1	10:1	N/A	10:1 $10,000 min.
	Private	20:1	N/A	N/A	20:1 $10,000 min.

Source: N.J. Administrative Code § 7:36-26.10

Notes: 1. Ratio of acreage of land to be offered as compensation to the acreage of the land to be disposed of or diverted. 2. Ratio of monetary compensation to be offered as compensation, in dollars, to the market value of the land to be disposed of or diverted, in dollars.

4.6 HISTORIC AND ARCHAEOLOGICAL RESOURCES

This section examines the affected environment of the Program as it pertains to Federal and state cultural resources laws and regulations. Cultural resources include both historic architectural and archaeological resources. Historic architectural and archaeological investigations are currently ongoing as the Program design progresses, with additional results to be reported at a later date.

At the Federal level, cultural resources investigations are being conducted to comply with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR Part 800). At the state level, cultural resources investigations are being conducted to comply with New Jersey Executive Order No. 215, the permitting requirements of the Freshwater Wetlands Protection Act (N.J.S.A. 13:9B-1 *et seq*.), administered by the NJDEP Division of Land Resource Protection; and the New Jersey Register of Historic Places Act (N.J.S.A. 13:1B – 15.128 *et seq*.). Under these Federal and state regulations, consultation with the New Jersey Historic Preservation Office (NJHPO) is required. The results of these investigations will provide the basis for Program consultation with the NJHPO, Federal agencies, and consulting parties.

Consultation with the NJHPO was initiated for the Program on August 18, 2021. The notification letter contained a brief Program description, a list of previously recorded historic architectural resources in the 500-foot study area, a list of previously conducted architectural-related studies in the study area, a list of archaeological sites abutting the ROW, and the proposed methodologies for the historic architectural and archaeological studies (Appendix C). The letter also included a proposed preliminary Area of Potential Effect (APE) for the architectural history reconnaissance survey. On October 6, 2021, and March 23, 2022, virtual meetings were conducted with the NJHPO concerning the architectural APE and architectural survey methodology. Additional email correspondence with the NJHPO was also conducted to clarify the architectural APE and methodology (Appendix C). A list of consulting parties was submitted to the NJHPO for review on September 29, 2022; NJHPO concurred with minor modifications on October 25, 2022.

4.6.1 Methodology and Data Sources

The cultural resources investigations undertaken for the Program consisted of background research and field investigations to identify historic properties and archaeological sites which may be eligible for inclusion in the National Register of Historic Places (NRHP) or the New Jersey Register of Historic Places (SR). Field investigations are on-going and will be reported at a later date.

4.6.1.1 Background Research

Background research was conducted to determine the presence or absence of previously recorded historic and archaeological resources within the Program area. Initial research was conducted in July and August 2021 and included a review of online data from the NJHPO's online mapping viewer of the state's cultural resources inventory. The viewer, called LUCY, provides locational data, NRHP/SR eligibility status, and previous cultural resources studies. Additional background research was conducted at NJHPO on September 1, 2022, to gather files and reports for previously documented historic architectural and archaeological resources, as well as general background information to build the historic context. This research included the collection of files on SR and NRHP-listed and eligible resources, survey forms, reports that were produced as part of municipal and county-wide surveys, and other cultural resource surveys and compliance studies conducted within the APE. Digital NJHPO data was acquired in the form of GIS layers and associated metadata from the New Jersey Office of Information Technology (OIT) of known historic districts, historic properties, and historic property features. These datasets were used to locate known historic resources in preparation for the field survey effort and they also provided preliminary boundaries and locational data for future mapping needs.

Research at the NJHPO was supplemented with a review of local histories, historic maps and atlases, historic aerial photographs and other materials to assist with identifying cultural resources and understanding the historical development of the project area.

Additional archaeological research was conducted to supplement information gathered at the NJHPO. Archaeological site information was obtained from the New Jersey State Museum (NJSM) in 2021 to determine the presence or absence of previously recorded archaeological sites. The NRHP and SR eligibility status of archaeological sites were checked against the most current NRHP, and SR listings published by the NJHPO. Available archaeological survey reports were reviewed to assess the extent of prior archaeological survey near the Program area. Research was also undertaken at the NJTA's archives room in Woodbridge, New Jersey in September 2022 to gather photographs and other documentary material which, in conjunction with the circa 1950 ROW plans associated with construction of the Turnpike's mainline, was used in the assessment of the archaeological potential and development of a historic context.

Assessment of the archaeological sensitivity was based on soil classification, proximity to water, and registered archaeological site locations which identify areas of pre-contact period archaeological potential. Historic-period archaeological potential was based largely on the background research, including presence of map-documented structures and previously-registered historic-period archaeological sites. Areas lacking archaeological potential were identified through review of Turnpike construction plans and mid-twentieth century photographs, construction photographs, and 1950s aerial photographs.

Area of Potential Effects. The APE, as defined in 36 CFR 800.16(d) as amended, is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking." Historic properties are identified as buildings, sites, structures, objects, districts, or landscapes. The APE includes an archaeological APE and a historic architectural APE.

The archaeological APE is the area that encompasses the limits of disturbance (LOD) for the proposed improvement work necessary for the construction of the Program. The figure titled, Limits of Disturbance (LOD) Map (Appendix B), shows the LOD for the Program. It is the area where the Program has the potential to physically damage or destroy archaeological sites through excavation, demolition, construction, grading, infilling, or other ground-disturbing actions. Based on Preliminary Design plans for the Program, activities expected to result in ground disturbance for the Program include the roadway capacity improvements and related grading, interchange improvements, construction of SWM basins and drainage infrastructure, installation/relocation of buried utilities, construction of highway noise barriers, vegetation removal and grubbing, construction staging and sediment stockpiling areas, and access road construction. To allow flexibility in ongoing Program design, the archaeological APE currently includes the entirety of the Turnpike ROW between MP 3.5 and MP 36.5, including the ramps at Interchanges 2, 3, and 4 extending to each respective toll plaza. A 200-foot buffer around the archaeological APE was used in consideration of previously recorded archaeological resources whose boundaries may extend into the archaeological APE. As Program plans further develop, additions to the archaeological APE may include additional areas used for construction staging, borrow pits, wetlands mitigation, or construction activities extending beyond the current ROW.

The architectural APE includes the archaeological APE or LOD, as well as any properties intersected by the LOD. In addition, the architectural APE includes adjacent properties that may be visually or contextually affected by the Program, such as modifications to interchanges, construction of SWM basins, highway noise barriers, temporary access roads, and removal and replacement of existing bridges. The architectural APE also includes areas where existing vegetation and trees are proposed for removal and adjacent properties that may be visually affected by changes to the setting. Because much of the Program would be undertaken within the existing Turnpike ROW, the architectural APE is confined to the ROW in locations where that is the only proposed activity. In areas where SWM facilities, noise barriers, new access roads, and ROW acquisition are proposed, the architectural APE is extended beyond the existing ROW to account for any potential physical and visual effects associated with those activities.

4.6.1.2 Field Survey

The Phase I archaeological field investigation is being overseen by Secretary of the Interior qualified archaeologists and consists of systematic subsurface surveys being undertaken in: 1) the vicinity of previously-registered archaeological resources located within or adjacent to the archaeological APE, and 2) portions of the archaeological APE where Program impacts are proposed in areas possessing archaeological potential. The archaeological field investigation commenced in March 2022 and is currently ongoing. Subsurface testing consists of the

excavation of shovel test pits (STPs) at 50-foot (15-meter) intervals along linear transects within the archaeological APE. Systematic shovel testing is supplemented by excavation of judgmental STPs based on existing conditions at the discretion of the Program archaeologist. Field observations of existing grading, cutting, and buried utilities are being documented, and subsurface testing is adjusted to avoid areas of prior comprehensive grading. The STPs are being excavated in the wooded portion of the ROW beyond the graded roadside ditch. Radial STPs are being excavated at 25-foot (7.5-meter) intervals around STPs from which pre-contact or historic artifacts are recovered. Modern items, including roadside debris, are noted on STP forms but not retained. Artifacts are transported to the AECOM laboratory in Burlington, New Jersey for processing and cataloging.

To date, the archaeological field investigation has focused on the survey of previously registered archaeological sites in and adjacent to the archaeological APE as well as the location of several proposed SWM basins. With respect to previously registered site locations, archaeological field survey has been aimed at identifying whether portions of these resources are present within the archaeological APE, and if so, whether associated cultural deposits are intact or have otherwise been subject to disturbance or destruction through Turnpike construction or maintenance activities. The goal of the archaeological survey for the proposed SWM basins is the identification of potential archaeological resources, if present, in locations where ground disturbance is proposed in the archaeological APE. Additional archaeological fieldwork will continue as Program design progresses.

The historic architectural field work was conducted by Secretary of the Interior-qualified architectural historians and historians in June and July 2022. An initial field view was conducted in June to get a sense of the historic resources within the preliminary architectural APE to plan for the intensive-level survey. This initial deployment consisted of a windshield survey to photograph the Program area, determine the potential extent of visibility of Program activities and components, and to refine the preliminary architectural APE as necessary. Prior to the intensive-level field work, all NRHP listed, eligible, and identified resources recorded at the NJHPO were located and mapped. In addition, architectural historians and historians reviewed historic aerial images to determine the presence and location of previously unrecorded historic architectural resources over 45 years of age within the preliminary architectural APE. The intensive-level survey was conducted in July 2022 to capture detailed physical information, locational data, and photographs for all historic architectural resources within the architectural APE.

4.6.2 Affected Environment

A description of the previously recorded historic architectural and archaeological resources within the APEs is provided below. The map titled, Historic Architectural Resources Map, in Appendix B depicts the locations of the historic architectural resources.

4.6.2.1 Previously Recorded Historic Architectural Resources

A review of NJHPO data determined there are 29 previously recorded historic architectural resources within or intersected by the architectural APE. Of those, two are individual properties listed in the NRHP: one is an individual property eligible for listing in the NRHP and one is a NRHP-eligible railroad historic district. Eighteen individual resources were recorded as part of other investigations (local county surveys and state or Federal compliance studies) but have not been formally assessed for NRHP or SR eligibility. One resource, the Woolwich Township Agricultural Historic District, was determined to be not eligible for listing in the NRHP. Six previously recorded resources that were identified as part of the Woolwich Township Agricultural Historic District have been demolished since they were last surveyed.
The eighteen resources that were previously recorded but not evaluated for NRHP or SR eligibility were surveyed and evaluated as part of the historic architectural intensive-level survey; AECOM is recommending three eligible for listing in the NRHP and/or SR and 15 not eligible for listing in the NRHP or SR. See **Table 4.6-1** for a list of all NRHP/SR listed, eligible, not eligible, and previously recorded historic architectural resources within the architectural APE.

Table 4.6-1: Previously Recorded Historic Architectural Resources in the Area of Potential Effects

Name/Address	AECOM Survey ID	Municipality	County	NRHP/SR Eligibility Status	AECOM Eligibility Recommendation
84 Pointers-Auburn Road	S-032	Oldmans Township	Salem	Identified 8/16/2002	Recommended Not Eligible
56 Pointers-Auburn Road	S-042	Oldmans Township	Salem	Identified 8/16/2002	Recommended Not Eligible
344 Pedricktown-Woodstown Road	S-041	Oldmans Township	Salem	Identified 8/16/2002	Recommended Not Eligible
343 Sharptown-Auburn Road	S-002	Oldmans Township	Salem	Identified 8/16/2002	Recommended Not Eligible
500 Auburn Road	S-001	Pilesgrove Township	Salem	Identified 8/23/2002	Recommended Not NR/SR Eligible
Woolwich Township Agricultural Historic District	G-175	Woolwich Township	Gloucester	Not Eligible 7/25/2008 (SHPO Opinion)	Not Eligible
1771 Oldmans Creek Road	G-021	Woolwich Township	Gloucester	Identified/Not Eligible (Woolwich Twp. HD) 7/25/2008	*Demolished*
325 King's Highway	G-008	Woolwich Township	Gloucester	Identified 8/26/1987	*Demolished*
2210 King's Highway	G-017	Woolwich Township	Gloucester	Identified/Not Eligible (Woolwich Twp. HD) 7/25/2008	*Demolished*

Name/Address	AECOM Survey ID	Municipality	County	NRHP/SR Eligibility Status	AECOM Eligibility Recommendation
123 Rainey Road	G-019	Woolwich Township	Gloucester	Identified/Not Eligible (Woolwich Twp. HD) 7/25/2008	*Demolished*
81 Rainey Road	G-020	Woolwich Township	Gloucester	Identified/Not Eligible (Woolwich Twp. HD) 7/25/2008	*Demolished*
Russell Mill Road (Vernacular Farmhouse)	G-007	Woolwich Township	Gloucester	Identified 8/26/1987	Recommended Not Eligible
9 Russell Mill Road	G-005	Woolwich Township	Gloucester	Identified 8/26/1987	Recommended Not Eligible
138 Pancoast Road	G-006	Woolwich Township	Gloucester	Identified 8/26/1987	*Demolished*
80 East Tomlin Station Road	G-002	East Greenwich Township	Gloucester	Identified 8/26/1987	Recommended Not Eligible
68 Cedar Road	G-149	East Greenwich Township	Gloucester	Identified 8/26/1987	Recommended Not Eligible
129 East Cohawkin Road	G-004	East Greenwich Township	Gloucester	Identified 8/26/1987	Recommended Not Eligible
Strawberry Vale	G-022	West Deptford Township	Gloucester	Identified 8/7/2008	Recommended Not Eligible
Lord-Moore House	G-013	West Deptford Township	Gloucester	Identified 8/26/1987	Recommended Eligible
West Jersey & Seashore Railroad: Camden to Cape May Line	G-173	Woodbury Heights Borough	Gloucester	Identified 12/5/2013	Recommended Eligible
Preferred Automotive/380 Barlow Avenue	G-023	Woodbury Heights Borough	Gloucester	Identified 5/1/2018	Recommended Not Eligible
363 Glassboro Road	G-025	Woodbury Heights Borough	Gloucester	Identified 12/5/2013	Recommended Not Eligible
Nathan [and Amy] Ward House	G-011	Deptford Township	Gloucester	Identified 8/26/1987	Recommended Eligible
Sullivan House	G-001	Deptford Township	Gloucester	NRHP Eligible 12/6/1991 (SHPO Opinion)	NRHP Eligible
Peter Mott House	C-001	Lawnside Borough	Camden	NRHP/SR Listed 9/8/1994 (NRHP); 8/1/1994 (SR)	NRHP/SR Listed

Name/Address	AECOM Survey ID	Municipality	County	NRHP/SR Eligibility Status	AECOM Eligibility Recommendation
Lawnside School/Lawnside Public School/Lawnside Elementary School	C-002	Lawnside Borough	Camden	NRHP Listed 03/17/2015 (NRHP); 1/23/2015 (SR)	NRHP/SR Listed
1603 Atlantic Avenue	C-005	Cherry Hill Township	Camden	Identified 6/1/2006	Recommended Not Eligible
Camden and Atlantic Railroad Historic District	C-215	Cherry Hill Township	Camden	NRHP Eligible 9/17/2001 (SHPO Opinion); 10/25/2012 (COE)	NRHP Eligible
1801 Old Cuthbert Road	C-004	Cherry Hill Township	Camden	Identified 6/1/2006	Recommended Not Eligible

Source: New Jersey Historic Preservation Office LUCY online viewer.

Notes: COE stands for “Certificate of Eligibility” and SHPO Opinion stands in for “State Historic Preservation Office Opinion of Eligibility.”

4.6.2.2 Previously Recorded Archaeological Resources

Based on review of NJSM archaeological site files as well as available cultural resources survey reports, a total of eighteen previously recorded archaeological sites are located within or adjacent to the archaeological APE (**Table 4.6-2**).

Table 4.6-2: Previously Recorded Archaeological Resources in or Adjacent to the APE

Site	Municipality	County	Temporal Association	Site Type	NRHP Eligibility Status	Field Verification Status as of October 2022
28Sa132	Carneys Point Township	Salem	Pre-Contact	Artifact Scatter		No evidence of site identified in APE
28Sa196	Pilesgrove Township	Salem	Historic	19th-20th c. Artifact Scatter		Field investigation not yet completed
28Sa200	Pilesgrove Township	Salem	Pre-Contact	Artifact Scatter		Field investigation not yet completed
28Gl298	Woolwich Township	Gloucester	Pre-Contact	Artifact Scatter		No evidence of site identified in APE
28Gl431	Woolwich Township	Gloucester	Historic	19th-20th c. Artifact Scatter		No evidence of site identified in APE
Not Assigned	Woolwich Township	Gloucester	Pre-Contact	Indeterminate		No evidence of site identified in APE
28Gl16	Woolwich Township	Gloucester	Pre-Contact: Middle Archaic-Late Woodland	Artifact Scatter		No evidence of site identified in APE
28Gl342	East Greenwich Township	Gloucester	Pre-contact: Late Archaic-Early Woodland	Artifact Scatter	SHPO Opinion: 4/17/2019	Field investigation not yet completed
28Gl300	West Deptford Township	Gloucester	Historic	19th-20th c. Possible Tenant House		Cultural material identified in APE
28Gl211	Woodbury Heights Borough	Gloucester	Pre-Contact	Artifact Scatter		No evidence of site identified in APE
28Gl301	Deptford Township	Gloucester	Historic	19th c. Foundation and Artifact Scatter		Cultural material identified in APE
28Gl302	Deptford Township	Gloucester	Pre-Contact	Artifact Scatter		Cultural material identified in APE
28Gl103	Deptford Township	Gloucester	Pre-Contact	Artifact Scatter	SHPO Opinion: 11/25/1981	No evidence of site identified in APE
28Gl303	Deptford Township	Gloucester	Unknown	Unknown		Field investigation not yet completed
28Ca20	Runnemede Borough	Camden	Pre-Contact	Artifact Scatter		Field investigation not yet completed
28Ca90	Lawnside Borough	Camden	Historic	19th-20th c. Residential District		Field investigation not yet completed
28Bu43	Mount Laurel Township	Burlington	Pre-Contact	Artifact Scatter		Cultural material identified in APE
28Bu242	Mount Laurel Township	Burlington	Historic	19th c. Farmstead		No evidence of site identified in APE

Source**:** New Jersey State Museum archaeological site files.

Of these 18 previously recorded archaeological sites, 11 are pre-contact resources characterized generally as artifact scatters based on available information (i.e., 28Sa132, 28Sa200, 28Gl298, [Not Assigned], 28Gl16, 28Gl342, 28Gl211, 28Gl302, 28Gl103, 28Ca20, and 28Bu43). The site lacking a site number was reported in Woolwich Township, Gloucester County by Alanson Skinner and Max Schrabisch during the early twentieth century. These resources varied in the density and nature of artifacts recovered with NJSM site forms indicating stone tools, pottery, lithic debitage, fire-cracked rock, and steatite vessel fragments recovered from various sites in the archaeological APE. Cultural deposits at a small number of the previously-recorded pre-contact sites were reported from soil horizons buried beneath approximately one foot (0.3 meters) of redeposited fill sediment related to Turnpike construction. Two of the previously recorded pre-contact sites located adjacent to the archaeological APE are considered to be eligible for the NRHP by the NJHPO. These sites include 28Gl342 (SHPO Opinion: 4/17/2019) in East Greenwich Township, Gloucester County, and 28Gl103 (SHPO Opinion: 11/25/1981) in Deptford Township, Gloucester County.

In addition, six historic-period archaeological resources have also been previously recorded in or adjacent to the archaeological APE (i.e., 28Sa196, 28Gl431, 28Gl300, 28Gl301, 28Ca90, and 28Bu242). Site types represented include artifact scatters, farmsteads, a possible tenant house, and a residential district. The historic-period sites date to the nineteenth and early twentieth centuries based on information available from site forms. One additional site, 28Gl303, is of indeterminate cultural/temporal association as a site form was not available.

Currently, twelve of the eighteen previously recorded archaeological sites have been subject to field investigation to determine whether intact portions of these sites are present within the archaeological APE. These sites include: 28Sa132, 28Gl298, 28Gl431, [Not Assigned], 28Gl16, 28Gl300, 28Gl211, 28Gl301, 28Gl302, 28Gl103, 28Bu43, and 28Bu242. Systematic subsurface surveys resulted in the identification of potential cultural deposits at four of these sites, including 28Gl300, 28Gl301, 28Gl302, and 28Bu43. Analysis of recovered cultural material from these sites is ongoing. Detailed reporting and management recommendations for these sites will be prepared in a report to be submitted to the NJHPO for review. Archaeological field investigations in and near the locations of the remaining previously recorded sites did not identify evidence of intact archaeological deposits within the archaeological APE for the Program. Field surveys of the six remaining sites (28Sa196, 28Sa200, 28Gl342, 28Gl303, 28Ca20, and 28Ca90) are planned.

4.6.2.3 Newly Identified Historic Architectural Resources

Background research and field investigations identified 169 previously undocumented historic architectural resources within the architectural APE that were constructed prior to 1975 and were not previously identified by NJHPO. These include 161 individual properties, 5 residential streetscapes, one thematic district of Turnpike bridges, one historic district, and one railroad historic district. AECOM architectural historians conducted an intensive-level survey of these newly identified historic architectural resources and evaluated them for NRHP and SR eligibility. AECOM is recommending two resources eligible for listing in the NRHP and/or SR and 167 resources as not eligible for listing in the NRHP or SR. The table titled, Newly Identified Historic Architectural Resources (Appendix D), lists the newly identified resources within the architectural APE.

4.6.2.4 Newly Identified Archaeological Resources

To date, one previously unrecorded archaeological resource has been identified in the archaeological APE. This resource was identified in Woolwich Township, Gloucester County and consists of a brick shaft feature measuring 8.9 feet in diameter and approximately 6.6 feet (2.0 meters) in depth located atop the slope of the Turnpike road cut. The feature may represent a historic cistern or cesspool. No associated foundation was observed in the archaeological APE during the initial field investigation, though a small concrete strip or slab was observed on the ground surface approximately 34.4 feet away. Judgmental STPs placed around the brick feature resulted in the recovery of historic ceramics, glass, and metal artifacts from plow zone layer. The site was registered with the NJSM as Site 28Gl494. Recommendations are currently pending additional analysis of the site. The NJHPO will be consulted on treatment of this site when reporting is completed. Additional archaeological resources may be identified through on-going Phase I archaeological surveys in the APE.

4.6.3 Environmental Consequences

This section discusses potential impacts of the No-Build Alternative and the IPA to cultural resources located within the APEs.

4.6.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for project purposes. Under the No-Build Alternative, the Program would not impact NRHP or SR listed or eligible cultural resources. Other projects in the No-Build Alternative could impact cultural resources; evaluation of that potential is the responsibility of the sponsors of those projects.

4.6.3.2 Initially Preferred Alternative

Mainline Improvements

Historic architectural and archaeological resources that fall within the APE have the potential to be affected by the mainline improvements.

Historic Architectural Resources

There are nine historic properties in the APE that are listed in, eligible for listing in, or recommended eligible for listing in the NRHP or SR and therefore, have the potential to be affected by the mainline improvements. Historic properties in the APE consist of two NRHP/SR-listed historic properties; two NRHP/SR-eligible historic properties; and five historic properties that are recommended eligible for listing in the NRHP and/or SR as the result of this investigation. The formal assessment of effects of the mainline improvements on historic properties will occur after the NJHPO has reviewed the intensive-level architectural history survey report and concurred with the eligibility findings. See **Table 4.6-3** below for a list of NRHP/SR-listed, eligible, and recommended eligible historic properties in the APE.

Table 4.6-3: Historic Properties in the APE that have the Potential to be Affected by Mainline Improvements

Name/Address	AECOM Survey ID	Municipality	County	NRHP/SR Eligibility Status
West Jersey & Seashore Railroad: Camden to Cape May Line	G-173	Woodbury Heights Borough	Gloucester	Recommended Eligible for the NRHP and SR
Lord-Moore House	G-013	West Deptford Township	Gloucester	Recommended Eligible for the NRHP and SR
Nathan and Amy Ward House	G-011	Deptford Township	Gloucester	Recommended Eligible for the NRHP and SR
Sullivan House	G-001	Deptford Township	Gloucester	NRHP Eligible 12/6/1991 (SHPO Opinion)
Camden and Atlantic Railroad Historic District	C-215	Cherry Hill Township	Camden	NRHP Eligible 9/17/2001 (SHPO Opinion); 10/25/2012 (COE)
Atlantic City Railroad: Camden to Atlantic City Main Line	C-126	Lawnside Borough	Camden	Recommended Eligible for the NRHP and SR
Lawnside Historic District	C-218	Lawnside Borough	Camden	Recommended Eligible for the NRHP and SR
Peter Mott House	C-001	Lawnside Borough	Camden	NRHP/SR Listed 9/8/1994 (NRHP); 8/1/1994 (SR)
Lawnside School/Lawnside Public School/Lawnside Elementary School	C-002	Lawnside Borough	Camden	NRHP Listed 03/17/2015 (NRHP); 1/23/2015 (SR)

COE – Certification of Eligibility

Source: AECOM 2022. Archaeological Resources

The potential exists for the Program to impact previously identified archaeological sites, described in Section 4.6.2 (Affected Environment), as well as archaeological resources that have not previously been identified. Construction of the Turnpike during the mid-twentieth century involved considerable ground disturbance, including cutting, filling, grading, and other earthmoving activities related to road construction. Historic aerial imagery suggests that a considerable portion of the archaeological APE was subject to prior earthmoving activities, which has likely resulted in the destruction or redeposition of strata containing potential archaeological deposits. Such disturbance has been observed and documented at several locations within the archaeological APE during the archeological field investigation. Despite this history of extensive ground disturbance within the archaeological APE, field investigations have identified some locations where grading is not comprehensive and archaeological deposits are present.

Based on the results of the background research and the archaeological field investigation to date, previously recorded as well as not previously recorded archaeological sites are within or adjacent to the archaeological APE as described in Section 4.6.2 (Affected Environment). As a result, the Program has the potential to impact archaeological resources.

Interchange 2

Historic Architectural Resources

There are no historic architectural resources within the architectural APE for Interchange 2, so the potential for an effect resulting from the Program is unlikely.

Archaeological Resources

Background research did not indicate the presence of previously recorded archaeological resources within or adjacent to Interchange 2. Previously undocumented archaeological resources may be present at this location pending completion of the archaeological field investigation.

Interchange 3

Historic Architectural Resources

There are no historic architectural resources within the architectural APE for Interchange 3, so the potential for an effect resulting from the Program is unlikely.

Archaeological Resources

Site 28Ca20 is situated within Interchange 3 along the SN roadway. This site consists of a surface scatter of prehistoric artifacts including a sherd of pottery and jasper and chert tools. It was recorded in 1941 and was likely heavily impacted if not completely obliterated by the construction of the interchange. Field investigation of this archaeological resource has not yet been undertaken. Assessment of Program impacts to this archaeological resource will be undertaken when the field investigation is complete and Program design has advanced.

No other previously recorded archaeological resources occur within 100 feet of this interchange. Further archaeological investigations for previously unidentified archaeological resources may be necessary to comply with Section 106.

Interchange 4

Historic Architectural Resources

There are no historic architectural resources within the architectural APE for Interchange 4, so the potential for an effect resulting from the Program is unlikely.

Archaeological Resources

Background research did not indicate the presence of any previously recorded archaeological resources within or adjacent to Interchange 4. Previously undocumented archaeological resources may be present at this location pending completion of the archaeological field investigation.

4.6.4 Minimization and Mitigation

Minimization and mitigation strategies associated with the Program's impacts to NRHP/SR-listed or eligible archaeological resources would be considered in consultation with NJTA and NJHPO. Phase II archaeological evaluations would be conducted to determine if archaeological sites are NRHP/SR-eligible. If NRHP/SR-eligible archaeological resources would be impacted by the Program, mitigation measures would be developed during Final Design. Measures to minimize impacts or avoid impacts through matting or protective measures would be considered. In general, mitigation measures include archaeological data recovery. Alternative mitigation measures may be developed in consultation with NJHPO, as appropriate.

Regarding historic architectural resources, if the effects assessment determines that NRHP/SR-listed or -eligible resources would be adversely affected by the Program, then measures to avoid, minimize, or mitigate the adverse effects would be considered in consultation with NJTA and NJHPO. For instance, if the adverse effect is visual, various devices could be explored to shield or buffer the view of the proposed improvements from the historic property. If the adverse effect is a physical impact to a historic property, then various mitigation approaches can be considered that seek to resolve or lessen the adverse effect by other means.

A memorandum of agreement (MOA) may be necessary to resolve adverse effects to significant NRHP/SR-listed or eligible historic properties.

4.7 VISUAL AND AESTHETIC EFFECTS

Executive Order 215 recognizes the visual, scenic, and aesthetic qualities of a landscape as an environmental component that is to be considered in a project's environmental documentation. In addition to this requirement to consider aesthetic quality, the general public is increasingly demanding aesthetic enhancements to existing and proposed transportation facilities.

Aesthetics is most often associated with a sense of beauty. By definition, it "relates to the enjoyment or study of beauty (Cambridge Advanced Learners Dictionary, 2003). With respect to the practice of transportation design, aesthetics deals with the visual integration of highways and other transportation modes into the fabric of a landscape in a way that blends with or complements that setting. This is important since the view to and from highways and other transportation facilities contributes to the perception of communities and the quality of a place.

Visual quality refers to the aesthetics of a view. Although assessing visual quality is subjective, a standard approach for such assessment has been developed by the Federal Highway Administration (FHWA) for use in documenting its own actions; this approach employs the criteria of vividness, intactness, and unity (FHWA, 1983). Vividness is the visual power or memorability of landscape components as they combine in a visual pattern. Intactness is the visual integrity of the natural and artificial landscape and its freedom from encroaching elements. Unity is the visual coherence and compositional harmony of the landscape considered as a whole.

Visual resources may include unique views and views identified as important in local plans as well as those from properties listed in or eligible for listing in the NRHP or SR, state parks, and county parks.

Visual and aesthetic conditions along the Program's corridor from MP 3.5 to MP 36.5 and within a 500-foot study area around the Program are described in the Affected Environment section. The Environmental Consequences section assesses changes that would occur as a result of the No-Build Alternative and the IPA.

4.7.1 Methodology and Data Sources

Because the Turnpike is already part of the existing landscape, for the purposes of the visual quality assessment of the Program, the study area is defined as the area located within the 500-foot buffer from the existing Turnpike ROW on either side of the existing mainline, including interchanges.

Aerial photography, USGS topographic mapping, and field reconnaissance of the study area was used to characterize the existing landscape and to inventory any unique visual features or viewsheds.

For this EIS, the visual quality of the study area is ranked as low, medium, or high. Views of high quality have topographic relief, a variety of vegetation, rich colors, impressive scenery, and unique natural and/or built features. Views of medium quality have interesting but minor landforms, some variety in vegetation and color, and/or moderate scenery. Views of low quality have uninteresting features, little variety in vegetation and color, uninteresting scenery, and/or common elements. The FHWA guidelines explain that all three criteria – vividness, intactness, and unity – must be high to indicate high quality.

4.7.2 Affected Environment

4.7.2.1 Mainline Improvements

In general, the Turnpike mainline in the Program area is aligned through a mix of developed commercial and residential developments and forested, waterway, and agricultural landscapes. Moving northeast from MP 3.5 to Interchange 2 at MP 13.0, the surrounding area is rural and consists primarily of agricultural fields. The land on both sides of the mainline at Interchange 2 is predominately forested and agricultural. An increase in residential developments is observed between Interchange 2 and Interchange 3, between MP 13.0 and MP 26.0, respectively. The study area surrounding Interchange 3 encompasses residential neighborhoods interspersed with commercial developments. Similar conditions are observed between Interchange 3 and 4 (MP 26.0 and MP 34.5, respectively) and to the end of the Program at MP 36.5. The following subsections describe existing visual and aesthetic conditions along the mainline in greater detail.

East of the SN roadway

MP 3.5 to Interchange 2

General Visual Setting: East of the SN roadway between MP 3.5 and Interchange 2 (MP 12.9) primarily consists of agricultural landscapes interspersed with sparce residential subdivisions. A notable feature in this segment is the John Fenwick Service Area at MP 5.5, which includes an open parking lot, service area, gas station, and Tesla Supercharger stations. In addition,

Oldmans Creek crosses underneath the mainline at MP 7.9 and the creek is surrounded on both sides by forested areas and vegetation. Occasional residential subdivisions are a minimum of 100 feet to the east of the ROW. The ROW between the mainline and any residential subdivisions or agricultural fields contains dense vegetation and thin deciduous forest that screen views of the areas beyond the ROW. Ten bridges cross over the mainline.

The visual quality of the study area east of the SN roadway between MP 3.5 and Interchange 2 can be described as having views of medium quality because of: high vividness resulting from the consistency of agricultural landscapes and forested areas within the ROW, and moderately intact and unified views because of the presence of the John Fenwick Service Area and the bridges over the mainline which serve as encroaching elements onto the landscape.

- **View from the Mainline**: For much of the length within this segment of the study area, the view of the surrounding landscape is screened from motorists using the Turnpike by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the wooded area continues beyond the ROW in some areas to create a forest or follow a waterway. In a few instances, agricultural fields and residential subdivisions are partially visible through the vegetation from the road.
- **View of the Mainline**: Much of the mainline in this segment of the study area is not visible from the surrounding landscape due to the dense vegetation and thin deciduous forest areas within the ROW that effectively screen views, resulting in a view of medium visual quality. There is a high density of agricultural fields in the vicinity of MP 6.5 where the mainline is partially visible through the vegetation in the ROW. In addition, there are views of the mainline from the vicinity of Oldmans Creek at MP 7.9. There are no visual resources that could be affected by altered views of the Turnpike located in this segment of the study area.

Interchange 2 to Interchange 3

General Visual Setting: The portion of the study area east of the SN roadway between Interchange 2 (MP 12.9) and Interchange 3 (MP 26.1) introduces differing natural and manmade elements within the study area; however, the area is predominantly agricultural fields. Immediately to the north of Interchange 2, the NJTA Maintenance District #1 facility is adjacent to the mainline. At MP 17.5, Mantua Creek splits and reconnects at MP 18.5. Between these two crossings of Mantua Creek, there is a residential subdivision. The ROW in the vicinity of MP 19.5 borders the West Deptford Green Acres property, a forested area. On either side of the West Deptford Green Acres property, there are residential subdivisions. The Deptford Sports Complex is between MP 24.0 and MP 24.5 and consists of several publicly accessible ballfields. To the north of the Deptford Sports Complex, Big Timber Creek crosses underneath the mainline. An increase in residential subdivisions and commercial developments is evident moving toward Interchange 3. There are 16 bridges over the mainline.

The visual quality of the study area east of the SN roadway between Interchanges 2 and 3 can be described as having views of medium quality resulting from an increase in residential subdivisions and waterways. The visual quality has moderate vividness resulting from the natural elements of forested areas and waterways interspersed with residential subdivisions, the

Deptford Sports Complex, and the NJTA Maintenance District #1 facility located to the north of Interchange 2. Views within this segment of the study area are moderately intact and unified because of the presence of the NJTA Maintenance District #1 facility, bridges over the mainline, the Deptford Sports Complex, and density of residential subdivisions, which serve as encroaching elements onto the landscape.

- **View from the Mainline:** For much of the length within this segment of the study area, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the forested area continues beyond the ROW in some areas to create a forest or follow a waterway. In a few instances, residential subdivisions and the Deptford Sports Complex are partially visible through the vegetation from the mainline. The mainline crosses over Mantua Creek at MP 17.5 and MP 18.5 and Big Timber Creek between MP 24.5 and MP 25.0, providing motorists with a moderately vivid view of the surrounding natural landscape.

- **View of the Mainline:** Much of the mainline in this segment of the study area is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW that effectively screen views, resulting in a view of low visual quality. There are several residential subdivisions in this segment and the Deptford Sports Complex where the mainline is partially visible through the thin deciduous forest in the ROW. In addition, there are views of the mainline from the vicinity of Mantua Creek and Big Timber Creek.

There are two visually-sensitive resources that could be affected by an altered view of the mainline located in this section of the study area: the West Deptford Green Acres property near MP 19.5 and Deptford Sports Complex located between MP 24.0 and MP 24.5. The mainline is completely screened from within the West Deptford Green Acres property because the area consists of a dense forest. In addition, the mainline is partially visible from the Deptford Sports Complex, although the view is not intact due to the intervening vegetation located within the ROW.

Interchange 3 to Interchange 4

General Visual Setting: The portion of the study area east of the mainline between Interchange 3 (MP 26.1) and Interchange 4 (MP 34.5) consists of a high density of residential subdivisions, commercial developments, community facilities, and fewer natural areas or agricultural fields compared to the southern portions of the study area. An approximately 75-foot-wide forested area lines the majority of the ROW from Interchange 3 to Interchange 4. This segment consists of many community and municipal facilities. Cherry Hill Chinese Church is located at MP 30.0 and Rosa International Middle School is located in the vicinity of MP 30.5. The Cherry Hill Township Department of Public Works is located at MP 31.5. There are few locations with natural elements, one being the South Branch Pennsauken Creek at MP 33.5, which crosses underneath the mainline and has an adjacent pond continuing northbound. There are eight bridges over the mainline.

The visual quality of the portion of the study area east of the mainline between Interchanges 3 and 4 can be described as having views of medium quality resulting from the density of residential subdivisions and commercial developments. The visual quality has moderate vividness resulting from the natural elements of forested areas within the ROW interspersed with residential subdivisions and commercial developments. Views within this segment of the study area are not intact or unified because of the density of residential subdivisions, commercial developments, and bridges over the mainline, which serve as encroaching elements onto the landscape.

- **View from the Mainline:** For much of the length within this segment of the study area, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the forested area continues after the ROW in some areas to create a forest or follow a waterway. There is a high density of residential subdivisions and commercial developments in this segment that are partially visible through the vegetation from the road.

- **View of the Mainline:** Much of the mainline in this portion of the study area is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW that effectively screen views, resulting in a view of low visual quality. There are several residential subdivisions and commercial developments in this portion of the study area where the mainline is partially visible through the thin deciduous forest in the ROW. In addition, developments are partially screened of the mainline in the vicinity of South Branch Pennsauken Creek, where there is a break in vegetation. There are no visual resources that could be affected by altered views of the Turnpike in this portion of the study area.

Interchange 4 to MP 36.5

General Visual Setting: The portion of the study area east of the mainline between Interchange 4 (MP 34.5) and MP 36.5 consists of a high density of residential subdivisions with neighborhoods spanning past the roughly 100-foot dense vegetation and thin deciduous forest within the ROW. A solar farm is located at MP 35.0, followed by multiple gas stations at MP 35.5. A dense forested area roughly 1,500 feet long borders the ROW from MP 36.0 to 36.5. At MP 36.5, Mount Laurel Memorial Park is at the northern end of the study area.

The visual quality of the study area east of the mainline between Interchange 4 and MP 36.5 can be described as having views of medium quality resulting from the dense vegetation and thin deciduous forest area of the ROW, the forested areas around Mount Laurel Memorial Park, and the interspersed residential subdivision and commercial developments. The visual quality has high vividness resulting from the consistency of natural elements of forested areas within the ROW. Views within this segment of the study area are moderately intact and unified because of the consistency of natural elements in the ROW with a small break in the natural landscape for commercial development.

- **View from the Mainline:** For most of the length within the study area east of the mainline between Interchange 4 and MP 36.5, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the forested area continues after the ROW in some areas to create a forest. There are two residential subdivisions and isolated commercial developments in this segment that are partially visible through the vegetation from the Turnpike.

- **View of the Mainline:** Much of the mainline between Interchange 4 and MP 36.5 is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW that effectively screen views, resulting in a view of low visual quality. The mainline would be partially visible through the thin deciduous forest from isolated commercial developments closest to the ROW.

There is one visually-sensitive resource that could be affected by an altered view of the mainline located in this portion of the study area: the Mount Laurel Memorial Park located in the vicinity of MP 36.5. The mainline is completely screened from Mount Laurel Memorial Park due to the intervening vegetation located within the ROW.

West Side of the NS roadway

MP 3.5 to Interchange 2

General Visual Setting: The study area on the west side of the NS roadway between MP 3.5 and Interchange 2 (MP 12.9) primarily consists of agricultural landscapes interspersed with sparce residential subdivisions. A notable feature in this segment is the Clara Barton Service Area at MP 5.4, which includes an open parking lot, a service area, gas station, and Tesla Supercharger stations. In addition, Oldmans Creek crosses underneath the mainline at MP 7.9 and the creek is surrounded on both sides by forested areas and vegetation. Occasional residential subdivisions are located a minimum of 100 feet to the east of the ROW in this portion of the study area. The ROW between the mainline and residential subdivisions or agricultural fields contains dense vegetation and thin deciduous forest that screen views of the areas beyond the ROW. There are ten bridges over the mainline.

The visual quality of the study area on the west side of the NS roadway between MP 3.5 and Interchange 2 can be described as having views of medium quality. The visual quality has high vividness resulting from the consistency of agricultural landscapes and forested areas within the ROW. Views within this portion of the study area are moderately intact and unified because of the presence of the Clara Barton Service Area and the bridges over the mainline, which serve as encroaching elements onto the landscape.

- **View from the Mainline:** For much of the length of this portion of the study area, the view of the surrounding landscape is screened from motorists using the Turnpike by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density

of the wooded area continues beyond the ROW in some areas to create a forest or follow a waterway. In a few instances, agricultural fields and residential subdivisions are partially visible through the vegetation from the mainline.

- **View of the Mainline:** Much of the mainline in this portion of the study area is not visible from the surrounding landscape due to the dense vegetation and thin deciduous forest areas within the ROW that effectively screen views, resulting in a view of low visual quality. There is a high density of agricultural fields in the vicinity of MP 6.5 where the mainline is partially visible through the vegetation in the ROW. In addition, there are views of the mainline from the vicinity of Oldmans Creek at MP 7.9. There are no visual resources that could be affected by altered views of the mainline located in this portion of the study area.

Interchange 2 to Interchange 3

General Visual Setting: The portion of the study area west of the mainline between Interchange 2 (MP 12.9) and Interchange 3 (MP 26.1) introduces differing natural and artificial elements; however, agricultural fields are predominant in this area. At MP 17.5, Mantua Creek splits and reconnects at MP 18.5. There is a residential subdivision between these two crossings of Mantua Creek. The ROW in the vicinity of MP 19.5 borders the West Deptford Green Acres property, a forested area. On the north side of the West Deptford Green Acres property, there is a residential subdivision. Big Timber Creek crosses underneath the mainline in the vicinity of MP 24.6. A large commercial development abutting the ROW is located to the north of MP 24.5 and approaching Interchange 3. There are 16 bridges over the mainline. The visual quality of the study area west of the mainline between Interchanges 2 and 3 can be described as having views of medium quality resulting from residential subdivisions and waterways. The visual quality has moderate vividness resulting from the natural elements of forested areas and waterways interspersed with residential subdivisions and commercial developments. Views within this portion of the study area are moderately intact and unified because of the presence of the bridges over the mainline, the large commercial development, and density of residential subdivisions, which serve as encroaching elements onto the landscape.

View from the Mainline: For much of the length of the study area west of the mainline between Interchanges 2 and 3, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the forested area continues after the ROW in some areas to create a forest or follow a waterway. In a few instances, residential subdivisions and the large commercial development to the north of MP 24.5 are partially visible through the vegetation from the mainline. The mainline crosses over Mantua Creek at MP 17.5 and MP 18.5 and Big Timber Creek between MP 24.5 and MP 25.0 providing motorists a moderately vivid view of the surrounding natural landscape.

- **View of the Mainline:** Much of the mainline in this portion of the study area is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW that effectively screen views, resulting in a view of low visual quality. There are several residential subdivisions and a large commercial development where the mainline is partially visible through the thin deciduous forest in the ROW. In addition, there are views of the mainline from the vicinity of Mantua Creek and Big Timber Creek.

There is one visually-sensitive resource that could be affected by an altered view of the mainline located in this portion of the study area: the West Deptford Green Acres property near MP 19.5. The mainline is completely screened from within the West Deptford Green Acres property because the area consists of a dense forest.

Interchange 3 to Interchange 4

General Visual Setting: The portion of the study area west of the NS roadway between Interchange 3 (MP 26.1) and Interchange 4 (MP 34.5) consists of a high density of residential subdivisions and commercial developments and fewer natural areas or agricultural fields compared to the southern portions of the study area. An approximately 75-foot-wide thin deciduous forest area lines the ROW from Interchange 3 to Interchange 4. The Interstate 295 mainline runs parallel to and near the Turnpike mainline from approximately MP 28.5 to MP 32.5. This portion of Interstate 295 is partially visible through the ROW thin deciduous forest. In addition, the Walt Whitman Service Area at MP 30.5 and a high density of commercial developments are present. There are a few locations with natural elements; one being the South Branch Pennsauken Creek at MP 33.5, which crosses underneath the mainline and has an adjacent pond continuing northbound. There are eight bridges over the mainline.

The visual quality of the study area west of the NS roadway between Interchanges 3 and 4 can be described as having views of low quality resulting from the density of residential subdivisions, commercial developments, and proximity of the Interstate 295 mainline. The visual quality is not vivid, resulting from the natural elements of thin forested areas within the ROW broken up by residential subdivisions, commercial developments, and the Interstate 295 mainline. Views within this portion of the study area are not intact or unified due to the density of residential subdivisions, commercial developments, and bridges over the mainline, which serve as encroaching elements onto the landscape.

View from the Mainline: For much of the length within this portion of the study area west of the NS roadway between Interchanges 3 and 4, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 75 feet between the mainline pavement and the outer boundary of the ROW. There is a high density of residential subdivisions, commercial developments, and the Walt Whitman Service Area in this portion of the study area that are partially visible through the vegetation from the mainline. In addition, the Interstate 295 roadway is partially visible from the Turnpike from approximately MP 28.5 to MP 32.5.

- **View of the Mainline:** Much of the mainline in this portion of the study area west of the NS roadway between Interchanges 3 and 4 is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW and the Interstate 295 mainline that effectively screens views, resulting in a view of low visual quality. There are several residential subdivisions and commercial developments in this segment where the mainline is partially visible through the thin deciduous forest in the ROW. In addition, there are partially screened views of the mainline from the vicinity of South Branch Pennsauken Creek and commercial developments between the Interstate 295 mainline and Turnpike mainline, where there are more frequent breaks in vegetation. There are no visual resources that could be affected by altered views of the mainline located in this portion of the study area.

Interchange 4 to MP 36.5

General Visual Setting: The portion of the study area west of the NS roadway between Interchange 4 (MP 34.5) and MP 36.5 consists of a high density of commercial developments spanning past the roughly 100-foot dense vegetation and thin deciduous forest within the ROW. There is a dense forested area at the north end of the study area in the vicinity of MP 36.5 between the Interstate 295 mainline and Turnpike mainline.

The visual quality of the study area west of the NS roadway between Interchange 4 and MP 36.5 can be described as having views of low quality resulting from the thin deciduous forest area of the ROW that is broken by the large commercial developments to the north of Interchange 4. The visual quality has moderate vividness resulting from the consistency of natural elements of forested areas within the ROW that thins in some areas to make the large commercial developments partially visible. Views within this portion of the study area are not intact or unified because of the large commercial developments, which function as encroaching elements.

- **View from the Mainline:** For most of the length within this portion of the study area west of the NS roadway between Interchange 4 and MP 36.5, the view of the surrounding landscape is screened from motorists using the Turnpike by the vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of low visual quality. The depth of the ROW is approximately 100 feet between the mainline pavement and the outer boundary of the ROW. The density of the forested area continues after the ROW in some areas to create a forest. There is a large commercial development in this portion of the study area that is partially visible through the vegetation from the mainline.
- **View of the Mainline:** Much of the mainline in this portion of the study area west of the NS roadway between Interchange 4 and MP 36.5 is not visible from the surrounding landscape due to the dense vegetation and forested areas within the ROW that effectively screen views, resulting in a view of low visual quality. The mainline is partially visible through the thin deciduous forest from the commercial developments closest to the ROW. There are no visual resources that could be affected by altered views of the mainline located in this portion of the study area.

4.7.2.2 Interchange 2

General Visual Setting: The study area on the east side of Interchange 2 is surrounded by agricultural fields with one artificial element, the NJTA Maintenance District #1 facility, located approximately 1,500 feet to the north of the northbound exit ramp. There are three isolated residences to the east of the ROW that are associated with the agricultural fields. The ROW consists of dense vegetation and thin deciduous forest and is bordered by the agricultural fields.

The study area on the west side of Interchange 2 is surrounded by agricultural fields with one artificial element, a gas station across from the Interchange 2 toll plaza. The ROW consists of dense vegetation and thin deciduous forest and is bordered by agricultural fields.

The visual quality of the study area around Interchange 2 can be described as having views of medium quality resulting from the high density of agricultural fields and dense vegetation and thin deciduous forest of the ROW interspersed with minimal artificial elements. The visual quality has high vividness resulting from the consistency of agricultural landscapes and forested areas within the ROW. Views within this portion of the study area are moderately intact and unified because of the presence of the NJTA Maintenance District #1 facility and the gas station, which serve as encroaching elements onto the landscape.

- **View from Interchange 2:** The view of the study area east of Interchange 2 is screened from motorists using the Interchange 2 ramps by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of medium visual quality. The study area is lined with a thin deciduous forest within the ROW. The forested area ranges from approximately 100 feet to 500 feet wide with the least dense area being located in the vicinity of the northbound exit ramp.

  The view of the study area west of Interchange 2 is screened from motorists using the Interchange 2 ramps by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of medium visual quality. The study area is lined with a thin deciduous forest within the ROW. The forested area ranges from approximately 100 feet to 500 feet wide with the least dense area located in the vicinity of the Interchange 2 toll plaza.

- **View of the Interchange 2:** Much of Interchange 2 and its ramps in this portion of the study area are not visible from the surrounding landscape due to the dense vegetation and thin deciduous forest areas within the ROW that effectively screen views, resulting in a view of low visual quality. There is a high density of agricultural fields in the vicinity of Interchange 2 where the interchange ramps are partially visible in the vicinities of the Interchange 2 toll plaza and the northbound exit ramp. However, Interchange 2 is partially visible from the gas station on the west side of the interchange as there are minimal obstructions, including deciduous trees that screen views. There are no visual resources that could be affected by altered views of the interchange located in this portion of the study area.

4.7.2.3 Interchange 3

General Visual Setting: The study area on the east side of Interchange 3 is surrounded by a residential subdivision and commercial development consisting of offices and a hotel. Separating these artificial elements from the Interchange 3 ramps is an approximately 75-foot-wide thin deciduous forest.

The study area west of Interchange 3 is surrounded by a residential subdivision and commercial development consisting of hotels and a restaurant. Separating these artificial elements from the Interchange 3 ramps is an approximately 75-foot-wide thin deciduous forest.

The visual quality of Interchange 3 can be described as having views of medium quality resulting from the consistency of natural elements in the ROW and artificial elements. The visual quality has moderate vividness due to the consistency of thin deciduous forest along the ROW that is broken by commercial developments in the vicinity of the Interchange 3 toll plaza. Views within this portion of the study area are moderately intact and unified because of the presence of residential subdivisions and commercial developments in the vicinity of the Interchange 3 ramps, which serve as encroaching elements onto the landscape.

- **View from Interchange 3:** The view of the study area east of Interchange 3 is screened from motorists using the Interchange 3 ramps by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of medium visual quality. The study area east of Interchange 3 is lined with a thin deciduous forest within the ROW. The forested area is approximately 75 feet wide. The commercial development to the east of the northbound exit ramp is partially visible through the thin deciduous forest.

  The view of the study area west of Interchange 3 is screened from motorists using the Interchange 3 ramps by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of medium visual quality. The study area west of Interchange 3 is lined with a thin deciduous forest within the ROW. The forested area is approximately 75 feet wide with the least dense area being located in the vicinity of the Interchange 3 toll plaza.

- **View of Interchange 3:** Much of Interchange 3 and its ramps in this portion of the study area is not visible from the surrounding landscape due to the dense vegetation and thin deciduous forest areas within the ROW that effectively screen views, resulting in a view of medium visual quality. There is a high density of residential subdivisions and commercial developments in the vicinity of Interchange 3 where the interchange ramps are partially visible in the area of the Interchange 3 toll plaza and the northbound exit ramp. In addition, the Interchange 3 toll plaza is partially visible from the hotels in the study area adjacent to the NS roadway as there are minimal obstructions, including deciduous trees that screen views. There are no visual resources that could be affected by altered views of the roadway located in this portion of the study area.

4.7.2.4 Interchange 4

General Visual Setting: The portions of the study area east and west of Interchange 4 are similar, having predominately artificial features apart from the wooded area that lines the ROW. The circular southbound exit has a higher density of sparse trees compared to the northbound exit. The study area west of the interchange is predominately hotels and restaurants with a pond before the exit.

The visual quality of the portions of the study area east and west of Interchange 4 can be described as having views of medium quality resulting from moderate scenery and a variety of visual features. Gaps between the trees in the wooded area along the ROW around the interchange allow for views of the surrounding buildings. There is intactness in this area due to the artificial element's connectedness. There is unity due to the lack of interfering natural elements. The vividness is low for this reason, leading to a view of medium quality.

The area east of Interchange 4 is surrounded by a residential subdivision, commercial development, and a deciduous forest with dense vegetation in the ROW ranging from approximately 100 feet to 800 feet wide. To the south of Interchange 4 is a Greyhound bus station and complex with a hotel, charging and gas station. The widest sections of the deciduous forest are located between the residential subdivision from Interchange 4. To the west of Interchange 4 is a high density of commercial developments consisting of hotels, offices, stores, and manufacturers intertwined with parking lots. The ROW in this area contains sparse vegetation. The base of the southbound exit lanes consists of the widest section of deciduous forest.

The visual quality in the vicinity of Interchange 4 can be described as having views of low quality resulting from the sparse deciduous forests in the study area west of the NS roadway and the interspersed commercial developments in the study area on both sides of Interchange 4. The visual quality of the study area east of Interchange 4 has a moderate vividness due to the consistency of thin deciduous forests that are broken by a commercial development but are wide in the vicinity of the residential subdivision. The natural elements west of Interchange 4 become less dense and provide no screening to the Interchange 4 toll plaza. Views within this portion of the study area are not intact or unified because of the presence of large commercial developments in the vicinity of the Interchange 4 ramps which serve as encroaching elements onto the landscape.

- **View from Interchange 4:** The view of the study area east of Interchange 4 is screened from motorists using the Interchange 4 ramps by the dense vegetation and thin deciduous forest areas within the ROW, consisting of deciduous trees and shrubs, resulting in a view of medium visual quality. The study area east of Interchange 4 is lined with a wide deciduous forest within the ROW. The forested area ranges in depth from approximately 100 to 800 feet. The commercial development to the south of the northbound exit ramp is partially visible through the thin deciduous forest.

  The view of the study area west of Interchange 4 is mostly visible to motorists using the Interchange 4 ramps with sparse vegetation and deciduous trees within the ROW, resulting in a view of low visual quality. The study area west of Interchange 4 is lined with a thin deciduous forest within the ROW at the base of the southbound exit ramp, but this forested area tapers off to provide unscreened views of the surrounding commercial developments from the Interchange 4 ramps.

- **View of Interchange 4**: Much of Interchange 4 and its ramps in the study area east of Interchange 4 is not visible from the surrounding landscape due to the dense vegetation and thin deciduous forest areas within the ROW that effectively screen views, resulting in a view of low visual quality. Much of Interchange 4 and its ramps in the study area west of Interchange 4 are visible from the surrounding commercial developments due to the sparse deciduous forest in the ROW. There are no visual resources that could be affected by altered views of the roadway located in this segment of the study area.

4.7.3 Environmental Consequences

4.7.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes and the associated landscaping within the Turnpike ROW would remain. As a result, the visual quality and aesthetics within the study area would remain the same as described in Section 4.7.2 (Affected Environment) with some modification to the nearby landscape due to programmed and/or approved residential and commercial developments in the area.

4.7.3.2 Initially Preferred Alternative

Mainline Improvements

East Side of the SN Roadway - MP 3.5 to Interchange 2:

- **View from the Mainline:** For most of this portion of the study area, the surrounding agricultural, waterway, and forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying sizes would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and would be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline. The John Fenwick Service Area at MP 5.5 would not be modified, with the exception of the connecting ramps.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. Because the surrounding area is dominated by natural elements, such as agricultural fields and forests that are situated beyond the vegetation lining the ROW, the opportunity for views of the mainline would continue to be limited. In addition, given the limited number of population centers in the vicinity, the opportunity for views of the mainline would be minimal. The view of the mainline from the John Fenwick Service Area would remain intact.

Interchange 2 to Interchange 3

- **View from the Mainline:** For most of this portion of the study area, the surrounding waterway and forested landscapes would remain partially visible, and the agricultural landscape and residential subdivisions would also remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying size would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline. The partial views of the West Deptford Green Acres property and the Deptford Sports Complex, which are visually-sensitive resources, would remain. The Deptford Sports Complex may be more visible due to the partial removal of a narrow band of existing woodlands in the ROW.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. Because the surrounding area is dominated by natural elements, such as agricultural fields and forests situated beyond the vegetation lining the ROW, the opportunity for views of the mainline would continue to be limited. However, population centers become more

  concentrated in the northern portion of the study area. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the residential subdivisions.

Interchange 3 to Interchange 4

- **View from the Mainline**: For most of this portion of the study area, the surrounding artificial landscape mixed with waterway and forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. The artificial landscape includes residential subdivisions and commercial developments beyond the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying size would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and would be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. The surrounding area has a high density of artificial elements that function as population centers. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the residential subdivisions and commercial developments.

Interchange 4 to MP 36.5

- **View from the Mainline:** For most of this portion of the study area, the surrounding artificial landscape mixed with forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. The artificial landscape includes residential subdivisions and commercial developments beyond the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying size would be incorporated into the landscape adjacent to the Turnpike at various locations. Although there would be partial removal of the forested area in the ROW in the vicinity of the Mount Laurel Memorial Park, a visually-sensitive resource, the remaining dense forest would continue to screen views of the Mount Laurel Memorial Park from the mainline.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. The surrounding area has a high density of artificial elements that function as population centers. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the residential subdivisions and commercial developments. In addition, the dense forest area to the west of the Mount Laurel Memorial Park would completely screen views of the mainline.

West Side of the NS Roadway - MP 3.5 to Interchange 2

- **View from the Mainline:** For most of this portion of the study area, the surrounding agricultural, waterway, and forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying size would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and would be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline. The Clara Barton Service Area at MP 5.4 would not be modified with the exception of the connecting ramps.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. Because the surrounding area is dominated by natural elements, such as agricultural fields and forests that are situated beyond the vegetation lining the ROW, the opportunity for views of the mainline would continue to be limited. In addition, given the limited number of population centers in the vicinity, the opportunity for views of the mainline would be minimal. The view of the mainline from the Clara Barton Service Area would remain intact.

Interchange 2 to Interchange 3

- **View from the Mainline:** For most of this portion of the study area, the surrounding waterway and forested landscapes would remain partially visible, and the agricultural landscape and residential subdivisions would also remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying sizes would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and would be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline. The partial views of the West Deptford Green Acres property, a visually-sensitive resource, would remain.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. Because the surrounding area is dominated by natural elements, such as agricultural fields and forests that are situated beyond the vegetation lining the ROW, the opportunity for views of the mainline would continue to be limited. However, population centers become more concentrated in the northern section of this segment. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the residential subdivisions.

Interchange 3 to Interchange 4

- **View from the Mainline:** For most of this portion of the study area, the surrounding artificial landscape mixed with waterway and forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. The artificial landscape includes residential subdivisions and commercial developments beyond the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying sizes would be incorporated into the landscape adjacent to the Turnpike at various locations. Improvements to bridges crossing over the mainline would also occur and would be visible from the mainline, but roadwork on local roadways on either side of the bridges would not be visible from the mainline.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. The surrounding area has a high density of artificial elements that function as population centers. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the residential subdivisions and commercial developments.

Interchange 4 to MP 36.5

- **View from the Mainline:** For most of this portion of the study area, the surrounding artificial landscape mixed with forested landscapes would remain partially visible from the mainline due to the elevated nature of the Turnpike and the removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. The artificial landscape includes commercial developments beyond the ROW. Views from the mainline are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. Several stormwater detention basins of varying size would be incorporated into the landscape adjacent to the Turnpike at various locations.

- **View of the Mainline:** Due to the partial removal of vegetation and forested area lining the ROW, the mainline would remain partially visible from the surrounding landscape. The surrounding area has a high density of artificial elements that function as population centers. The partial removal of forested area in the ROW would reduce the screening of the views of the mainline, but views of the mainline would continue to be partially screened from the commercial developments.

Interchange 2

- **View from the Interchange:** As a result of the Program, realignment of the northbound exit and entrance ramps would require the partial removal of vegetation and forested area that has screened views of the surrounding landscape from Interchange 2. Views of the surrounding landscape from the east side of Interchange 2 would experience a minor change with the removal of the forested area that currently screens views of the surrounding natural landscape. A stormwater detention basin would be incorporated into the landscape adjacent to the northbound exit ramp.

  The southbound Interchange 2 entrance ramp would be removed and realigned slightly to the west within the ROW requiring the partial removal of a narrow band of the existing woodlands and understory vegetation that provides screening within the ROW. Views from west side of Interchange 2 are not expected to change substantially. Although a narrow band of tree removal would occur, the existing thin deciduous forest in the ROW would remain and provide screening. A stormwater detention basin would be incorporated into the landscape adjacent to the southbound exit ramp.

- **View of the Interchange:** Due to the partial removal of vegetation and forested area lining the ROW, Interchange 2 would remain partially visible from the surrounding landscape. Because the surrounding area is dominated by natural elements, such as agricultural fields and forests that are situated beyond the vegetation lining the ROW, the opportunity for views of the mainline would continue to be limited. In addition, given the limited number of population centers in the vicinity, the opportunity for views of the mainline would be minimal.

Interchange 3

- **View from the Interchange:** As a result of the Program, realignment of the northbound exit and entrance ramps would require the partial removal of the narrow band of vegetation and forested area that has screened views of the surrounding landscape from Interchange 3. Views of the surrounding landscape from the east side of Interchange 3 would change with the removal of the forested area that currently screens views of the surrounding natural landscape. The surrounding commercial developments would be more visible to motorists on Interchange 3. Two stormwater detention basins would be incorporated into the landscape adjacent to the northbound exit ramps.

  The Program would not remove or realign the southbound Interchange 3 entrance and exit ramps. The views from the west side of Interchange 3 are not expected to change. The existing thin deciduous forest in the ROW would remain and provide screening. A stormwater detention basin would be incorporated into the landscape adjacent to the southbound entrance ramp.

- **View of the Interchange:** Due to the partial removal of vegetation and forested area lining the ROW, Interchange 3 would remain visible from the surrounding landscape. The surrounding area consists of residential subdivisions and commercial developments that function as population centers. The partial removal of forested area in the ROW on the east side of Interchange 3 would reduce the screening of the views of Interchange 3 from the adjacent residential subdivision and commercial development. Views of the east side of Interchange 3 would experience a visual change. The removal of forested area within and adjacent to the existing ROW would reduce the screening of views of Interchange 3 from the commercial developments to the south and west of the interchange.

Interchange 4

- **View from the Interchange:** As a result of the Program, realignment of the northbound exit and entrance ramps would require the partial removal of the narrow band of vegetation and forested area that has screened views of the surrounding landscape from Interchange 4. Views of the surrounding landscape from the east side of Interchange 4 are not expected to change. The surrounding commercial development and forested areas would be partially visible to motorists. Two stormwater detention basins would be incorporated into the landscape adjacent to the northbound exit and entrance ramps.

  The Program would not remove or realign the southbound Interchange 4 entrance and exit ramps. Views from the west side of Interchange 4 are not expected to change. The existing thin deciduous forest in the ROW would remain and provide screening. Two stormwater detention basins would be incorporated into the landscape adjacent to the southbound exit and entrance ramps.

- **View of the Interchange:** Due to the partial removal of vegetation and forested area lining the ROW, Interchange 4 would remain partially visible from the surrounding landscape. The surrounding area consists of residential subdivisions and commercial developments that function as population centers. The partial removal of forested area in the ROW on the east side of Interchange 4 would reduce the screening of the views of Interchange 4 from the adjacent residential subdivision and commercial development. Views of the west side of Interchange 4 are not expected to change.

4.7.4 Minimization and Mitigation

Although the Program would result in changes in views from various locations along the roadway into the study area, none of these changes would constitute an adverse impact. In addition, the Turnpike's user population (i.e., motorists) is a transient population that only experiences these views on a temporary basis. Consequently, no mitigation measures would be necessary. Although the Program would cause the Turnpike to be more visible from certain parts of the study area, these changes are minimal in nature. In addition, no unique visual resources would be adversely affected.

4.8 AIR QUALITY

This section assesses potential impacts of the No-Build Alternative and the IPA regarding air quality resources. The study area is consistent with the traffic impact study area along the mainline and interchanges.

4.8.1 Methodology and Data Sources

4.8.1.1 Pollutants of Concern and National Ambient Air Quality Standards

Criteria Pollutants

Air quality is defined as the concentration of specific pollutants of concern in ambient air. Most air pollutants originate from human-made sources, including mobile sources (e.g., cars, trucks, buses, non-road equipment) and stationary sources (e.g., power plants). As required under the Clean Air Act (CAA), the U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for six pollutants for which criteria have been established, referred to as criteria pollutants (40 Code of Federal Regulations [CFR] Part 50):

- Carbon monoxide (CO);
- Nitrogen dioxide (NO_2);
- Ozone (O_3);
- Particulate matter with diameters up to 10 µm (PM_{10}) and diameters up to 2.5 µm ($PM_{2.5}$);
- Lead (Pb); and
- Sulfur dioxide (SO_2).

The NAAQS include primary and secondary standards. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect the public welfare from the adverse effects associated with pollutants in the ambient air, such as damage to plants and ecosystems. The primary and secondary standards are presented in **Table 4.8-1**. These standards have been adopted as the ambient air quality standards for New Jersey.

Mobile Source Air Toxics (MSATs)

In addition to the criteria pollutants, the CAA also lists 187 air toxins, known as hazardous air pollutants (HAPs). Toxic air pollutants include several substances that are known or suspected to cause cancer or other health effects in humans when they are exposed to certain levels of the

pollutants. The CAA authorizes the USEPA to characterize and control emissions of these pollutants. However, unlike the criteria pollutants, ambient air quality standards have not been established for most air toxins. Most air toxins originate from human-made (anthropogenic) sources, including on-road mobile sources (e.g., cars, trucks), non-road mobile sources (e.g., airplanes), and stationary sources (e.g., dry cleaners, factories, or refineries). Of the 187 HAPs, 93 have been identified as mobile source air toxic (MSAT) and nine MSAT are considered priority MSATs as shown below.

- Acetaldehyde
- Acrolein
- Benzene
- 1,3-butadiene
- Diesel particulate matter plus diesel exhaust organic gases (diesel PM)
- Ethylbenzene
- Formaldehyde
- Naphthalene
- Polycyclic organic matter (POM)

Table 4.8-1: National and New Jersey Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
Nitrogen Dioxide		Primary	1-hour	100 ppb	98th percentile, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
Ozone		Primary and Secondary	8-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
Particulate Matter	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide		Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source**:** http://www.epa.gov/air/criteria.html

The MSATs are compounds emitted by highway-traveling vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted when the fuel evaporates or passes through the engine unburned. Other toxins are generated by the incomplete combustion of fuels or as secondary combustion products. Metal air toxins also result from engine wear or from impurities in oil or gasoline.

Greenhouse Gases (GHGs): Greenhouse gases (GHG) are gas emissions that trap heat in the atmosphere. The primary long-lived greenhouse gases directly emitted by human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Scientific evidence indicates a trend of increasing global temperature over the past century due to an increase in GHG emissions from human activities. The heating effect from these gases is considered the probable cause of the global warming observed over the last 50 years (Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202[a] of the CAA; Final Rule 2009).

Executive Order (EO) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis was signed on January 20, 2021 and directs Federal agencies "to immediately review, and take action to address Federal regulations promulgated and other actions taken during the last four years that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce GHG emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and employment."

Pursuant to EO 13390, the Council on Environmental Quality (CEQ) rescinded its 2019 Draft NEPA Guidance on Consideration of Greenhouse Gas (GHG) Emissions and is reviewing, for revision and update, the 2016 Final Guidance for Federal Departments and Agencies on Consideration of GHG Gas Emissions and the Effects of Climate Change in NEPA reviews. The CEQ advised that the 2016 Guidance is applicable to current NEPA reviews. As such, the EIS for the Program will consider the potential effects of the Program on climate change by assessing GHG emissions using the same planning tools for estimating criteria pollutant emissions.

4.8.1.2 Attainment of the NAAQS

The CAA requires geographic areas to be designated according to their ability to attain the NAAQS. These areas are categorized for each criteria pollutant as:

- Attainment Area – Areas where no exceedance of NAAQS for a specific criteria pollutant occurred.
- Non-attainment Area – Areas where exceedance of NAAQS for a specific criteria pollutant occurred.
- Maintenance Area – Areas that have previously been designated as a non-attainment area but are still in need of efforts to maintain the improved conditions in the future. Most of the CAA rules for non-attainment areas are still applicable to a maintenance area.

The study area for air quality encompasses portions of four counties (i.e., Salem, Gloucester, Camden, and Burlington) and is located within the Metropolitan Philadelphia Interstate Air Quality Control Region (Pennsylvania-New Jersey-Delaware) per CFR Part 81. Each of the four counties is designated attainment for all NAAQS, with the exceptions of:

Marginal and moderate non-attainment for the ozone 2008 and 2015 standard, respectively, within all four counties;

- Maintenance for $PM_{2.5}$ within Gloucester, Camden, and Burlington Counties; and
- Maintenance for CO within Camden County.

The CAA requires states to develop a general plan to attain and maintain the NAAQS and a specific plan to attain the standards for each area designated non-attainment for a NAAQS. These plans, known as State Implementation Plans (SIP), are developed by state and local air quality management agencies.

Per CAA Section 176(c), Federal agencies are required to ensure that their actions conform to the SIP in non-attainment or maintenance areas for purposes of reducing the severity and number of violations of the NAAQS in an effort to achieve attainment of these standards. There are two sections of the conformity regulations in the CAA that are applicable to Federal actions:

- Transportation projects funded or approved by FHWA or the Federal Transit Administration (FTA), which are governed by the Transportation Conformity Rule (TCR). The TCR is enforced on both a regional level and project level.
- Non-FHWA/FTA projects or components of an FHWA/FTA transportation project requiring actions by other Federal agencies, such as the U.S. Army Corps of Engineers (USACE), which are governed by the General Conformity Rule (GCR). This rule would apply to the Program since bridge replacement over regulated waters would require a USACE permit.

4.8.1.3 Methodology

To demonstrate Program compliance with the SIP according to applicable guidelines (i.e., Executive Order No. 215, FHWA transportation conformity guideline, USACE general conformity requirements, and CAFRA under NJDEP Coastal programs), the potential air quality impact analyses considered in the EIS includes the below information:

Clean Air Act Transportation Conformity

TCR applies to two levels of transportation activity:

- **Regional conformity**: Demonstration of regional transportation conformity is through the development of a TIP (Transportation Improvement Program), which is the responsibility of the metropolitan planning organization (MPO). For the greater Philadelphia region/Delaware Valley (including Salem, Camden, Gloucester, and Burlington counties), the Delaware Valley Regional Planning Commission (DVRPC) is the designated MPO. The current applicable transportation plan and TIP are known as the Connections 2050 Long-Range Plan and the DVRPC FY2022 TIP for New Jersey (FY22-FY25) (Adopted September 2021), respectively. DVRPC is responsible for demonstrating that the transportation plan and TIP conform to the SIP. The proposed Program is currently included in the Connections 2050 Long-Range Plan as one of the major regional preservation projects that needs to occur over the next 25 years but has not yet moved into the TIP. The NJTA anticipates that the IPA would be advanced, included within a future revision of the TIP, and a regional conformity demonstration would be completed by DVRPC at that time.

- **Project-level conformity**: For specific transportation projects, the conformity determination must show that the individual project is included in the TIP in order to be consistent with the SIP conformity determination (i.e., to be exempt from a regional emissions analysis and to be in compliance with the NAAQS on a local level). Potential localized emission impacts should be addressed through a hot spot analysis for localized non-attainment or maintenance pollutants (such as $PM_{2.5}$) to demonstrate that such emissions would be in compliance with the NAAQS.

Operational CO Impact Analysis (CO Hot-Spot Analysis)

To satisfy the TCR requirements for assessing potential mobile source air quality impacts of CO emissions, the EIS followed the guidelines and procedures established for non-attainment pollutants in 40 CFR 93.123 through an analysis addressing localized mobile source related CO concentrations.

The guidelines identify four categories of projects to be considered for a CO hot spot analysis (40 CFR 93.123[b][1]) and they will be used for the CO microscale analysis for this Program.

- For projects in or affecting locations, areas, or categories of sites which are identified in the applicable implementation plan as sites of violation or possible violation;
- For projects affecting intersections that are at LOS D, E, or F or those that will change to LOS D, E, or F because of increased traffic volumes related to the project;
- For any project affecting one or more of the top three intersections in the non-attainment or maintenance area with higher traffic volumes, as identified in the applicable implementation plan; and
- For any project affecting one or more of the top three intersections in the non-attainment or maintenance area with the worst level of service, as identified in the applicable implementation plan.

A screening dispersion modeling analysis was performed using the USEPA Motor Vehicle Emissions Simulator (MOVES) Version MOVES3 and CAL3QHC modeling tools per Using MOVES3 in Project-Level Carbon Monoxide Analyses at the selected worst-case condition intersections at which worst-case LOS and highest traffic volume were forecasted.

Operational $PM_{2.5}$ Impact Analysis (PM Hot-Spot Analysis)

As indicated previously, the NJTA utilized available guidance established for analyzing potential hot spot impacts for non-attainment or maintenance pollutants for purposes of meeting TCR requirements for assessing potential mobile source air quality impacts of $PM_{2.5}$ emissions. Consistent with the EPA PM hot spot analysis guidance established in Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Non-attainment and Maintenance Areas, forecasted 2040 traffic conditions in the study area were used to determine if a hot spot analysis is warranted as part of the TCR requirement.

As the Program would involve adding travel lanes, the hot spot impacts at the worst-case intersections with the highest traffic volume and highest congestion were selected for $PM_{2.5}$ concentration dispersion modeling. Emission factors for travel links at these intersections were

estimated using the MOVES3 model in association with the county-specific input parameters. The refined dispersion model (the EPA/AMS AERMOD dispersion model) was then used to predict the $PM_{2.5}$ concentrations during the peak traffic conditions at the sensitive receptors; predicted concentrations were then compared to the respective NAAQS to determine impact significance and whether mitigation measures would be warranted.

Construction Period Impacts

In contrast to operational activities, construction activities are usually of short duration and produce temporary air quality effects. However, the impacts of construction vehicle and equipment emissions from large-scale construction activities occurring over many years (typically over five) at a specific local site could cause adverse air quality effects and may need to be quantitatively addressed.

According to CFR 93.123(c)(5), "CO, PM_{10}, and $PM_{2.5}$ hot spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site." The Program's construction activities are unlikely to occur at an individual site over five years; therefore, potential air quality impacts from construction activities are considered temporary and a hot spot analysis is not warranted at the Program level.

Clean Air Act General Conformity

The CAA general conformity rule (GCR) would apply to the non-transportation elements of the Program that require permits from the USACE, such as in-water bridge demolition and construction activities. Under the GCR, emissions resulting from these elements would be compared to *de minimis* non-attainment and maintenance pollutant emission levels on an annual basis.

Construction equipment and manpower requirements are based on the data contained in 2003 and 2011 RSMeans Facilities Construction Cost Data (RSMeans 2002 and 2010). It was conservatively assumed for emission estimating purposes that these bridge construction activities would occur within one year.

Construction equipment emissions were calculated based on estimated hours of equipment use and the emission factor assigned to the equipment, as provided by the USEPA in the MOVES Model. National default model inputs applicable to the counties where the Program is located for off-road construction equipment were used in MOVES emission factor modeling.

If the emissions for a non-attainment or maintenance criteria pollutant (or its relevant precursors) do not exceed the *de minimis* levels specified in the GCR, the Federal action is determined to conform for the pollutant under study and no further analysis is necessary. Conversely, if the total direct and indirect emissions are above the *de minimis* value, a formal general conformity determination is required related to that pollutant.

Localized MSATs

On February 3, 2006, the FHWA and the USEPA issued joint guidance for the assessment of MSAT for highway projects. The FHWA subsequently released updated guidance on conducting air toxin analyses on September 30, 2009, December 6, 2012, and October 18, 2016. This guidance requires analysis of MSAT as part of the environmental analysis for a transportation project. The 2016 update reflects recent regulatory changes, addresses stakeholder requests to broaden the horizon years of emission trends performed with the MOVES model, and updates stakeholders on the status of scientific research on air toxics.

FHWA's Interim Guidance (Guidance) establishes a three-tiered approach to determine the level of MSAT analysis required by the Program. According to the Guidance, the categories of exempt projects (or projects with no meaningful potential for MSAT impacts) include:

- Projects qualifying as categorical exclusions;
- Projects exempt under the Federal conformity regulations or 40 CFR §93.126; or
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

For projects with low potential of MSAT effects (such as those projects where the design year traffic is projected to be less than 140,000-150,000 annual average daily traffic (AADT), a qualitative assessment of emission projections should be conducted.

For projects with high potential of MSAT effects (such as some limited projects that create new capacity or add significant capacity to urban highways, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 or greater by the design year), consultation with FHWA and a quantitative analysis to forecast local-specific emission trends of the MSAT for each alternative would be required.

Mesoscale Air Emissions

As compared to a localized hot spot impact analysis at a specific congested location, the mesoscale emission burden analysis would provide a comparison of pollutant emission levels within the roadway network where a project is planned as compared to the existing condition and No-Build Alternative on a regional level. The more the roadway network is affected by congestion, the greater the effect emissions from congested traffic on the roadway network would have on regional air quality. The analysis boundary of emission burden on a mesoscale level is consistent with the subarea selected for the traffic impact analysis that is limited to the roadway network, which includes the Turnpike mainline and ramps and major arterial roadways that are adjacent to the mainline around Interchanges 2, 3, and 4.

The analysis would use the most recent emission factors predicted from MOVES3 and the project-specific mesoscale vehicle miles travelled (VMT) predicted using the *DVRPC*-developed regional model.

4.8.2 Affected Environment

As discussed previously, the four counties where the Program is located are designated as attainment for all NAAQS with the exceptions of:

Marginal and moderate non-attainment for the ozone 2008 and 2015 standard, respectively, within all four counties;

- Maintenance for $PM_{2.5}$ within Gloucester, Camden, and Burlington counties; and
- Maintenance for CO within Camden County.

The most recent (Year 2021) monitored ambient criteria pollutant concentrations as compared to the NAAQS at the closest monitoring stations with available monitoring data are summarized in **Table 4.8-2**. This data shows that all the measured pollutant concentrations were well below the NAAQS with the exception of ozone. Therefore, the monitored pollutant concentration levels were all consistent with the attainment designation.

Table 4.8-2: Year 2021 Monitored Background Concentrations

Pollutant (units)	Averaging Period	Monitoring Location	Background Concentration	NAAQS Primary Criteria
CO (ppm)	1-hr	Camden/ 266-298 Spruce Street	2.2	35
	8-hr		1.7	9
NO_2 (ppb)	1-hr	Camden/ 266-298 Spruce Street	48(1)	100
	Annual		11.4	53
$PM_{2.5}$ ($\mu g/m^3$)	24-hr	East Greenwich/ 256 County House Road	20(1)	35
	Annual		7.8(2)	12
PM_{10} ($\mu g/m^3$)	24-hr	Camden/ 266-298 Spruce Street	55(3)	150
Ozone (ppm)	8-hour	East Greenwich/ 256 County House Road	0.067(4)	0.07

Source: AECOM, 2022.

Notes: (1) Value is 98th percentile; (2) Value is the weighted annual mean; (3) Value is the highest; (4) Value is the 4th highest daily maximum. https://www.epa.gov/outdoor-air-quality-data/monitor-values-report

4.8.3 Environmental Consequences

4.8.3.1 No-Build Alternative

2040 No-Build Alternative traffic increases would range from 3 percent to 7 percent during the weekday peak hours compared to the 2019 Base Year level due to natural growth. However, the vehicle emissions would continue to reduce in the future as a result of Federal emissions control programs. Therefore, the air quality conditions under the 2040 No-Build Alternative would likely be improved as compared to the existing baseline condition.

4.8.3.2 Initially Preferred Alternative – Long-Term Operational Effects

Mainline Improvements

TCR Compliance: Based on the ranking process at a total of 16 intersections selected for traffic impact analysis per the EPA hot spot analysis guideline, a total of two worst-case intersections, where sensitive receptors are in proximity with the highest traffic volume and the worst LOS condition, were selected for both CO and $PM_{2.5}$ microscale hot spot analysis. The selected intersections include:

- NJ Route 168 (Black Horse Pike) and NJ Route 41 (Clements Bridge Road); and
- Route 73 and Fellowship Road.

At each of the above intersections, CO concentrations were predicted using EPA's CAL3QHC model Version 2.0 with the MOVES3 model-predicted 2040 CO vehicle emission factors at each travel link at the intersections. The CAL3QHC model employs a Gaussian (normal distribution) dispersion assumption and includes an algorithm for estimating vehicular queue lengths at signalized intersections.

CAL3QHC computations were performed using a wind speed of 1 meter per second, source height of 0 meters (for at-grade roadways), mixing height set at 1,000 meters, and the neutral atmospheric stability Class D (i.e., a condition that neither enhances nor suppresses atmospheric turbulence). In order to ensure that the reasonable worst-case scenario was used in estimating impacts, 1-hour CO concentrations were calculated for all wind directions. The 8-hour average CO concentrations were estimated from the predicted 1-hour average CO concentrations using a factor of 0.7 to account for persistence of meteorological conditions and fluctuations in traffic volumes. Receptors were placed along the sidewalks around each intersection.

For $PM_{2.5}$, per the EPA hot spot analysis guideline for $PM_{2.5}$, the refined dispersion model (EPA/AMS AERMOD, Version 22112) was used to predict the worst-case condition concentrations at senstive receptors at each selected intersection.

Seasonal and off-peak hourly emission factors were prepared using additional runs of the MOVES model to capture the effect of temperature differences over four seasons, as well as changing hourly vehicular volume and classifications in off-peak hours. The detailed hourly traffic profiles and additional MOVES runs were developed at the two worst-case intersections for hot spot analysis. The contribution of disturbed road surface fugitive dust from traveling vehicles to $PM_{2,.5}$ concentrations is considered to be insignificant; therefore, the $PM_{2.5}$ estimates include emissions from engine exhaust and brake and tire wear. Modeling data and runs are provided in Appendix D.

A 24-hour time profile was developed using existing automatic traffic recorder (ATR) counts. **Table 4.8-3** presents the analysis time periods modeled. The peak-hour traffic for each time period was applied to all hours within the respective time frame, which is conservative.

Table 4.8-3: Analysis Time Periods Modeled

Analysis Period	Representative Time Frame
Morning Peak (AM)	6 AM to 10 AM
Midday (MD)	10 AM to 2 PM
Evening Peak (PM)	2 PM to 10 PM
Night Time (NT)	10 PM to 6 AM

Source: AECOM, 2022.

The model-predicted maximum concentrations of CO and $PM_{2.5}$ are summarized in **Table 4.8-4**. These concentrations were conservatively added to the most recent measured background concentrations **(Table 4.8-2**) to estimate total concentrations under the IPA for comparison with the NAAQS for these pollutants. As shown in **Table 4.8-4**, the worst-case CO and $PM_{2.5}$ concentrations predicted are all below the respective NAAQS. Therefore, the IPA would not result in significant localized air quality impacts and would be in compliance with the TCR.

Table 4.8-4: Hot Spot Modeling Results

Pollutant (units)	Averaging Period	Background Concentration	Maximum Predicted Concentration	Future with IPA(1)	NAAQS (µg/m³)
CO (ppm)	1-hour	2.2(2)	0.03	2.2	35
	8-hour	1.7(2)	0.02	1.7	9
$PM_{2.5}$ (µg/m³)	24-hour	23.0(3)	7.3	30.3	35
	Annual	9.4(3)	2.5	11.9	12

Source: AECOM, 2022.

Notes:

(1) The future with the IPA concentrations consists of a summation of the background concentration and the maximum predicted concentrations. The future with the IPA concentrations were then compared to the NAAQS.

(2) The background concentration for CO is based on the most recent year level.

(3) The background concentration for $PM_{2.5}$ is based on the 3-year average design level (2019-2021) per the averaging period per the NAAQS.

MSATs: The roadways with the potential to be impacted by the IPA are those within the Program study area. The IPA, as compared to the No-Build Alternative, would not create any meaningful changes in maximum traffic volumes as shown in **Table 4.8-5**, vehicle mix, or truck percentages that would cause concern of MSAT impacts.

Furthermore, because the maximum design year peak hour traffic volume was predicted to be approximately 9,000 along the mainline per **Table 4.8-5**, the AADT of 90,000 can be estimated using a 10 percent peak-hour to 24-hour conversion factor. Therefore, under the IPA, the overall traffic on the mainline would be well below the 140,000 AADT level, which is the FHWA threshold whereby a detailed MSAT analysis would be required. Therefore, the IPA falls into the category of projects with “Low Potential MSAT Effects.”

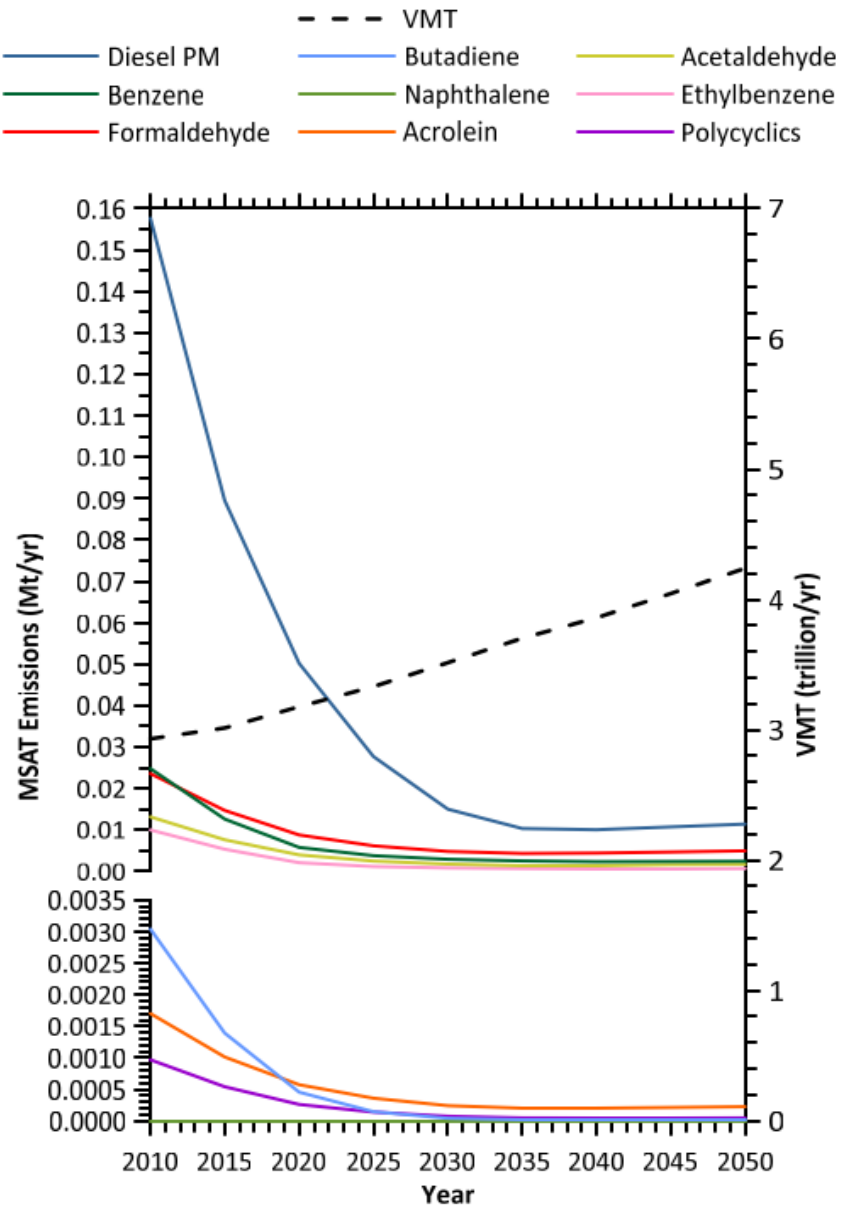
Table 4.8-5: 2040 Design Year PPA LOS Analysis: Maximum Recorded Volumes

NJ Turnpike Section	Direction	Maximum Recorded Volumes				
		2040 Volume	% Heavy Vehicles	LOS	Speed (mph)	Density (pc/mi/ln)
Between Interchanges 1 - 2	NS	3,626	3.4	C	67.9	19.6
	SN	3,513	2.8	C	68.1	18.8
Between Interchanges 2 - 3	NS	3,784	13.3	C	66.7	22.8
	SN	3,733	2.9	C	67.8	20.1
Between Interchanges 3 - 4	NS	3,763	3.1	C	67.7	20.3
	SN	3,625	2.6	C	68.0	19.4
North of Interchange 4	NS	4,502	2.9	C	65.4	25.1
	SN	4,468	4.3	C	65.3	25.3

Source: AECOM, 2022. *New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5)*.

It should be noted that the IPA may result in a slightly increased exposure to MSAT emissions at certain locations, such as those areas immediately adjacent to the mainline. However, as a result of the USEPA's national control programs that are projected to reduce MSAT emissions as shown in **Figure 4.8-1**, FHWA estimates that even if vehicle miles travelled (VMT) increases by 45 percent from 2010 to 2050 as forecasted, a combined reduction of 91 percent in the total annual emissions for the MSAT is projected for the same time period. Therefore, the emissions within these sensitive areas immediately adjacent to the mainline or interchanges would be lower than at present in both opening and design years and the operational MSAT effects as a result of the IPA would be negligible resulting in no significant adverse MSAT impacts.

Figure 4.8-1: National MSAT Emission Trends 2010 – 2050 for Vehicles Operating on Roadways



Source: FHWA, October 18, 2016

Mesoscale Emissions: For the purpose of providing an alternative comparison of the potential for emissions to change as a result of the Program, subarea VMT was selected as an indicator of potential change in mesoscale emissions for the criteria pollutants and GHGs between the No-Build Alternative and the IPA. The Program-level mesoscale (subarea along the corridor) emissions for criteria pollutants and GHG emissions in terms of CO_2 for 2019 baseline and design year No-Build Alternative and IPA were estimated based on the forecasted VMT during peak traffic hours as summarized in **Table 4.8-6** within the affected roadway network selected and described in Chapter 3 and the MOVES-predicted emissions factors. These estimated mesoscale emissions burdens and comparisons in change in emissions are summarized in **Tables 4.8-7 through 4.8-10.** Modeling data is provided in Appendix D.

The IPA during 2040 traffic peak periods would show an 8 to 72 percent net reduction of emissions depending on the individual pollutant as compared to the existing condition. However, as compared to the No-Build Alternative, the IPA would slightly increase emissions by less than 10 percent along the mainline and interchange ramps and approximately one percent on local roads during AM peak period and reduce emissions by approximately six percent during PM peak period on local roads.

The predicted slight increase in air emissions along the mainline as compared to the No-Build Alternative is primarily attributed to the increases in VMT. However, the mainline VMT increase associated with the Turnpike mainline improvements would also result in a slight overall reduction in VMT along local roads particularly during PM peak period. The slight overall reduction of emissions along the local roads would provide an overall air quality benefit on a regional level if the local road network extended beyond the area immediately adjacent to the mainline corridor. With the Program inclusion of the future TIP, the potential air quality impacts under the IPA on a regional level would not be significant.

GHG and Climate Change: The GHG emissions associated with the operation of the IPA in terms of estimated peak hour CO_2 emissions are summarized in **Tables 4.8-6 through 4.8-9**. These planning level estimates show that the operational GHG levels would be substantially reduced as compared to the existing condition and comparable to the No-Build Alternative. Since GHGs and their impact on climate change should be assessed on a global scale, the IPA would not result in any appreciable change in GHG emissions as compared to the No-Build Alternative and result in no adverse global climate change impacts.

Table 4.8-6: Peak Hour Vehicle Miles Travelled

Mainline and Interchange Ramps		
Year / Condition	**AM Peak Hour**	**PM Peak Hour**
2019 Base	116,310.59	127,773.82
2040 No-Build	121,115.72	133,191.34
2040 Build (Capacity Improvements)	130,188.01	142,998.66
Arterials/Local Roads at Interchanges		
Year / Condition	**AM Peak Hour**	**PM Peak Hour**
2019 Base	13,371.11	13,799.89
2040 No-Build	14,178.32	15,612.06
2040 Build (Capacity Improvements)	14,122.76	14,488.05

Source: AECOM, 2022. New Jersey Turnpike Interchanges 1 to 4 Traffic Analysis Report, Mainline (MP 3.5 – 36.5).

Table 4.8-7: Mesoscale AM Peak Hour Mainline/Ramps Emissions Burden (tons)

Pollutant	AM Peak Hour			% Change	
	2019 Baseline	2040		2019 to Build	2040 No-Build to Build
		No-Build	Build		
VOC	0.008	0.003	0.003	-58	5
NOx	0.051	0.014	0.015	-71	4
CO	0.256	0.115	0.125	-51	8
$PM_{2.5}$	0.002	0.001	0.001	-62	2
PM_{10}	0.004	0.003	0.003	-24	-1
SO_2	0.001	0.000	0.000	-55	7
CO_2e	53.41	41.08	44.12	-17	7

Source: AECOM October 2022

Table 4.8-8: Mesoscale PM Peak Hour Mainline/Ramps Emissions Burden (tons)

Pollutant	PM Peak Hour			% Change	
	2019 Baseline	2040		2019 to Build	2040 No-Build to Build
		No-Build	Build		
VOC	0.009	0.003	0.004	-59	5
NOx	0.056	0.015	0.016	-72	5
CO	0.280	0.127	0.137	-51	8
$PM_{2.5}$	0.002	0.001	0.001	-64	1
PM_{10}	0.005	0.003	0.003	-29	-2
SO_2	0.001	0.000	0.000	-55	7
CO_2e	58.42	44.83	48.17	-18	7

Source: AECOM October 2022

Table 4.8-9: Mesoscale AM Peak Hour Interchange Arterial/Local Road Emissions Burden (tons)

Pollutant	AM Peak Hour			% Change	
	2019 Baseline	2040		2019 to Build	2040 No-Build to Build
		No-Build	Build		
VOC	0.002	0.001	0.001	-57	1
NOx	0.008	0.003	0.003	-56	1
CO	0.049	0.020	0.020	-58	1
$PM_{2.5}$	0.000	0.000	0.000	-44	1
PM_{10}	0.002	0.002	0.002	-8	1
SO_2	0.000	0.000	0.000	-60	1
CO_2e	8.85	6.67	6.71	-24	1

Source: AECOM October 2022

Table 4.8-10: Mesoscale PM Peak Hour Interchange Arterial/Local Road Emissions Burden (tons)

Pollutant	PM Peak Hour			% Change	
	2019 Baseline	2040		2019 to Build	2040 No-Build to Build
		No-Build	Build		
VOC	0.002	0.001	0.001	-67	-5
NOx	0.008	0.003	0.003	-66	-6
CO	0.049	0.019	0.018	-62	-6
$PM_{2.5}$	0.000	0.000	0.000	-55	-6
PM_{10}	0.002	0.001	0.001	-28	-6
SO_2	0.000	0.000	0.000	-65	-6
CO_2e	8.79	6.13	5.76	-34	-6

Source: AECOM October 2022

Interchange 2

Although the 2040 traffic at Interchange 2 shows congestion at the Turnpike ramps ST and NT during both peak hours, localized air quality impacts would not be significant based on the hot spot analysis conducted at the worst-case intersections and discussed above, particularly as no sensitive receptors are around this interchange.

Interchange 3

The hot spot analysis results at the intersection of NJ Route 168 (Black Horse Pike) and NJ Route 41 (Clements Bridge Road), one of the worst-case congested intersections, show no violations of the CO and $PM_{2.5}$ NAAQS. Therefore, potential localized air quality impacts around Interchange 3 would not be significant.

Interchange 4

The hot spot analysis results at the intersection of Route 73/Fellowship Road show no violations of the CO and $PM_{2.5}$ NAAQS. Therefore, potential localized air quality impacts around Interchange 4 would not be significant.

4.8.3.3 Program - Short-Term Construction Effects

Potential air quality impacts from Program construction would be temporary and could include the following impacts:

- Localized increases in emissions from construction equipment, particularly diesel-powered equipment. Increased concentrations could occur in the areas of work activities and haul routes.
- Increases in motor vehicle emissions associated with potential disruption of traffic operations during construction. Effects could occur if temporary lane closures and detours cause congestion and travel delays.
- Localized dust and airborne particulate matter generated by temporarily exposed soils and earth-disturbance activities.

In contrast to operational activities, construction activities are relatively short-term conditions with the potential to produce temporary air quality effects. However, the impacts of construction vehicle and equipment emissions from large-scale construction activities occurring over many years (typically over five years) at a specific local site could cause adverse air quality effects and may need to be quantitatively addressed. According to the current schedule at a specific construction site, construction activities would not last more than five years; therefore, construction activities are considered temporary and would not result in potential for significant air quality impacts. As a result, a quantitative hot-spot analysis is not warranted.

General Conformity: Since the Program would require a USACE permit for the bridge replacements over regulated waterways, a GCR conformity applicability analysis was conducted.

The GCR requires that potential emissions generated by the activity associated with the USACE Federal action be determined on an annual basis and compared to the annual *de minimis* levels for those pollutants (or their precursors) for which the area is designated as non-attainment or maintenance. If estimated annual emissions are below the respective *de minimis* thresholds, potential air quality impacts are deemed to be less than significant and a formal GCR determination is not required. Because the Program area is within a moderate non-attainment area for the 8-hour O_3 NAAQS in an O_3 transportation region, and a maintenance area for CO and $PM_{2.5}$ NAAQS, the *de minimis* levels are 50 tons for VOCs and 100 tons each for NOx, CO, and $PM_{2.5}$.

As shown in **Table 4.8-11**, the total calculated emissions for bridge demolition and construction are compared to the applicable *de minimis* thresholds, conservatively assuming the emissions levels would occur within one calendar year. The predicted total emissions would be below the applicable *de minimis* levels for each pollutant and would result in minor adverse air quality impacts. Therefore, no formal conformity determination is required under the GCR requirements for the IPA.

Table 4.8-11: Total Emissions for Bridge Demolition and Construction (in tons)

Source	VOC	NOx	CO	$PM_{2.5}$
Non-road Equipment	0.55	4.98	8.98	0.29
On-road Vehicle	0.06	0.36	2.35	0.02
Total	0.6	5.3	11.3	0.3
de minimis Level	50	100	100	100

Source: AECOM October 2022

4.8.4 Minimization and Mitigation

Best management practices (BMPs) to minimize temporary construction air quality effects during Program construction, particularly for dust control, would be considered by the NJTA during Final Design of the Program. No mitigation is warranted during the operational phase of the Program because no significant impacts on air quality were predicted.

4.9 NOISE

4.9.1 Methodology and Data Sources

Potential negative effects from traffic noise are assessed on the basis of predicted noise levels approaching or exceeding the FHWA Noise Abatement Criteria (NAC). These criteria have been adopted by the NJTA and are included in the *Policy for Traffic Noise Analysis and Abatement (Noise Policy)* dated May 2023. As shown in **Table 4.9-1**, the NAC for residences and other noise-sensitive exterior receivers is a one-hour equivalent sound level [Leq(h)] of 67 dB(A). These noise levels are used by NJTA to evaluate the need for noise mitigation measures due to highway improvements.

A noise modeling assessment for the Program was conducted in accordance with the FHWA's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* and the NJTA's *Noise Policy*. In order to determine the potential effects of the Program, a traffic noise prediction model was developed using the FHWA's Traffic Noise Model® (TNM2.5) to determine existing and future noise levels at sensitive receptors along the Program corridor. Noise-sensitive receptors were selected within a screening distance of 500 feet from the proposed pavement edge. Based on this screening distance, noise impacts were evaluated at 1,226 receivers, which includes 1,131single-family residences and 79 multi-family residences (Category B land uses), two schools (Rosa International Middle School in Cherry Hill and Lake Tract School in Deptford), four churches, one museum (Peter Mott House in Lawnside), one public building (Borough Hall in Lawnside) and eight parks (Category C land-uses). For exterior

non-residential facilities (such as schools, churches, parks, museums and public buildings), NJTA's lot-size based "equivalent number of residences" method was used to determine the number of receptors for the barrier cost-effectiveness calculations.

Table 4.9-1: Noise-Sensitive Activity Categories and Criteria for Impact Determination [Hourly A-Weighted Sound Level or dB(A)]

Activity Category	Activity Leq(h)	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67	Exterior	Residential
C[1]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios

Source: NJTA. May 2023. *Noise Policy*.

The NJTA *Noise Policy* has defined impact as approaching within one decibel of the NAC for residential or other similar sensitive land use areas. Additionally, NJTA defines a substantial increase as 10 dB(A) greater than existing noise levels.

FHWA guidelines and the NJTA *Noise Policy* indicate that abatement should be considered if the noise criteria described above are exceeded. However, the abatement measures must be found to be both "feasible" and "reasonable" to be recommended for implementation.

Existing conditions were modeled using 2019 traffic while future conditions (i.e., the No-Build Alternative and the IPA) were modeled using 2040 traffic estimates. For all conditions, the afternoon PM peak-hour period was used because it represents the highest traffic volumes that would result in the worst-case noise condition. Traffic volumes were allocated into the following FHWA vehicle class types:

- 74 percent – CARS – all passenger cars and pick-up trucks;
- 8 percent – MT – all medium trucks with 2 axles and 6 wheels;
- 17.5 percent – HT – all heavy trucks with 3 or more axles; and
- 0.5 percent – BUS – buses designed to carry more than nine passengers.

Acoustical adjustments were applied for free-flow and roadway design speeds of 70 miles per hour (mph), which is 5 mph above the posted speed limit.[1] Similarly, a speed of 35 mph was applied to all on and off ramps. Other adjustments include truck deceleration at toll plazas, truck acceleration along on-ramps, first and second row buildings, ground attenuation effects, and terrain features such as cuts and fills.

4.9.2 Affected Environment

A noise monitoring program was conducted in August 2021 at 17 residences to document the current baseline conditions along the Program corridor. These baseline noise measurements were also used to establish a relationship between actual field measurements and the future predicted noise levels from the Program. The figure titled, Noise Monitoring Sites Map, in Appendix B shows the locations of noise measurement locations.

As shown in **Table 4.9-2**, existing noise levels measured at the 17 sites range from 64 dB(A) at Site 5 (a residence at 147 Winding Way in Woolwich Township) to 71 dB(A) at Site 16 (a residence at 29 Oak Avenue in Lawnside Borough). These noise levels are dominated by traffic along the Turnpike.

As part of the prediction modeling analysis, the existing measurements were “validated” using the same traffic volumes and speeds observed during the monitoring period. The validated software model is then used to predict Program noise levels for the 2019 Existing Condition, 2040 No-Build Alternative and the 2040 IPA for comparison with the Program impact criteria. As shown in **Table 4.9-2**, the validated noise levels are all within 1-3 dB(A) of the measured noise levels indicating that the noise prediction model is valid for use with future predictions.

Once the model is validated, existing noise levels were predicted using the existing year (2019) traffic data for the Project. These noise levels form the basis for comparison with the 2040 IPA noise levels against the NJTA relative increase criterion. The 2040 No-Build and Build Alternative noise levels are predicted using the traffic data for the future year developed from the existing year (2019) traffic data.

[1] “Traffic Analysis Report”, August 2022.

Table 4.9-2: 2019 Base Year Noise Levels, Decibels (dB(A))

ID	Location	Municipality	Date/Time	Measure	Model	Change	Validate
1	33 Laytons Lake Drive	Carneys Point Twp	08/04/21, 10:47 AM	68.3	67.4	-0.9	valid
2	8 Judy Home Place	Woolwich Twp	08/04/21, 10:06 AM	67.6	65.9	-1.8	valid
3	2255 Kings Highway	Woolwich Twp	08/04/21, 09:08 AM	66.2	66.8	0.6	valid
4	6 Alexis Court	Woolwich Twp	08/04/21, 08:26 AM	65.5	65.4	-0.2	valid
5	147 Winding Way	Woolwich Twp	08/03/21, 04:41 PM	64.1	66.8	2.7	valid
6	320 Salarno Court	Harrison Twp	08/03/21, 03:58 PM	68.0	66.4	-1.6	valid
7	142 Sunset Drive	East Greenwich Twp	08/03/21, 05:39 PM	70.1	67.5	-2.5	valid
8	454 Heather Drive North	West Deptford Twp	08/03/21, 06:00 PM	68.9	66.4	-2.5	valid
9	20 Biscayne Boulevard	West Deptford Twp	08/03/21, 04:39 PM	69.8	67.9	-1.9	valid
10	415 Maple Avenue	Borough of Woodbury Heights	08/03/21, 03:50 PM	67.3	69.4	2.1	valid
11	350 Woodbury Lake Drive	Deptford Twp	08/03/21, 03:01 PM	67.2	70.0	2.8	valid
12	35 Knollwood Drive	Deptford Twp	08/03/21, 09:50 AM	68.4	66.3	-2.1	valid
13	116 Talon Lane, Westville	Deptford Twp	08/03/21, 10:35 AM	68.6	67.9	-0.7	valid
14	Roberts Avenue	Borough of Bellmawr	08/03/21, 08:53 AM	69.3	68.0	-1.3	valid
15	38 Clark Drive	Borough of Barrington	08/03/21, 01:16 PM	65.1	67.4	2.3	valid
16	29 Oak Avenue	Borough of Lawnside	08/03/21, 02:08 PM	70.6	69.1	-1.5	valid
17	1203 Sequoia Road	Cherry Hill Twp	08/03/21, 01:16 PM	67.0	66.0	-1.0	valid

Source: AECOM October 2022.

4.9.3 Environmental Consequences

4.9.3.1 No-Build Alternative

Future noise levels under the 2040 No-Build Alternative are anticipated to remain the same or increase slightly compared to the 2019 Existing Condition. This is due to the 3.7 percent increase in traffic during this period. From a noise perspective, this increase is marginal. As shown in **Table 4.9-3**, noise under the No-Build Alternative is predicted to remain essentially the same as the Existing Condition. Similarly, corridor wide, peak-hour noise levels at the noise modeling sites are predicted to range from 57 dB(A) at a residence in Cherry Hill (ID# 521) to 77 dB(A) at a residence in Lawnside (ID# 678). Overall noise levels are predicted to increase slightly 0 to 1 dB(A) from the Existing Condition.

Table 4.9-3: Base Year and 2040 Noise Levels Predicted at Select Representative Receivers

ID	Residence Address	Township	2019 Existing	2040 No-Build	2040 Build	NJTA Criteria	Impact
1	33 Laytons Lake Drive	Carneys Point Twp	74	74.1	74.7	66	Yes
2	8 Judy Home Place	Woolwich Twp	72.5	72.7	73.4	66	Yes
3	2255 Kings Highway	Woolwich Twp	70.4	70.6	70.2	66	Yes
4	6 Alexis Court	Woolwich Twp	68.3	68.4	70	66	Yes
5	147 Winding Way	Woolwich Twp	71.5	71.7	73	66	Yes
6	320 Salarno Court	Harrison Twp	72.6	72.9	73.5	66	Yes
7	142 Sunset Drive	East Greenwich Twp	72.2	72.4	71.4	66	Yes
8	454 Heather Dr N	West Deptford Twp	68.6	68.9	69.5	66	Yes
9	20 Biscayne Boulevard	West Deptford Twp	73.3	73.5	74.5	66	Yes
10	415 Maple Avenue	Borough of Woodbury Heights	70.3	70.6	70.7	66	Yes
11	350 Woodbury Lake Drive	Deptford Twp	73.9	74.2	74.6	66	Yes
12	35 Knollwood Drive	Deptford Twp	70.8	71.1	72.3	66	Yes
13	116 Talon Lane	Deptford Twp	73.8	74	74.6	66	Yes
14	312 Roberts Avenue	Borough of Bellmawr	74.2	74.4	75.8	66	Yes
15	38 Clark Drive	Borough of Barrington	72.9	73	73.8	66	Yes
16	29 E. Oak Avenue	Borough of Lawnside	74.1	74.3	74.6	66	Yes
17	1203 Sequoia Road	Cherry Hill Twp	71.6	71.8	72.6	66	Yes

Source: AECOM, March 2024.

4.9.3.2 Initially Preferred Alternative

Future noise levels under the Build Alternative are anticipated to increase between the 2019 Existing Condition and the 2040 Build Alternative, with a total projected increase of approximately 11.4 percent. From a noise perspective, this increase is again considered to be marginal, resulting in an anticipated increase of approximately 0.47 dB(A) when modeled. As shown in **Table 4.9-3**, noise under the Build Alternative is predicted to increase 1 to 2 dB(A) compared to the Existing Condition. This change is due primarily to several roadway configurations proposed including a new third travel lane along the mainline corridor as well as ramp realignments at Interchanges 3 and 4. As a result, future noise levels under the Build Alternative would primarily reflect these geometric roadway changes rather than the growth in traffic volumes. Additionally, several ramp configurations were developed and evaluated at each of the interchanges. The results discussed in this report reflect the most current ramp configuration at Interchange 3 and 4.

Corridor wide, peak-hour noise levels at the noise modeling sites along the Program corridor under the Build Alternative are predicted to range from 57 dB(A) at a residence in Mount Royal (ID# 92) to 78 dB(A) at a residence in Lawnside (ID# 678). As shown in **Table 4.9-4**, overall corridor wide traffic noise impacts under the 2040 Build Alternative are predicted at 1,513 residences (Category B), two schools (Rosa International Middle School in Cherry Hill and Lake Tract School in Deptford), three churches, one museum (Peter Mott House in Lawnside), five parks and one public building (Borough Hall in Lawnside). The increase in overall noise impacts (+97) between the Existing Condition and the future Build Alternative is primarily due to the spreading of traffic volumes closer to residences.

Table 4.9-4: Base Year and 2040 Noise Impact Counts Predicted along the Program Corridor

FHWA		Receivers			
Category	**Description**	**Inventory**	**2019 Existing**	**2040 No-Build**	**2040 Build**
B	Residences	1,951	1,418	1,436	1,513
C	Schools	2	2	2	2
	Churches	4	2	2	3
	Museum	1	1	1	1
	Parks	8	4	4	5
	Public	1	1	1	1
Totals		1,967	1,428	1,446	1,525
Change				+18	+97

Source: AECOM, March 2024.

Regarding indirect and cumulative impacts from the Program, a cumulative impact refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the Program.

The Program would involve the construction and modification of bridge overpasses, ramp modifications, and new pavement to accommodate the third travel lanes, and shoulder lanes. Each of these measures is proposed to improve the mobility and use of the current traffic corridor and is consistent with other existing uses within the State's designated transportation corridors. Although there may be other regional transportation projects in the area, they are not expected to entail the same magnitude and scope of the Interchanges 1 to 4 Capacity Enhancements Program. As a result, no significant or adverse effects are expected from other smaller regional transportation projects are expected.

4.9.4 Minimization and Mitigation

Since noise impacts are predicted under the 2040 Build Alternative, mitigation measures were evaluated in accordance with NJTA's *Noise Policy*. Accordingly, a noise abatement determination is a two-phased approach including:

1. Is it feasible to provide highway traffic noise abatement from an engineering and acoustical standpoint?
2. Is it reasonable from a cost/benefit, maintainability, and land use conformity consideration to provide highway traffic noise abatement?

A detailed traffic modeling analysis was conducted to determine future noise levels from the affected roadways at nearby residences. Since future modeled noise levels are predicted to exceed the NJTA noise abatement criteria under the Build Alternative, traffic noise abatement consideration is required in accordance with the NJTA *Noise Policy*.

Furthermore, the FHWA guidelines and the NJTA *Noise Policy* indicate that abatement should be considered if the noise criteria described previously are exceeded for a Type I project. For example, feasibility refers to engineering considerations such as if a noise barrier can be built given the topography of the location, can a substantial noise reduction be achieved given certain access, drainage, safety, or maintenance requirements, or are other noise sources present in the area. For instance, maintaining access to residential properties often requires gaps in noise barriers at entrance and exit driveways and reduces their effectiveness to the point where substantial noise reduction is not feasible. Feasibility also includes a minimum reduction of 5 dB(A) to Design Year noise levels for at least 50 percent of impacted receptors in the first row.

Similarly, reasonableness refers to a barrier's cost effectiveness and the level of public support. NJTA considers a noise barrier to be cost effective if the construction cost is less than $50,000 per benefited receptor. Additionally, the barrier should achieve a noise reduction design goal of 7 dB(A) at 50 percent or more of first-row receptors and 10 dB(A) for at least one receptor. Benefited receptors include all residences in the study area attaining at least a 5 dB(A) reduction in noise. Receptors where no impact is predicted but would attain at least a 5 dB(A) reduction in noise are considered to count as one-half benefit credit.

In accordance with the FHWA noise policy CFR 772, the following noise abatement measures were evaluated to reduce the traffic noise impacts. These are grouped into measures that are either feasible or not feasible for this Program.

Control measures that are not feasible:

- Traffic management measures (such as traffic control devices and signing for prohibition of trucks, time-use restrictions for trucks, modified speed limits, and exclusive land designations) would not be feasible on an interstate highway that requires open access for truck traffic;
- The alteration of horizontal and vertical alignments would also not be feasible because the Program corridor elevations and siting have been optimized to minimize traffic and construction effects in the community;
- The acquisition of real property to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise is also not feasible since there is limited ROW.

Control measures that may be feasible:

- The construction of noise barriers (including landscaping for aesthetic purposes) whether within or outside the highway ROW could be feasible given that the Program corridor is a limited access roadway that includes adequate ROW to investigate the effectiveness of noise walls;
- The acquisition of property rights (either in fee or lesser interest) for construction of noise barriers could be possible but highly unlikely given the NJTA intent to minimize property impacts during the Program. Any property acquisitions proposed as part of the Program would be for roadway modifications and not for acoustical purposes;
- Sound insulation and/or air conditioning to meet interior standards may be considered for public use or non-profit institutional structures listed in FHWA Category D. This control measure is subject to the same cost-effectiveness criterion as noise barriers and is not provided for other buildings including private residences or commercial properties.

During Final Design, additional analysis will be conducted to ascertain locations where noise barriers meet the “feasible and reasonable” criteria in accordance with the NJTA *Noise Policy*. Additionally, a public hearing will be conducted in accordance with the requirements of Executive Order No. 172. During the public hearing comment period, the NJTA will survey the owners and residents of properties benefited by potential noise barriers to determine community viewpoints on noise barriers. Based on the additional analysis and community feedback, the NJTA will make a determination on the location of noise barriers within the Program corridor.

Noise levels from Program construction activities, although temporary, could be a nuisance at nearby sensitive receptors. Noise levels during construction are difficult to predict and vary depending on the types of construction activity and the types of equipment used for each stage of work. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns and is not usually at one location very long. Additionally, the sequencing of each phase of construction creates further uncertainty about expected cumulative noise effects.

Program construction activities are expected to include bridge overpass construction, site excavation, relocating utilities, and roadway grading. Although these general excavation activities typically include earth-moving equipment, heavy-duty impulsive equipment (such as pile drivers) may be utilized by the selected contractor at bridge overpasses. These impacts are not expected to be significant except at areas where sensitive residential receptors are located

in proximity to the Turnpike. As a result, noise control measures (such as vibratory pile drivers or pre-auguring) may be required during construction to mitigate temporary impacts in the community. All construction activities would need to comply with local ordinances and the NJTA project specifications.

Standard specifications to be considered for inclusion in the Program's construction documents may include the following:

- All construction equipment powered by an internal combustion engine would be equipped with a properly maintained muffler;
- Air compressors would meet current USEPA noise emission exhaust standards;
- Air powered equipment would be fitted with pneumatic exhaust silencers;
- Stationary equipment powered by an internal combustion engine would not be operated within 150 feet of noise sensitive areas without portable noise barriers placed between the equipment and noise sensitive sites. Noise sensitive sites include residential buildings, motels, hotels, schools, churches, hospitals, nursing homes, libraries, and public recreation areas. Portable noise barriers would be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment); and
- Powered construction equipment would not be operated before 7:00 AM or after 6:00 to 8:00 PM depending on the local municipality.

4.10 SOILS AND GEOLOGY

4.10.1 Methodology and Data Sources

This section addresses soil and geological conditions with the potential to impact Program construction activities. For the purposes of this assessment, the review and evaluation of potential impacts was conducted within a study area extending 500 feet from either side of the existing Turnpike ROW and 100 feet from the existing edge of local road crossings. Information on soils within the study area was obtained from the U.S. Department of Agriculture (USDA) *Web Soils Survey.* A general description of the geological character and soil characteristics and the potential direct or indirect impacts of Program construction on these geological and soil characteristics has been completed in this assessment. The soil properties include depth to high water table, hydric soil, erosion potential ranking, and potential to produce acidic soils. The NJDEP Bureau of GIS was reviewed to identify geologic formations with the potential to produce acid sulfate (acid-producing) soils. The Geologic Map of New Jersey and the New Jersey Geology Survey's website were reviewed to identify geological formations.

The New Jersey Department of Agriculture's Standards for Soil Erosion and Sediment Control in New Jersey were used to outline the compliance requirements of N.J.S.A. 4:24-39 *et seq*. These standards were used to outline the mitigation procedure that would be put in place to address potential long-term operational and short-term Program construction effects caused by soil erosion.

4.10.2 Affected Environment

The Program study area is located within New Jersey's Coastal Plain physiographic province. The Coastal Plain is the largest of the four physiographic provinces, encompassing approximately three-fifths of the state. The specific geological formations in the study area, a brief description of their lithology, and the potential for each formation to produce acidic soils are summarized in **Table 4.10-1**.

Three geological formations were identified within the study area with the potential to produce acid sulfate (acid-producing) soils. These formations, Englishtown, Marshalltown, and Wenonah Formations, encompass approximately 60 percent of the study area. When exposed to air and/or water through excavation and grading, acid sulfate soils can produce very low soil pH conditions, which inhibit establishment of restorative vegetation and may degrade concrete, iron, steel, or other infrastructure elements. In addition, these soils may produce acidic runoff which may potentially affect water quality and aquatic biota.

The following sections of the Program study area are within the Englishtown and Marshalltown formations, both of which have the potential to produce acid-producing soils: MP 3.5 to MP 6.1, MP 17.2 to MP 17.6, MP 18.2 to MP 26.2, and MP 33.2 to MP 36.6. The Interchange 2 study area is not located in geologic formations with the potential to produce acid-producing soils. The entire study area surrounding Interchange 3 is located within the Englishtown, Marshalltown, and Wenonah Formations, which are acid-producing soil areas. Interchange 4 is located entirely within the Marshalltown Formation, an acid-producing soil area. A description of these conditions by Program element is described in the subsections below.

There are a diverse range of soil types identified within the Program study area. A list of the soils and a description of important soil characteristics is provided in **Table 4.10.2.** The figure titled, Soil Survey Map, in Appendix B shows the locations of the various soil types in the Program study area.

Within the study area, soil types range from well and moderately well-drained sands and sandy loams to muck soils comprised of very poorly drained finely decomposed organic matter. Several of the soil types are considered hydric and are associated with wetlands, as discussed in Section 4.15 (Wetlands).

Soils that are saturated with water or have a water table near the surface are significantly limited and often require improvement for most construction purposes. The seasonal high water table ranges from 0 to <80 inches below the ground surface in the study area.

Soil erosion hazard potential ratings indicate the risk of soil loss associated with each soil type. The ratings are based on soil erosion factor K, slope, and content of rock fragments. Soils within the study area have been designated with either slight, moderate, or severe erosion hazard potential. Pockets of soils with a severe erosion potential rating were identified between MP 7.7 to MP 18.4. No soils with a severe erosion potential rating were identified within the study areas surrounding Interchanges 2, 3, or 4. A description of these conditions by Program element is described in the subsections below.

Table 4.10-1: Study Area Geologic Formations

Geologic Name	Lithology	Potentially Acid-Producing
Alluvium	Sand, gravel, silt, minor clay, and peat; reddish brown, yellowish brown, brown, gray. As much as 20 feet thick.	No
Cape May Formation	Sand, minor silt, clay, and pebble gravel; very pale brown, yellow, reddish yellow. As much as 50 feet thick.	No
Englishtown Formation	Quartz sand, fine- to coarse-grained, locally interbedded with thin- to thick-beds of clay	Yes
Lower Stream Terrace Deposits	Sand, pebble gravel, minor silt and cobble gravel; reddish brown, yellowish brown, reddish yellow. As much as 30 feet thick.	No
Marshalltown Formation	Quartz and glauconite sand, silty, and clayey	Yes
Pensauken Formation	Sand, clayey sand, pebble gravel, minor silt, clay, and cobble gravel; yellow, reddish yellow, white. Sand typically includes weathered feldspar. Locally iron-cemented. As much as 140 feet thick.	No
Salt Marsh and Estuarine Deposits	Silt, sand, peat, clay, minor pebble gravel; brown, dark-brown, gray, black. As much as 100 feet.	No
Swamp and Marsh Deposits	Peat and organic clay, silt, and minor sand; gray, brown, black. As much as 40 feet thick.	No
Upland Gravel	Sand, clayey sand, pebble gravel, minor cobble gravel; yellow to reddish yellow. Locally iron-cemented. As much as 20 feet thick.	No
Upper Stream Terrace Deposits	Sand and pebble gravel, minor silt and cobble gravel; yellow, reddish yellow, yellowish brown. As much as 20 feet thick.	No
Weathered Coastal Plain Formations	Exposed sand and clay of Coastal Plain bedrock formations. Includes thin, patchy alluvium and colluvium, and pebbles left from erosion of surficial deposits.	No
Wenonah Formation	Quartz sand, fine-grained, silty, clayey micaceous	Yes

Source: New Jersey Geological Survey.
Note: Lithology is the description of physical and chemical characteristics of a rock formation

Table 4.10-2: Soil Types Found within the Study Area

Major Soil Series	Depth to Seasonal High Water Table	Erosion Potential	Hydric Rating
Adelphia	18 to 42 inches	Slight	No
Askecksy	0 to 12 inches	Slight	Yes
Berryland	0 to 6 inches	Slight	Yes
Chicone	About 0 inches	Slight	Yes
Colemantown	0 to 12 inches	Slight	Yes
Collington	Greater than 80 inches	Slight / Moderate / Severe	No
Colts Neck	Greater than 80 inches	Slight / Moderate	No
Donloton	18 to 24 inches	Slight	No
Downer	Greater than 80 inches	Slight / Moderate	No
Galestown	Greater than 80 inches	Slight	No
Fallsington	0 to 20 inches	Slight	Yes
Fluvaquents	6 to 18 inches	Slight	Yes
Freehold	Greater than 80 inches	Slight / Moderate / Severe	No
Glassboro	12 to 18 inches	Slight	No
Hammonton	18 to 24 inches	Slight	No
Holmdel	6 to 36 inches	Slight / Moderate	No
Keansburg	0 to 6 inches	Slight	Yes
Keyport	18 to 24 inches	Moderate	No
Lenni	0 to 12 inches	Slight	Yes
Manahawkin	0 to 6 inches	Slight	Yes
Mannington	0 to 6 inches	Slight	Yes
Marlton	18 to 42 inches	Moderate	No
Mullica	0 to 6 inches	Slight	Yes
Nanticoke	0 to 10 inches	Slight	Yes
Pedricktown	0 to 6 inches	Slight	Yes
Pemberton	12 to 48 inches	Slight	No
Psamments	About 48 inches	Slight	No
Sassafras	Greater than 80 inches	Slight	No
Shrewsbury	0 to 12 inches	Slight	Yes
Swedesboro	Greater than 80 inches	Slight / Moderate	No
Tinton	Greater than 80 inches	Slight	No
Udorthents	18 to 42 inches	Slight	No
Woodstown	20 to 40 inches	Slight	No

Source: USDA NRCS Web Soil Survey.

4.10.2.1 Mainline Improvements

The potential to encounter acid-producing soils exists within the following sections of the Program study area: MP 3.5 to MP 6.1, MP 17.2 to MP 17.6, MP18.2 to MP 26.2, and MP 33.2 to MP 36.6. Soils with an erosion hazard potential rating of severe were identified between MP 7.7 and MP 18.4; therefore, there is a greater risk of soil erosion impacts within this section of the Program.

4.10.2.2 Interchange 2

The potential to encounter acid-producing soils exists within the entire study area of Interchange 2. Soils with a moderate or slight erosion hazard potential were identified within the study area; however, no soils with a severe rating were identified in the area of Interchange 2.

4.10.2.3 Interchange 3

The potential to encounter acid-producing soils exists within the entire study area of Interchange 3. Soils with a moderate or slight erosion hazard potential were identified within the study area; however, no soils with a severe rating were identified in the area of Interchange 3.

4.10.2.4 Interchange 4

The potential to encounter acid-producing soils exists within the entire study area of Interchange 4. Soils with a slight erosion hazard potential were identified within the study area; however, no soils with a moderate or severe rating were identified in the area of Interchange 4.

4.10.3 Environmental Consequences

4.10.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration, with no land being disturbed for Program purposes. Consequently, there would be no direct or indirect Program impacts to existing soils or geologic features in the study area, nor would there be any new exposure of acid-producing soils because of the Program. Planned projects in the No-Build Alternative have the potential to cause impacts to soil and geological resources; the sponsors of these projects may be required to comply with applicable regulations to protect such resources.

4.10.3.2 Initially Preferred Alternative

No long-term impacts to soils or geology are expected as a result of the Program's operations. SWM systems would be installed to promote the settling of eroded particles, resulting in no long-term impacts to water quality during the operational phase of the Program. The finished grade of the new travel lanes, shoulders, bridges, underpasses, and interchange ramps would be similar to the existing roadway; therefore, no substantial changes to existing topography, resulting in impacts to geology and soils, would result. Additionally, no blasting or alteration of the underlying geology is anticipated to be required for the Program, resulting in no long-term impacts to geology within the study area. The figure titled; Proposed Stormwater Management Map (Appendix B) shows the preliminary locations of proposed structures to handle stormwater runoff from the Turnpike.

Short-term construction activities associated with excavation for the Program improvements would result in land and soil disturbance. Land disturbance has the potential to result in soil erosion as exposed soil can be washed or blown by water and wind, respectively. Unmitigated soil erosion can impact local waterways by increasing the sediment load and the potential for erosion is greater in areas with soils exhibiting a severe erosion hazard potential. To address this potential effect, the NJTA would comply with the New Jersey Soil Erosion and Sediment Control (SESC) Act (N.J.S.A. 4:24-39 *et seq.*) and apply BMPs to control soils over the long-term. Specifically, temporarily exposed soils would be permanently stabilized at the conclusion of Program construction. The following sections describe specific soils conditions and the management of those conditions during Program construction.

4.10.4 Minimization and Mitigation

Excavations within areas with the potential to encounter acid-producing soils would be monitored for the presence of such soils during construction. Planning for mitigation measures if acid-producing soils are encountered would occur during Final Design and overall construction planning. If acid-producing soils are encountered during construction, mitigation measures would be implemented in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey. An approved SESC Plan for the Program would be obtained by the NJTA prior to the start of construction.

Excavated soil would be stockpiled adjacent to the excavation site and stockpile compliance requirements would be followed as outlined in the Program's certified SESC Plans. Excess excavated soil would be removed from the site as necessary. If offsite disposal is required, the soil would be sampled and analyzed to inform disposal regulation requirements. A licensed disposal transport facility would be utilized consistent with environmental regulations specific to the soil's characterization.

4.11 SURFACE WATER RESOURCES

4.11.1 Methodology and Data Sources

This section identifies surface water resources and potential Program-related effects to these resources during construction and long-term operations. For purposes of resource identification, the study area extends approximately 500 feet from either side of the Turnpike ROW and 100 feet from the existing edge of local road crossings; however, it is recognized that Program effects on water quality can be experienced cumulatively on a watershed and sub-watershed level.

Surface waters were identified in the study area using NJDEP GIS data with field verification during wetland delineation activities. Specifically, GIS data from the NJDEP Bureau of GIS was analyzed to determine the presence of streams and waterbodies. These data, combined with knowledge of existing infrastructure and previous projects that impacted the tidal nature of nearby waters, were used to delineate tidal waters within the study area.

Information on water quality classifications for study area streams and rivers was obtained from the NJDEP Surface Water Quality Standards (SWQS) (N.J.A.C. 7:9B). Information on the quality of existing surface waters was obtained from the New Jersey 2018-2020 Integrated

Water Quality Monitoring and Assessment Report which was prepared pursuant to Section 303(d) and 305(b) of the Federal Clean Water Act. Program-related impacts to surface waters are addressed in this section from an overall water quality perspective in consideration of the preliminary SWM design for the Program. An assessment of coastal zone consistency is addressed in Section 4.12 (Coastal Zone Considerations). Potential flood hazard and riparian zone impacts are addressed in Section 4.13 (Floodplains and Riparian Zones). Navigability considerations for project area waterways are addressed in Section 4.14 (Navigability). Direct effects to waterways are considered state open water (SOW) impacts and are addressed in Section 4.15 (Wetlands).

The SWQS establish the designated uses and antidegradation categories of the state's surface waters, classify surface waters based on those uses (i.e., stream classifications), and specify the water quality criteria and other policies and provisions necessary to attain those designated uses. Designated uses include water supply for drinking, agriculture and industrial uses, fish consumption, shellfish resources, propagation of fish and wildlife, and recreation. In addition, the SWQS specify general, technical, and interstate policies, and policies pertaining to the establishment of water quality-based effluent limitations.

The current SWQS rules (N.J.A.C. 7:9B) were readopted in July 2023 and amended in December 2023. The SWQS are used to develop regulatory requirements for other NJDEP programs that will serve to protect the existing and designated uses of the state's surface waters. These programs include the New Jersey Pollutant Discharge Elimination System (NJPDES) program, Site Remediation Program, and various programs implemented by the Division of Land Resource Protection.

The SWQS also form the basis for the integrated report. Waters that exceed SWQS require the development of total maximum daily loads (TMDLs) or other alternative approaches to address the impairment. The NJDEP has developed a Nutrient Criteria Enhancement Plan (NCEP) to explain the NJDEP's approach to developing and enhancing the existing SWQS nutrient criteria and policies to protect designated uses of all of New Jersey's surface waters, including saline waters (estuarine and marine).

4.11.2 Affected Environment

The Turnpike crosses 26 waterways from MP 3.5 to MP 36.5 including small headwater streams, non-tidal rivers, and larger tidal creeks. In addition to these stream crossings, several other streams intersect the 500-foot study area as shown on the figure titled, Streams, Rivers, and Floodplains Map, in Appendix B. All these waterways eventually drain into the Delaware River and together comprise a sizeable portion of the Delaware estuary. Major river systems in the study area include Game Creek (a major tributary to the Salem River and Salem Canal), Oldmans Creek, Raccoon Creek, Mantua Creek, Big Timber Creek, Cooper River, and Pennsauken Creek. Game Creek is within NJDEP Watershed Management Area 17 (Maurice, Salem and Cohansey) and the remaining river systems are located within Watershed Management Area 18 (Lower Delaware Tributaries). Within the study area, tidal waters are associated with Oldmans Creek, Raccoon Creek, Raccoon Creek unnamed tributary (UNT), Edwards Run, Mantua Creek, Mantua Creek UNTs, Big Timber Creek UNTs, Big Timber Creek, Beaver Brook UNT, and Beaver Brook.

According to the SWQS, most waterways within the study area are classified as FW2-NT in the immediate area of the Turnpike. As set forth in N.J.A.C. 7:9B, FW2 is a general surface water classification applied to fresh waters that are not considered to have exceptional or unique ecological, recreational, or water supply significance; NT identifies surface waters that are generally not suitable for trout but are suitable for a wide variety of other fish species. Many waters immediately downstream of the study area have a dual designation of FW2-NT/SE1 or FW2-NT/SE2. These dual designations indicate waters where there is a boundary somewhere along the watercourse between fresh and saline water due to tidal influence. NJDEP-designated uses for surface waters, as established under N.J.A.C. 7:9B, are summarized in **Table 4.11-1**.

Table 4.11-1: Surface Water Classification

Surface Water Quality Classification	Designated Uses
FW2	(1) Maintenance, migration, and propagation of the natural and established biota (2) Primary contact recreation (3) Industrial and agricultural water supply (4) Public potable water supply (after conventional treatment) (5) Any other reasonable uses
SE1	(1) Shellfish harvesting in accordance with N.J.A.C. 7:12 (2) Maintenance, migration, and propagation of the natural and established biota (3) Primary contact recreation (4) Any other reasonable uses
SE2	(1) Maintenance, migration, and propagation of the natural and established biota (2) Migration of diadromous fish (3) Maintenance of wildlife (4) Secondary contact recreation (5) Any other reasonable uses

Source: NJDEP Surface Water Quality Standards (N.J.A.C. 7:9B); NJDEP GIS.

In addition to the general surface water classifications, Category One (C1) is an antidegradation designation that provides additional protection from measurable changes to water quality because the water's exceptional ecological, recreational, water supply and/or fisheries significance. These waters receive additional protection under various NJDEP regulations including the NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13), NJDEP Stormwater Management Rules (N.J.A.C. 7:8) and other regulations.

An UNT to Raccoon Creek converges with the mainstem just before its crossing beneath the Turnpike near MP 12.1 and is designated as C1 due to exceptional ecological significance. Beyond/upstream of the study area, segments of Oldmans Creek, its tributaries, and Pargey Creek, which Rattling Run flows into, are also designated as C1. A summary of Program area waterways is provided in **Table 4.11-2** and **Table 4.11-3**.

Table 4.11-2: Program Area Surface Waters Summary

Waterway and Associated Tributaries	HUC-11 Watershed	HUC (11 Digit)	Watershed Management Area	Approx. Limits within Program
Game Creek tributaries, including Two Penny Run	Salem River (above 39d40m14s dam)/Salem Canal (17BA)	02040206030	Maurice, Salem, and Cohansey (WMA 17)	MP 3.6 – 7.1
Oldmans Creek and tributaries	Oldmans Creek (18HA)	02040202160	Lower Delaware (WMA 18)	MP 7.1 - 10.0
Raccoon Creek, Church Run and tributaries	Raccoon Creek/ Birch Creek (18GA)	02040202150	Lower Delaware (WMA 18)	MP 10.0 - 13.5
Rattling Run, Still Run and tributaries	Cedar Swamp/ Repaupo Creek/Clonmell Creek (18FA)	02040202140	Lower Delaware (WMA 18)	MP 13.5 - 16.7
Mantua Creek, Edwards Run and tributaries	Mantua Creek (18EA)	02040202130	Lower Delaware (WMA 18)	MP 16.7 - 20.0
Hesters Branch, Woodbury Creek, Big Timber Creek, Beaver Brook and tributaries	Woodbury/Big Timber/Newton Creeks (18DA)	02040202120	Lower Delaware (WMA 18)	MP 20.0 - 28.2
Cooper River, Tindale Run, North Branch Cooper River	Cooper River (18CA)	02040202110	Lower Delaware (WMA 18)	MP 28.2 - 32.3
Pennsauken Creek South Branch, North Branch	Pennsauken Creek (18BA)	02040202100	Lower Delaware (WMA 18)	MP 32.3 - 37.9

Source: NJDEP GIS

Table 4.11-3: Waterways Crossing the Turnpike

Waterway Name	Approximate Milepost	Surface Water Quality Classification	Tidal At Turnpike Crossing
Game Creek UNT	3.6	FW2-NT/SE1	No
Two Penny Run	3.9	FW2-NT/SE1	No
Oldmans Creek	7.8	FW2-NT	Yes
Church Run	10.2	FW2-NT	No
Church Run UNT	11.2	FW2-NT	No
Raccoon Creek	12.1	FW2-NT	Yes
Raccoon Creek UNT	12.7	FW2-NT	No
Rattling Run	14.3	FW2-NT	No
Still Run	15.4	FW2-NT/SE2	No
Edwards Run	17.5	FW2-NT/SE2	No
Mantua Creek	18.4	FW2-NT/SE2	Yes
Hesters Branch	21.2	FW2-NT/SE2	No
Woodbury Creek	22.0	FW2-NT/SE2	No
Woodbury Creek UNT	22.1	FW2-NT/SE2	No
Big Timber Creek UNT	23.7	FW2-NT	Yes
Big Timber Creek	24.6	FW2-NT	Yes
Beaver Brook UNT	24.9	FW2-NT	Yes
Beaver Brook	25.4	FW2-NT	No
Beaver Brook	26.3	FW2-NT	No
Cooper River	29.2	FW2-NT	No
Tindale Run	30.2	FW2-NT	No
North Branch Cooper River	31.6	FW2-NT	No
South Branch Pennsauken Creek UNT	33.0	FW2-NT	No
South Branch Pennsauken Creek	33.5	FW2-NT	No
North Branch Pennsauken Creek	34.8	FW2-NT	No
North Branch Pennsauken Creek UNT	36.2	FW2-NT	No

Source: NJDEP GIS; NJDEP Surface Water Quality Standards (N.J.A.C. 7:9B); *New Jersey 2018-2020 Integrated Water Quality Monitoring and Assessment Report*.

A review of water quality information from the New Jersey 2018-2020 Integrated Water Quality Monitoring and Assessment Report indicates that, where sufficient data was available, the primary contact recreational, aquatic life, and fish consumption designated uses were not supported in any of the study area sub-watersheds. Water quality assessments are categorized into three statuses: fully supporting, not supporting, or insufficient data for assessment. These assessment results are consistent with the state as a whole where fully supporting sub-watersheds are predominantly found in rural areas including the Pinelands and Highlands areas which have large areas of forest and intact riparian buffers with less urban development.

Pollutants causing water quality impairment within the Program area primarily include total phosphorus, chloride, mercury, polychlorinated biphenyls (PCBs), and pathogens (*E. coli*, etc.). Sources of these contaminants include agricultural and urban runoff/storm sewers, industrial and municipal point source discharges, and atmospheric deposition (identified as a predominant source of mercury in fish tissue).

The NJDEP has developed various TMDLs in accordance with Section 303(d) of the Clean Water Act in order to address specific contaminants in some of the impaired waters within the study area waterways. TMDLs can briefly be defined as the pollutant load that a given waterway can assimilate and still remain in compliance with the SWQS. TMDLs consider point source and non-point source pollution and are established through detailed pollutant loading studies which are performed by NJDEP and approved by the USEPA. TMDLs set forth a series of management strategies, which, once implemented, are expected to ultimately result in attainment of water quality standards. TMDLs for study area waterways are summarized as follows:

- **Statewide** – TMDL adopted for mercury impairments based on concentration in fish tissue caused mainly by air deposition, June 2010.
- **Salem River, Big Timber Creek, Mantua Creek, Oldmans Creek, Pennsauken Creek, Raccoon Creek, Woodbury Creek and Cooper River** – TMDL for fecal coliform approved by USEPA, September 2003; amended May 2020.
- **Cooper River** – TMDL for phosphorus approved by USEPA, September 2004.
- **Oldmans Creek** – TMDL for phosphorus approved by USEPA, September 2005.
- **Edwards Run** – TMDL for fecal coliform approved by USEPA, September 2005.

Additional TMDLs are to be developed by NJDEP to address the remaining impaired waters in the study area. The 2018-2020 integrated list of impaired waters mainly indicates development of these TMDLs as medium to high priority.

Overall, water quality in the study area can be characterized as fair with relatively common issues including mercury in fish tissue, phosphorus, undesirable pH, and bacteria. Although impaired, many of these waters provide a robust recreational and scenic resource which is valued by residents in the study area and surrounding region.

The existing roadway drainage system along the Turnpike was designed to rapidly remove stormwater from the road surface. This system was developed prior to current stormwater regulations and does little to promote water quality. The existing Turnpike is uncurbed and stormwater from the existing roadway drains down the roadway embankment via sheet flow into a series of roadside ditches that discharge into local streams. Median drainage is captured and piped to the roadside ditches which are relatively small V-shaped swales. Many of the drainage ditches were designed with a concrete lining which, over many years, have experienced sedimentation and are now buried beneath maintained grass.

The existing drainage system does not provide significant total suspended solids (TSS) removal. The embankment along the Turnpike is hydraulically short and the overland flow to and through these roadside ditches does not provide meaningful water quality treatment. In addition, there are no SWM basins or other structural BMPs along the Turnpike to provide attenuation and treatment of stormwater prior to discharge.

4.11.3 Environmental Consequences

4.11.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no change to existing waterway crossings, drainage, SWM, or water quality characteristics, and no additional impervious motor vehicle surfaces associated with the Turnpike. Planned projects in the No-Build Alternative have the potential to cause impacts to surface water resources; the sponsors of these projects may be required to comply with applicable regulations to protect such resources.

4.11.3.2 Initially Preferred Alternative

The IPA would require the replacement of six bridges and one culvert over waterways along the Turnpike mainline. In addition, eight mainline culverts would require repairs and lengthening to accommodate the mainline improvements, seven mainline culverts would require repairs and installation of headwalls at the pipe ends, and three mainline culverts would require just repairs. Improvements associated with Interchange 3 would require the repair and lengthening of a culvert and installation of a headwall, and the repair of a culvert. The Interchange 4 improvements would require the replacement of one culvert and the repair of one culvert. There would be no impacts to bridges or culverts associated with the Interchange 2 improvements. Only those waterbodies where there would be a bridge or culvert improvement are summarized in **Table 4.11-4**.

The reconstruction and improvements to existing bridges and culverts would result in direct impacts to surface water resources from relocating the roadway embankment, increasing culvert lengths, increasing structure widths, modifying channels, and filling for structures to accommodate the additional lanes, full width shoulders, and interchange improvements. As previously mentioned, direct impacts to surface waters are quantified as SOW impacts in Section 4.15 (Wetlands).

Land disturbance required to construct the Program has the potential to cause erosion of exposed soils and sedimentation of project area waterways. The potential for these impacts would be minimized through strict implementation of an approved SESC Plan.

The construction phase also has the potential to result in discharges of oils, greases, and other substances into nearby waters from equipment malfunctions, accidents during mobile refueling, and other unforeseeable incidents. This potential would be managed by construction planning that includes spill prevention and management measures.

To address the potential for spills that could occur during Program construction, the NJTA would prepare and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan during construction. This Plan would address concerns regarding water quality impacts during construction attributed to the materials and the equipment being utilized for construction. Plan specifics would address fuel/lubricant handling and storage, containment measures, and unforeseen releases of fuel or hydraulic fluids from equipment breakdowns. Spill kits would be available throughout the Program area to contain such spills. Management of such incidents would be a priority during the construction phase.

Most notable from a water quality standpoint is that the IPA would result in a permanent increase of approximately 128 acres of new motor vehicle surface area, not including non-vegetative surface under guiderails. These additional impervious surfaces have the potential to increase runoff during storm events, change water temperatures, cause sedimentation and turbidity, and change nutrient concentrations. To address these changes, the Program design includes a SWM plan, which is described below.

Table 4.11-4: Summary of Bridge and Culvert Improvements

Structure Type	Program Element	Watercourse	Milepost	Proposed Action
Culvert	Mainline	Game Creek UNT	3.61	Repair and lengthen
Culvert	Mainline	Two Penny Run	3.93	Repair and lengthen
Bridge	*Mainline*	*Oldmans Creek*	*7.85*	*Full Replacement*
Culvert	Mainline	Church Run UNT	11.24	Repair and add headwall
Bridge	*Mainline*	*Raccoon Creek*	*12.13*	*Full Replacement*
Culvert	Mainline	Rattling Run	14.29	Repair and add headwall
Culvert	Mainline	Still Run	15.43	Repair
Culvert	Mainline	Unnamed Waterway	16.00	Repair and lengthen
Bridge	Mainline	Edwards Run	17.50	Full Replacement
Bridge	*Mainline*	*Mantua Creek*	*18.45*	*Full Replacement*
Culvert	Mainline	Unnamed Waterway	19.46	Repair
Culvert	Mainline	Unnamed Waterway	20.16	Repair and lengthen
Culvert	Mainline	Hesters Branch	21.20	Repair and add headwall
Culvert	Mainline	Woodbury Creek	21.97	Repair and lengthen
Culvert	Mainline	Woodbury Creek UNT	22.12	Repair and lengthen
Culvert	*Mainline*	*Big Timber Creek UNT*	*23.75*	*Repair and add headwall*
Bridge	*Mainline*	*Big Timber Creek*	*24.61*	*Full Replacement*
Culvert	*Mainline*	*Beaver Brook UNT*	*24.90*	*Repair and lengthen*
Culvert	Mainline	Beaver Brook	25.41	Repair and add headwall
Culvert	Interchange 3	Beaver Brook	26.13	Repair
Culvert	Interchange 3	Beaver Brook	26.29	Repair, lengthen, and add headwall
Bridge	Mainline	Cooper River	29.24	Full Replacement
Culvert	Mainline	Tindale Run	30.25	Repair and add headwall
Culvert	Mainline	North Branch Cooper River	31.58	Repair and add headwall
Culvert	Mainline	South Branch Pennsauken Creek UNT	33.04	Repair and lengthen
Culvert	Mainline	South Branch Pennsauken Creek	33.47	Full Replacement
Culvert	Interchange 4	Unnamed Waterway	34.63	Repair
Culvert	Interchange 4	North Branch Pennsauken Creek	34.86	Full Replacement
Culvert	Mainline	Unnamed Waterway	35.30	Repair

Source: NJDEP GIS; AECOM 2022.
Notes: 1) Tidal crossings are indicated in *italics*.

4.11.4 Minimization and Mitigation

To address the potential for erosion and sedimentation of Program area waterways, the NJTA would obtain approval of an SESC Plan that provides appropriate controls to maintain water quality during construction. These measures are anticipated to include devices to capture and trap sediment in stormwater prior to discharge to Program area waterways, such as silt fences, hay bales, floating turbidity barriers, check dams, and measures for stabilization and dust control. Approval of these plans would be required by the respective soil conservation districts, including the Cumberland-Salem Conservation District (CSCD), the Gloucester County Soil Conservation District (GCSCD), the Camden County Soil Conservation District (CCSCD), and the Burlington County Soil Conservation District (BCSCD).

Because the Program would disturb more than one acre of land and would exceed a one-quarter acre increase of combined Regulated Impervious Surface and Regulated Motor Vehicle Surface, the Program is classified as a "major development" according to the NJDEP Stormwater Management Rules (N.J.A.C. 7:8). Accordingly, the NJTA must address the surface water quantity, water quality, and groundwater recharge requirements at N.J.A.C. 7:8. An analysis was performed in accordance with these requirements. Stormwater within each watershed would be treated as required before it is discharged to waterways.

The 33-mile Program corridor traverses 26 stream crossings. Stormwater runoff within each watershed would be treated for the required TSS removal as set forth in N.J.A.C. 7:8-5.5. Runoff would be treated with bioretention basins, extended detention basins, and manufactured treatments devices (MTDs) or combinations of these three measures. The treated stormwater would be discharged into adjacent surface waters, which would ultimately flow to the stream located within the watershed.

The NJDEP encourages the adoption of non-structural SWM strategies when planning and designing a new or redesigned municipal separate storm sewer system (MS4). The Program drainage design seeks to maintain and utilize existing drainage patterns throughout the Program corridor, where feasible, to minimize the hydraulic impact of new impervious surfaces and associated runoff.

To mitigate the increase in impervious surfaces, it is anticipated that 170 structural SWM BMPs would be constructed, including 107 bioretention basins, 9 extended detention basins, and 54 MTDs. The figure titled; Proposed Stormwater Management Map (Appendix B) shows the preliminary locations of proposed structures to handle stormwater runoff from the Turnpike. Even with the construction of these BMPs, a waiver of certain requirements of N.J.A.C. 7:8 would likely be needed due to various utility and environmental constraints throughout the Program corridor.

An NJDEP pre-application meeting would be held early in the Final Design phase to provide an opportunity for the NJDEP and NJTA representatives to discuss Program-wide SWM design requirements. Following this conference, additional refinement of the SWM measures would be conducted where the design engineers would analyze each region and fully devise BMP locations, sizes, pipe and ditch layouts, and outfall locations.

In addition, SWM maintenance plans would be developed to identify required maintenance procedures for the BMP's including timing of regular inspections and post precipitation event inspections. Approval of the SWM design and maintenance procedures would be a key component of the NJDEP permit application and approval process. Impacts to tidal waters would require a permit in accordance the NJ Coastal Zone Management Program (N.J.A.C. 7:7-2.4) and pursuant to the NJ Waterfront Development Act (N.J.S.A. 12:5-3).

4.12 COASTAL ZONE CONSIDERATIONS

This section examines the consistency of the Program with Federal and state coastal zone policies and assesses potential impacts of the Program on coastal resources under the framework of New Jersey's Coastal Zone Management Rules (N.J.A.C. 7:7).

At the Federal level, coastal resources include those waters and surrounding areas in states along the coastlines of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the shorelines of the Great Lakes. These resources include islands, beaches, transitional and intertidal areas, salt marshes, wetlands, estuaries, dunes, barrier islands, and coral reefs, as well as fish and wildlife and their respective habitats within these areas. New Jersey's coastal zone includes the Coastal Area Facility Review Act (CAFRA) area, coastal waters, all areas containing tidal wetlands, and the Hackensack Meadowlands District as defined by N.J.S.A. 13:17-4.

4.12.1 Methodology and Data Sources

The Program was evaluated for consistency with the New Jersey's Coastal Zone Management Rules defined in N.J.A.C. 7:7. To determine if coastal resources (i.e., CAFRA, coastal wetlands, waterfront development areas, tidelands) are within the study area, a desktop survey was conducted. The study area was defined as 500 feet from the Turnpike ROW and 100 feet from the existing edge of local road crossings. GIS data from the NJDEP Bureau of GIS was analyzed to determine the presence of the following resources: NJDEP mapped coastal wetlands, upper wetlands boundary/upper wetlands limit, streams and waterbodies, heads of tide, and claimed tidelands. Mapping showing wetlands and waters delineated within 200 feet from the existing edge of Turnpike pavement was also utilized, and NJDEP Bureau of Tidelands Management mapping of the study area was obtained from the NJDEP. All Tidelands conveyances mapped within the study area were confirmed through comparison of NJDEP mapping and existing GIS data in relation to proposed improvements. These data sources, combined with knowledge of existing infrastructure and previous projects that impacted the tidal nature of nearby waters, were used to identify tidal waters and coastal wetland habitat within the study area.

The Federal Coastal Zone Management Act of 1972 (CZMA) was established to encourage coastal states to manage development within the state's designated coastal areas to balance coastal development and the protection of resources within the coastal zone. Requirements for Federal approval of coastal zone management programs and grant application procedures for development of the state programs are included in 15 CFR Part 923, Coastal Zone Management Program Regulations, National Oceanic and Atmospheric Administration (NOAA). The CZMA requires that Federal activities within a state's coastal zone be consistent with that state's coastal zone management plan.

New Jersey's Federally approved coastal zone management program is administered by NJDEP through the Coastal Zone Management Rules (N.J.A.C. 7:7). These rules are used in reviewing applications for coastal permits under CAFRA, N.J.S.A. 13:19-1 *et seq*. (CAFRA permits), the Wetlands Act of 1970, N.J.S.A. 13:9A-1 *et seq*. (coastal wetlands permits), and the Waterfront Development Law, N.J.S.A. 12:5-3 (waterfront development permits). CAFRA provides regulatory review and permitting for development located in coastal areas. NJDEP regulates the use and development of coastal resources through these rules. The Coastal Zone Management Rules establish criteria (e.g., acreage limits, regulatory thresholds, seasonal limitations, and BMPs) for development and encompass the location rules (N.J.A.C. 7:7-9 through 14), use rules (N.J.A.C. 7:7-15), and resource rules (N.J.A.C. 7:7-16).

The CAFRA area, as defined at N.J.S.A. 13:19-4, begins near the Raritan Bay in Middlesex County, extends south along the coastal bays to Cape May County, along the Delaware Bayshore and includes the Delaware River marshes. A review of NJDEP NJ-GeoWeb determined that the study area is not within the CAFRA area.

Coastal wetlands permits are required for all activities in coastal wetlands delineated and mapped pursuant to the Wetlands Act of 1970. The Wetlands Act of 1970 provides for the inventory and mapping of coastal/tidal wetlands as well as the regulatory identification of permits for activities in these wetlands. This act enables NJDEP to review and modify all proposed activities in coastal wetlands for the purposes of promoting public safety, health and welfare, and protecting public and private property, wildlife, and marine fisheries.

The Waterfront Development Act establishes areas within the Hackensack Meadowlands District and the CAFRA zone as waterfront development areas, which consist of tidal waterways up to and including the mean high water (MHW) line. Outside these two areas, it includes tidal waterways up to and including the MHW line and adjacent upland areas within 100 feet of the MHW line. For properties within 100 feet of the MHW line that extend inland beyond the 100-foot limit, the regulated waterfront area extends to 500 feet from the MHW line or to the first paved public road, railroad, or surveyable property line in existence on September 26, 1980, that parallels the waterway, whichever comes first. The Waterfront Development Act regulates development in all tidal waters up to the MHW line as well as adjacent land areas extending as much as 500 feet from the MHW line in some circumstances.

Tidelands claim areas include lands now or formerly flowed by the tide, which are owned by the State of New Jersey and managed by the Tidelands Resource Council.

4.12.2 Affected Environment

The presence of coastal wetlands, tidal waters, and tidelands claim areas are the main focus of this section. **Table 4.12-1** summarizes the streams within the study area that are affiliated with these coastal resources. Coastal wetlands and tidelands claim areas are shown on the map titled, Streams, Rivers, and Floodplains Map, and the figure titled, NJDEP Wetlands Map, in Appendix B. A review of the available data sources determined that there are no regulated areas within the Interchange 2 or Interchange 4 study areas. Additional information on coastal wetlands and tidal streams can be found in Section 4.15 (Wetlands) and Section 4.11 (Surface Water Resources), respectively.

Table 4.12-1: Streams with Coastal Resources within the Study Area

Stream	Approximate Milepost	Presence/Absence of Coastal Resource		
		Tidal Water	Coastal Wetlands	Tidelands Claim Area
Oldmans Creek	7.8	X	X	X
Raccoon Creek and tributaries	12.1	X	X	X
Edwards Run and tributaries	17.5	X	X	X
Mantua Creek and tributaries	18.4	X	X	X
Woodbury Creek	22.0	--	--	X
Woodbury Creek UNT	22.1	--	--	X
Big Timber Creek UNT	23.7	X	X	X
Big Timber Creek and tributaries	24.6	X	X	X
Almonesson Creek	24.5 (Along NJ 42 at Route 55 NB)	X	X	X
Beaver Brook and tributaries	24.7 - 25.7	X	X	X

Source: AECOM, 2022

Table 4.12-2 provides a preliminary review of whether special areas, as listed in the Coastal Zone Management Rules (N.J.A.C. 7:7), are located within the mainline or Interchange 3 study area. A complete assessment of the applicability and consistency with these rules would be completed during the Final Design and permitting phase of the Program. Additional information on certain special areas within the study area can be found in the EIS sections as noted in **Table 4.12-2**.

4.12.3 Environmental Consequences

4.12.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes and the associated landscaping within the Turnpike ROW would remain. The projects in the No-Build Alternative may cause impacts to coastal zone resources; the project sponsors would be responsible for compliance with the applicable regulations governing protection of such resources.

Table 4.12-2: New Jersey Coastal Zone Management Rules - Special Areas

Coastal Zone Management Act Rule		Within Study Area	Not Within Study	Design Element	EIS Section to Reference
Subchapter 9 – Special Areas					
7:7-9.2	Shellfish Habitat		X	--	--
7:7-9.3	Surf Clam Area		X	--	--
7:7-9.4	Prime Fishing Areas		X	--	--
7:7-9.5	Finfish Migratory Pathways	X		Mainline	4.16
7:7-9.6	Submerged Vegetation Habitat		X	--	--
7:7-9.7	Navigation Channels	X		Mainline	4.14
7:7-9.8	Canals		X	--	--
7:7-9.9	Inlets		X	--	--
7:7-9.10	Marina Moorings		X	--	--
7:7-9.11	Ports		X	--	--
7:7-9.12	Submerged Infrastructure Routes	X		Mainline/ Interchange 3	4.19
7:7-9.13	Shipwreck/Artificial Reef Habitats		X	--	--
7:7-9.14	Wet Borrow Pits		X	--	--
7:7-9.15	Intertidal/Subtidal Shallows	X		Mainline	--
7:7-9.16	Dunes		X	--	--
7:7-9.17	Overwash Areas		X	--	--
7:7-9.18	Coastal High Hazard Areas		X	--	--
7:7-9.19	Erosion Hazard Areas		X	--	--
7:7-9.20	Barrier Island Corridor		X	--	--
7:7-9.21	Bay Islands		X	--	--
7:7-9.22	Beaches		X	--	--
7:7-9.23	Filled Water's Edge	X		Mainline/ Interchange 3	--
7:7-9.24	Existing Lagoon Edges		X	--	--
7:7-9.25	Flood Hazard Areas	X		Mainline/ Interchange 3	4.13
7:7-9.26	Riparian Zones	X		Mainline/ Interchange 3	4.13
7:7-9.27	Wetlands	X		Mainline/ Interchange 3	4.15
7:7-9.28	Wetlands Buffers	X		Mainline/ Interchange 3	4.15
7:7-9.29	Coastal Bluffs		X	--	--
7:7-9.30	Intermittent Stream Corridors	X		Mainline/ Interchange 3	--
7:7-9.31	Farmland Conservation Areas	X		Mainline	4.1
7:7-9.32	Steep Slopes	X		Mainline/ Interchange 3	--

Coastal Zone Management Act Rule		Within Study Area	Not Within Study	Design Element	EIS Section to Reference
Subchapter 9 – Special Areas					
7:7-9.33	Dry Borrow Pits		X	--	--
7:7-9.34	Historic/Archaeological Resources	X		Mainline/ Interchange 3	4.6
7:7-9.35	Specimen Trees		X	--	--
7:7-9.36	Endangered/Threatened Species	X		Mainline	4.16
7:7-9.37	Critical Wildlife Habitat	X		Mainline	4.16
7:7-9.38	Public Open Space	X		Mainline/ Interchange 3	4.5
7:7-9.39	Special Hazard Areas	X		Mainline/ Interchange 3	4.20
7:7-9.40	Excluded Federal Lands		X	--	--
7:7-9.41	Special Urban Areas	X		Mainline	--
7:7-9.42	Pinelands National Reserve and Pinelands Protection Area		X	--	--
7:7-9.43	Meadowlands District		X	--	--
7:7-9.44	Wild and Scenic River Corridors		X	--	--
7:7-9.45	Geodetic Control Reference Marks	X		Mainline	--
7:7-9.46	Hudson River Waterfront Area		X	--	--
7:7-9.47	Atlantic City		X	--	--
7:7-9.48	Lands/Waters Subject to Public Trust Rights	X		Mainline	--

Source: AECOM 2022

4.12.3.2 Initially Preferred Alternative

Mainline Improvements

As noted in **Table 4.11-4,** the IPA would require the replacement of six bridges and one culvert over waterways along the Turnpike mainline. In addition, eight mainline culverts would require repairs and lengthening to accommodate the mainline improvements, seven mainline culverts would require repairs and installation of headwalls at the pipe ends, and three mainline culverts would require just repairs. Improvements associated with Interchange 3 would require the repair and lengthening of a culvert and installation of a headwall, and the repair of a culvert. The Interchange 4 improvements would require the replacement of one culvert and the repair of one culvert. There would be no impacts to bridges or culverts associated with the Interchange 2 improvements.

The potential for impacts to coastal wetlands, tidal waters, and claimed tidelands resulting from these bridge and culvert improvements are discussed further in Section 4.15 (Wetlands) and Section 4.11 (Surface Water Resources), respectively.

The potential for Program impacts to each of the 20 coastal zone special areas that are within the Program study area would be studied further during the Final Design and permitting phase of the Program.

Interchange 2

There are no coastal wetlands, tidal waters, or claimed tidelands within the Interchange 2 study area.

Interchange 3

Coastal wetlands are located within the Interchange 3 study area; however, no tidal waters or claimed tidelands are within this area. Eleven of the 20 coastal zone special areas, which were noted within the overall Program study area, are within Interchange 3. The potential for the Program to impact these special areas would be studied further during the Final Design and permitting phase of the Program.

Interchange 4

There are no coastal wetlands, tidal waters, or claimed tidelands within the Interchange 4 study area.

4.12.4 Minimization and Mitigation

Minimization and mitigation strategies associated with the Program's impacts to the following surface water resources: wetlands, surface water resources, and navigability, are discussed in Sections 4.15 (Wetlands), 4.11 (Surface Water Resources), and 4.14 (Navigability), respectively.

While impacts to tidelands claimed areas would be unavoidable, all tidelands' claims would be reconciled by the NJTA prior to, or along with, the NJDEP Coastal Zone Management permit process and all required minimization and mitigation measures would be taken, if deemed applicable.

4.13 FLOODPLAINS AND RIPARIAN ZONES

4.13.1 Methodology and Data Sources

An assessment of the floodplain and riparian resources within 500 feet of the Turnpike ROW and 100 feet from the existing edge of local road crossings was prepared based on field reconnaissance and information compiled and through existing map and survey reviews.

A riparian zone exists along every regulated water and varies in width (i.e., 50, 150, or 300 feet) depending on water quality classification and presence of documented critically dependent habitat for threatened or endangered species. To determine riparian zone widths, a desktop survey utilizing data from the NJDEP Bureau of GIS was conducted to determine the presence of the following resources: streams and waterbodies, surface water quality standards, HUC-14 watersheds, the coastal wetland boundary, and threatened and endangered species. Consultation with the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries was

conducted to further assess the presence of state and Federally listed species. Existing conditions determined through the desktop survey and verified via field investigations were then examined based on the Program's consistency with the Federal and state policies discussed below.

Floodplains are valuable resources providing natural flood and erosion control, biodiversity, and socioeconomic benefits. The Federal Emergency Management Agency (FEMA) defines the 100-year floodplain as the area of land inundated by a flood event that has a 1 percent chance of being equaled or exceeded in any given year. The 100-year floodplain is also known as the base flood, and it is generally considered the regulated floodplain and used as a benchmark in engineering design. The 100-year floodplain was identified via the FEMA National Flood Hazard Layer GIS data. In portions of the study area, base flood elevations and/or flood depths have not yet been determined by FEMA. In such areas, an approximated FEMA study was referenced which provides only the delineation of floodplain boundaries for the 100-year flood. All areas where an approximated 100-year floodplain was referenced are identified in the figure titled, Streams, Rivers, and Floodplains Map (Appendix B).

The NJDEP Division of Land Resource Protection regulates construction in floodplains and riparian zones under the Flood Hazard Area Control Act (N.J.S.A. 58:16A-50 *et seq*.). The Flood Hazard Area Control Act allows NJDEP to delineate and mark flood hazard areas, control stream encroachment, and integrate flood control activities. This act is enforced through the NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) which define regulated waters and govern construction activities within associated flood hazard areas and riparian zones to mitigate the adverse impacts of flooding to the environment that can be caused by such development. These rules define the flood hazard area as the land and the space above that land which lies below the flood hazard area design flood elevation. These rules also establish "riparian zones" which were enacted as an additional level of protection for near-watercourse vegetation and these vegetative buffers play an important role in water quality, stream channel stability, and flood storage.

Executive Order (EO) 11988, Floodplain Management (5/24/1977), was established to avoid adverse impacts associated with occupancy and modification of floodplains to the maximum extent practicable. The policy requires a Federal agency to avoid and consider alternatives to development in floodplains for the purposes of minimizing flood impacts on public safety, health and welfare, and to preserve the values of these natural resources.

4.13.2 Affected Environment

The Turnpike ROW traverses 26 waterways ranging from small headwater tributaries to larger streams. In addition to these stream crossings, several other streams intersect the 500-foot study area but do not cross the Turnpike ROW.

Within the study area, 100-year floodplains have been preliminarily identified via FEMA's National Flood Hazard Layer GIS data and riparian zones have been documented along all regulated waters. Flood hazard areas and riparian zones are shown in the figure titled, Streams, Rivers, and Floodplains Map (Appendix B). Most riparian zones in the study area are 50 feet wide; however, Raccoon Creek, Still Run, and Edwards Run, as well as some of their

tributaries, have associated riparian zones widths of 150 feet due to the presence of critically dependent threatened and endangered species. An UNT to Raccoon Creek is the only stream with a C1 water quality designation within the study area; therefore, the riparian zone width along this tributary is 300 feet. Pargey Creek is a stream with a C1 water quality designation located approximately 3.4 miles northwest of the study area within the Lower Delaware HUC14 watershed. Rattling Run and one UNT to Rattling Run are both upstream tributaries to Pargey Creek within the same HUC14, and thus have 300-foot riparian zone widths within the study area. For streams that intersect the Program area of impact, the riparian zone widths and related criteria (i.e., surface water quality standards and threatened and endangered species) are listed in **Table 4.13-1**. Additional information on threatened and endangered species can be found in Section 4.16 (Ecology and Wildlife). FEMA mapping identifies 100-year floodplains within the study area where various waterways either cross or flow adjacent to the Turnpike. Floodplains which would be impacted by the Program have been identified in **Table 4.13-1**. These include areas where FEMA has adopted base flood elevations (BFE) and areas where the floodplain is estimated and referred to as the approximated 100-year floodplain.

During the Program's permitting phase, additional analysis of waterways identified during the wetland delineation, which were not shown on FEMA mapping, would be conducted to determine if these waters are regulated in accordance with the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13).

4.13.3 Environmental Consequences

4.13.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no land being acquired for Program purposes and the associated landscaping within the Turnpike ROW would remain. The projects in the No-Build Alternative may cause impacts to floodplains and riparian zones; the project sponsors would be responsible for compliance with the applicable regulations governing protection of such resources.

The No-Build Alternative would not provide opportunities to address existing drainage, runoff, or flooding issues that are present in portions of the study area. Surface water from the existing Turnpike discharges to the local streams via umbrella drainage into roadside ditches. The median drainage is captured and piped to the outside roadway ditches. The roadside ditches are relatively small V-shaped swales and do not provide attenuation of flood waters due to storm events. In addition, there are limited structural features to store/infiltrate stormwater and reduce flooding along the Program section of the Turnpike.

4.13.3.2 Initially Preferred Alternative

Portions of the riparian zones associated with each of the streams listed in **Table 4.13-1** would be impacted by the Program. A total of approximately 9 acres of riparian zones would be impacted due to the Turnpike capacity improvements, realignment of the local roadways, construction of SWM basins, and relocation of utilities. In addition, the Program would impact the floodplains of 21 streams that have been preliminarily identified via FEMA's National Flood Hazard Layer GIS data. As previously noted, additional analysis would be conducted during Final Design and the Program's permitting phase to determine if there are other regulated waters and if they have an associated flood hazard area and/or riparian zone that would be impacted.

In areas where the source of floodwaters is tidal, the BFE would not be affected by displacement of floodplain storage or conveyance as a result of permanent structures or fill; therefore, in tidal areas, the IPA would not affect the floodplain or result in flooding of adjacent areas.

During Final Design, the NJTA would develop construction plans with a goal of avoiding work areas in floodplains and riparian areas to the extent reasonably feasible. If construction activity cannot avoid such resources, the NJTA's permitting activities would include construction phase impacts to floodplains and riparian areas.

Table 4.13-1: Riparian Zones and 100-Year Floodplains Impacted by the Program

Regulated Waters	Approximate Milepost	Riparian Zone Width (feet)	Resources Determining Riparian Zone Width	Preliminarily Identified 100-Year Floodplain	Design Element
Game Creek UNT	3.6	50	--	No	Mainline
Two Penny Run	3.9	50	--	Yes	Mainline
Oldmans Creek	7.8	50	--	Yes	Mainline
Church Run	10.2	50	--	No	Mainline
Church Run UNT	11.2	50	--	Yes	Mainline
Raccoon Creek	12.1	150, 300[1]	Critically dependent T&E species, C1 water along SN roadway	Yes	Mainline
Raccoon Creek UNT	12.7	150	Critically dependent T&E species	No	Interchange 2/Mainline
Rattling Run	14.3	300	Upstream tributary of C1 water within same HUC14	Yes	Mainline
Still Run	15.4	50, 150[1]	Critically dependent T&E species	Yes	Mainline
Edwards Run/ Edwards Run UNT	17.5	50, 150[1]	Critically dependent T&E species	Yes	Mainline
Mantua Creek	18.4	50	--	Yes	Mainline
Mantua Creek UNT	19.4	50	--	No	Mainline
Hesters Branch	21.2	50	--	Yes	Mainline
Woodbury Creek	22.0	50	--	Yes	Mainline
Woodbury Creek UNT	22.1	50	--	Yes	Mainline
Big Timber Creek UNT	23.7	50	--	Yes	Mainline
Big Timber Creek	24.6	50	--	Yes	Mainline
Beaver Brook UNT	24.9	50	--	Yes	Mainline
Beaver Brook	25.4	50	--	Yes	Mainline
Beaver Brook	26.3	50	--	Yes	Interchange 3
Cooper River	29.2	50	--	Yes	Mainline
Tindale Run	30.2	50	--	No	Mainline
North Branch Cooper River	31.6	50	--	Yes	Mainline
South Branch Pennsauken Creek UNT	33.0	50	--	No	Mainline
South Branch Pennsauken Creek	33.5	50	--	Yes	Mainline
North Branch Pennsauken Creek	34.8	50	--	Yes	Interchange 4
North Branch Pennsauken Creek UNT	36.2	50	--	Yes	Mainline

Source: AECOM, 2022

[1] Riparian zone width varies depending on location of determining resource(s).

Mainline Improvements

The mainline design elements traverses 25 regulated streams and their associated riparian zones as identified in **Table 4.13-1**. The mainline improvements would impact approximately 7 acres of riparian zones. In addition, there would be impacts to the 100-year floodplains associated with 19 of the streams listed in **Table 4.13-1**.

Interchange 2

An intermittent UNT to Raccoon Creek, which has a 150-foot riparian zone, flows through the southern portion of Interchange 2, flowing beneath the Turnpike mainline and the acceleration and deceleration lanes for the interchange. The Interchange 2 improvements would impact approximately 1 acre of riparian zone. There are no mapped flood hazard areas within the Interchange 2 study area.

Interchange 3

Beaver Brook and its associated tributaries, which have a 50-foot riparian zone, flow along and through the Interchange 3 study area. The Interchange 3 improvements would impact approximately 1.2 acres of riparian zone. In addition, there would be impacts to the 100-year floodplains associated with these streams, which encompass a large portion of the Interchange 3 study area.

Interchange 4

The North Branch of Pennsauken Creek, which has a 50-foot riparian zone, flows beneath the Turnpike mainline and the acceleration and deceleration lanes for the interchange. The Interchange 4 improvements would impact less than 1 acre of riparian zone and there would be impacts to the 100-year floodplain associated with this stream.

4.13.4 Minimization and Mitigation

Impacts to floodplains and riparian zones would be minimized to the maximum extent practicable. Regulated activities proposed within floodplains and riparian zones would require an NJDEP Flood Hazard Area Individual Permit. Flood Hazard Area verifications would also be required for all waterways within or proximate to the area of impact as part of the environmental documentation and permitting process. As an integral part of bridge/culvert improvements and/or replacements, impacts to flood hazard areas, including floodway and flood fringe areas, would be evaluated via hydrologic and hydraulic (H&H) studies during Final Design to ensure water flow and floodplain capacity are not constrained. The Program would comply to the maximum extent practicable with all applicable rules that pertain to work within the floodplain; therefore, floodplain impacts would be minimal. Removal of vegetation would be limited to those areas necessary to construct and maintain the Program. Mitigation for all riparian zone impacts would be completed in accordance with the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13). Riparian zone mitigation amount requirements and methodology would be fully analysed during the Program's permitting phase, and mitigation activities would comply with all 50-foot, 150-foot, and 300-foot riparian zone thresholds, respectively.

Additional methods to reduce Program impacts would be evaluated during Final Design. A detailed Side Slope Analysis (SSA) process, which would consider standard roadway side slopes, steeper side slopes, and/or a retaining wall or barrier curb, would be undertaken at that time to determine if such measures could further avoid and/or minimize impacts to sensitive environmental resources. Furthermore, an approved SESC Plan and BMPs would be implemented during construction to minimize soil erosion and sedimentation to environmentally sensitive areas. BMPs that may be implemented are listed in Section 4.15 (Wetlands).

Regarding resiliency, the NJTA would consider the NJDEP's requirements during Final Design of the Program and would comply with those requirements to the extent reasonably feasible. See also Section 4.21.2 (Resiliency).

Riparian zone mitigation could include on-site or off-site restoration (2:1 ratio), creation (1:1 ratio), enhancement (3:1 ratio), and/or preservation. If off-site, mitigation is to be provided along the same regulated water as the disturbance or an upstream tributary to that regulated water if within a 300-foot riparian zone. If within a 150-foot or 50-foot riparian zone, off-site mitigation is to be within the same watershed management area (WMA) as the disturbance or be provided through the purchase of credits from a riparian zone mitigation bank with a service area within the same WMA as the impacts. Riparian zone mitigation banks that would be of consideration for the Program include Abbot Creek (WMA 17) and/or Oldmans Creek (WMA 18). If off-site mitigation within the same WMA is not feasible, mitigation may occur in another WMA provided the mitigation is as close as possible to the WMA where the disturbance would occur. Mitigation requirements could be met by using one or a combination of all these types of mitigation methods.

In order to minimize impacts from construction activities, soil stockpiles would be located outside of floodplains. In addition, upon completion of construction, all temporarily disturbed areas would be restored to their pre-existing condition and planted with native vegetation species, in accordance with the approved SESC Plan.

4.14 NAVIGABILITY

4.14.1 Methodology and Data Sources

Sources consulted to obtain information on navigable waters include United States Coast Guard (USCG) regulations, the List of Navigable and Non-Navigable Waters in the USACE Philadelphia District, the NJDEP head-of-tide GIS data, NOAA tide charts and Google Maps aerial photography. This information was supplemented via preliminary coordination with the New Jersey State Police Marine Services Bureau (personal communication June 27, 2022) to obtain information on river users and functional navigability.

4.14.2 Affected Environment

The USCG has the Federal mandate to approve the location and plans for bridges across Navigable Waters of the United States. This is the primary criteria for determining Federal bridge permitting jurisdiction by the USCG. Navigable Waters of the United States are defined by USCG regulations (Title 33 CFR 2.36) and state, in part, that navigable waters of the United States are: 1) "internal waters of the United States that are subject to tidal influence" and 2)

"internal waters of the United States not subject to tidal influence that…are or have been used, or are or have been susceptible for use, by themselves or in connection with other waters, as highways for substantial interstate or foreign commerce notwithstanding natural or man-made obstructions that require portage."

Numerous waterway crossings occur along the Turnpike in the Program area ranging from small creeks to larger rivers flowing directly into the Delaware River. Waterways such as Oldmans Creek, Raccoon Creek, Mantua Creek, Woodbury Creek, Big Timber Creek, Cooper River, and Pennsauken Creek have the depth and width to support various types of navigation at their downstream reaches. Historically, some of these waterways supported some level of commercial navigation near their mouths on the Delaware River. However, at the Turnpike crossings of these waterways there is no active navigation other than small outboards or human-powered navigation such as canoes, rowboats, or kayaks. Generally, the upper reaches of these waterways at the Turnpike are bordered by wetlands and wooded uplands with low-density residential populations. The potential for development of future marinas or commercial navigation at these locations along Program area waterways is considered minimal given the protection provided by state and local conservation and preservation authorities.

Existing Turnpike bridges over Oldmans Creek, Raccoon Creek, Mantua Creek and Big Timber Creek as well as some of their associated tributaries are located well upstream of any commercial navigation. At the Turnpike crossings, these waterways are navigable in law but are not traversed by any vessel larger than small motorboats. Based on a review of aerial photography and information obtained by the New Jersey State Police Marine Services Bureau, there are no commercial marinas upstream or immediately downstream of any of the Turnpike bridges over these waters.

4.14.3 Environmental Consequences

4.14.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration with no bridge replacements over Navigable Waters for Program purposes; therefore, the No-Build Alternative would not affect navigation for commercial or recreational users.

4.14.3.2 Initially Preferred Alternative

The Program would require reconstruction of existing Turnpike bridges over Oldmans Creek, Raccoon Creek, Mantua Creek, and Big Timber Creek. From a navigational perspective, existing recreational users of these waters would not be able to pass beneath the structures during the construction phase; however, once construction is completed, access would be fully restored.

Federal regulations addressing the USCG's Bridge Administration Program (Title 33 CFR Subchapter J) include criteria which may exempt bridge projects across certain waterways from the requirement to obtain a Federal Bridge Permit. One such regulation includes Title 33 CFR 115.70 (Advance Approval of bridges). This section of the regulations provides for the Advance Approval by the USCG Commandant "to the location and plans of bridges that are to be constructed across reaches of waterways navigable in law, but not actually navigated other than by logs, log rafts, rowboats, canoes and small motorboats."

The navigational activity along all the waterways at the Turnpike bridge crossings for this Program clearly meet the criteria outlined in 33 CFR 115.70. It is therefore likely that the USCG would place all these waterways within the Advance Approval category; thereby, exempting the requirement for the NJTA to obtain formal Bridge Permits for this undertaking.

During the regulatory/permitting phase of this Program, coordination with the USCG would be undertaken and a "Bridge Project Questionnaire" for each waterway to be crossed would be submitted to the USCG with sufficient documentation for them to consider formal bridge exemptions for all the bridge crossings anticipated for the Program.

Beyond its bridge permitting authority, the USCG retains jurisdiction regarding bridge-marine construction coordination and proper navigational markings (navigation lighting). This coordination with the local USCG District would be conducted by the NJTA prior to commencement of construction.

4.14.4 Minimization and Mitigation

Aside from obtaining Advance Approval from USCG and publication of a ''Local Notice to Mariners'' to report changes to local waterway and navigation conditions, no minimization or mitigation is required regarding navigability.

4.15 WETLANDS

4.15.1 Regulatory Context

4.15.1.1 Methodology and Data Sources

On a Federal level, wetlands are protected under EO 11990, Protection of Wetlands, which requires a Federal agency to avoid undertaking or providing assistance for new construction in wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland. Wetlands in the study area are regulated under Section 404 of the Clean Water Act administered by the USACE. In 1987, the NJDEP assumed regulatory control over the Section 404 program for freshwater wetlands throughout most of New Jersey pursuant to the Freshwater Wetlands Protection Act.

In addition, NJDEP regulates activities within coastal wetlands pursuant to the Wetlands Act of 1970. Projects impacting coastal wetlands must comply with the Coastal Zone Management Rules (N.J.A.C. 7:7E). The Freshwater Wetlands Protection Act Rules and Coastal Zone Management Rules are also used in NJDEP's review of water quality certificates subject to Section 401 of the Clean Water Act. The USACE retains program oversight and jurisdiction in

some parts of the state (i.e., coastal waterways or wetlands, waterfront development areas, other waterways within 1,000 feet of ordinary high water or mean high tide, and along the Delaware River). Therefore, impacts to coastal wetlands and areas within 1,000 feet of tidal waterways are regulated by the USACE. Projects with wetland impacts greater than five acres would also likely involve the USEPA review of the USACE and NJDEP permit applications.

Prior to field investigations, a review of background data was conducted. Materials reviewed included: NJDEP mapped wetlands; the USFWS National Wetlands Inventory mapping; 1970 Coastal Wetlands Map; USEPA Priority Wetlands; streams and head of tide GIS data; USDA, Natural Resources Conservation Service (NRCS) soil surveys for Burlington, Camden, Gloucester, and Salem Counties; and available aerial photography. In addition, previous delineations conducted within/near the study area were reviewed.

After completing the desktop survey, field investigations were conducted, and wetlands and Waters of the United States (WOTUS)/SOWs were field assessed and delineated within the study area. The study area generally encompassed the area within 200 feet from the existing edge of Turnpike pavement where improvements are proposed.

Wetlands were delineated in accordance with the Routine Onsite Determination Method outlined in the USACE Wetlands Delineation Manual (1987), Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1989), and the Regional Supplement to the USACE Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (2010) which use a three-parameter approach for identifying and delineating wetlands. Both wetland delineation manuals were used as wetlands under the jurisdiction of both the USACE and NJDEP are present within the study area.

Field investigations included examining soils, hydrology, and vegetation in order to classify the habitat as wetland or upland. Soils were examined using a hand auger to evaluate hydric soil indicators. The Munsell Soil-Color Charts were used to evaluate hue, value, and chroma as a means of determining the soil matrix and oxidation-reduction reaction colors. Evidence of wetland hydrology indicators, such as surface inundation, soil saturation, water-stained leaves, oxidized rhizospheres on living roots, and topographic indications were noted. To determine if hydrophytic vegetation was present, investigators identified plant species within the study area and reviewed the USACE National Wetland Plant List for the Atlantic and Gulf Coastal Plain Region to determine the indicator status of each plant. If the habitat met the regulatory requirement of a wetland, the area was flagged at the wetland/upland boundary and surveyed. Wetland data forms were completed, and photographs of the wetland and upland areas were taken. Wetland habitats were categorized based on field observations using the Classification of Wetlands and Deepwater Habitats of the United States (Cowardin *et al*., 1979).

At the time of the wetland delineation, proposed improvements to local roadways and locations of SWM basins had not been evaluated. Therefore, for areas extending beyond the 200-foot study area where there would be additional impacts, the NJDEP mapped wetlands, shown on the figure titled, NJDEP Wetlands Map (Appendix B), were used to estimate impacts to wetlands.

4.15.2 Affected Environment

The study area is approximately 2,120 acres, of which wetlands comprise approximately 169 acres and SOW comprise approximately 24 acres (See **Table 4.15-1**). Wetlands in the study area include those associated with watercourses, including small headwater streams, non-tidal and tidal rivers, isolated depressional areas, and SWM facilities. In addition, portions of the study area contain a groundwater table that is at or near the surface for some period during the year; thereby, providing sufficient sustaining wetland hydrology in some locations.

Table 4.15-1: Wetlands and State Open Waters within the Study Area

Design Element	Wetlands (Acres)	State Open Waters (Acres)
Mainline	148	20
Interchange 2	3	<1
Interchange 3	7	2
Interchange 4	11	2

Source: AECOM 2022.

Both freshwater wetlands and coastal wetlands were delineated in the study area. Wetlands consist of palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM), palustrine unconsolidated bottom (PUB), riverine lower perennial unconsolidated bottom (R2UB), riverine unknown perennial unconsolidated bottom (R5UB), riverine intermittent streambed (R4SB), estuarine intertidal forested (E2FO), and estuarine intertidal emergent (E2EM) wetlands and/or a combination of these and include both tidally-influenced wetlands and non-tidal wetlands. In addition, along the shoulders of the Turnpike are man-made emergent wetlands, swales, and ditches which generally collect and drain stormwater from the roadway surface.

Mapped coastal wetlands occur along Oldmans Creek, Raccoon Creek, a UNT to Raccoon Creek, Edwards Run, a UNT to Edwards Run, Mantua Creek, a UNT to Mantua Creek, UNTs to Big Timber Creek, Big Timber Creek, Beaver Brook, and a tributary to Beaver Brook. Tidal waters are associated with these same waterways except for Edwards Run, where the head of tide is downstream of the study area.

A table titled, Delineated Wetlands and Waterways (Appendix D) lists study area wetlands, including the location, acreage, and whether the wetland is under the jurisdiction of the USACE and/or NJDEP. The wetland acreage was determined for only the portion of the wetland located within the study area, which is the area within 200 feet from the existing edge of Turnpike pavement where improvements are proposed. The figure titled, Freshwater Wetlands Map, in Appendix B shows the delineated wetlands and waterbodies. Roadside ditches are not included in the table or shown on the figure.

A composite species list of vegetation identified within the study area along with the scientific name and regional indicator status for each plant species, as listed in the USACE National Wetland Plant List for the Atlantic and Gulf Coastal Plain Region, is included in Appendix D.

A brief description of each wetland habitat type in the study area and major associated vegetation is listed below.

Emergent Wetland – Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens.

Within the study area, a vast number of species comprise emergent freshwater wetlands including species such as common reed (*Phragmites australis*), broad-leaf cat-tail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*), sensitive fern (*Onoclea sensibilis*), halberd-leaf tearthumb (*Persicaria arifolia*), skunk cabbage (*Symplocarpus foetidus*), pinkweed (*Persicaria pensylvanica*), jewelweed (*Impatiens capensis*), eastern poison ivy (*Toxicodendron radicans*), pickerelweed (*Pontederia cordata*), green arrow-arum (*Peltandra virginica*), rushes, sedges, and grasses.

Scrub-Shrub Wetland – Scrub-shrub wetlands generally consist of woody plants less than 20 feet tall and include true shrubs, young tree species that have not reached 20 feet in height, and woody plants (including tree species) that are stunted because of adverse environmental conditions.

Within the study area, scrub-shrub freshwater wetlands are dominated by deciduous species. Common species include, but are not limited to, small red maple (*Acer rubrum*) and sweetgum (*Liquidambar styraciflua*) trees, highbush blueberry (*Vaccinium corymbosum*), southern arrow-wood (*Viburnum dentatum*), northern spicebush (*Lindera benzoin*), and coastal sweet pepperbush (*Clethra alnifolia*). Scrub-shrub wetlands occur mainly along the margins of ponds and streams.

Forested Wetland – Forested wetlands are dominated by trees that are at least 20 feet in height. These wetlands usually have an overstory of trees, an understory of young trees and/or shrubs, and an herbaceous layer.

Within the study area, forested wetlands are dominated by deciduous species. Common species include, but are not limited to, red maple, sweetgum, black tupelo (*Nyssa sylvatica*), green ash (*Fraxinus pennsylvanica*), willow oak (*Quercus phellos*), horsebrier (*Smilax rotundifolia*), Japanese stiltgrass (*Microstegium vimineum*), and eastern poison ivy.

Unconsolidated Bottom – This class includes all wetlands and deep-water habitats with at least 25 percent cover of particles smaller than stones and vegetative cover less than 30 percent. These areas are characterized by the lack of large stable surfaces for plant and animal attachment.

Streambed – This class includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the Tidal Subsystem of the Riverine System that are completely dewatered at low tide. These areas are generally not vegetated.

A more detailed analysis of the affected environment is included in the 2022 Application for a United States Army Corps of Engineers Jurisdictional Determination and a New Jersey Department of Environmental Protection Letter of Interpretation – Line Verification.

4.15.3 Environmental Consequences

4.15.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration; the Program would have no direct or indirect impacts to wetlands or waterbodies. Projects in the No-Build Alternative have the potential to impact wetlands and waterbodies; sponsors of those projects would be responsible for compliance with applicable regulations that protect such resources.

4.15.3.2 Initially Preferred Alternative

The Program would impact a total of approximately 14 acres of wetlands and approximately 6 acres of SOWs due to the mainline and interchange improvements, realignment of the local roadways leading to bridges over the mainline, construction of SWM basins, and relocation of utilities (See **Table 4.15-2**). Roadside ditches are not included in the impact number as they would be re-created as part of the Program and wetland vegetation within these ditches would, over time, reestablish itself. Transition area impacts have not been quantified in this EIS because the resource values of the wetlands have not yet been determined by NJDEP. A request for a Letter of Interpretation (LOI) was submitted to NJDEP on January 30, 2023 for verification of the wetland boundary lines associated with the Program. In the Fall of 2023, NJDEP and the USACE verified the wetland boundary lines. The LOI is currently being revised and will be resubmitted to NJDEP. In addition, the NJDEP may impose wetland buffers up to 300 feet along coastal wetlands. Impacts to wetland transition areas would be identified and assessed during the permitting phase of the Program.

Table 4.15-2: Program Impacts to Wetlands and State Open Waters within the Study Area

Design Element	Wetlands Impacts (Acres)	State Open Waters Impacts (Acres)
Mainline	11	5
Interchange 2	1	<1
Interchange 3	<1	<1
Interchange 4	2	<1

Source: AECOM 2022.

The Program would result in direct impacts to wetlands and waterways by the filling in or excavation of these resources. The additional impervious surface area associated with the mainline improvements have the potential to increase runoff during storm events, increases in water temperature, sedimentation, turbidity, and increased nutrient concentrations. In addition, indirect impacts could occur, such as shading from widened bridges which would result in the potential loss of existing vegetation and could negatively impact wetland functions such as sediment trapping, nutrient retention, shoreline anchoring, and food-chain support.

Wetlands and SOWs where existing bridges and/or culverts would have to be replaced, lengthened, and/or require the addition of a headwall already experience impacts from these structures. In most cases, the proposed culverts and bridges would have the same internal dimension as existing structures and, as such, should not change the water regime and circulation pattern of the wetlands; therefore, a significant impact on the hydrology that would affect wetlands would not occur.

Excavating, grading, embankment construction, and soil stockpiling would be required during construction. Temporarily exposed soils and dewatering activities for the Program could result in increased site erosion and sedimentation impacts to nearby wetlands and waterbodies. During Program construction, there is also the potential for the discharges of oils, greases, and other substances into nearby wetlands and waters from equipment malfunctions, refueling of equipment, and other unforeseeable incidents.

4.15.4 Minimization and Mitigation

A USACE Individual Section 404/10 Permit, an NJDEP Individual Freshwater Wetlands and Open Water Fill Permit, and an NJDEP Coastal Wetlands Permit would be required for the Program's impacts to wetlands, wetland transition areas, and watercourses. The NJTA would comply with all permit conditions.

During the Final Design phase, means to minimize impacts, would be evaluated. A detailed Side Slope Analysis (SSA) process, which would look at standard side slopes, steeper side slopes and/or retaining walls or barrier curbs, would be undertaken to avoid and/or minimize impacts to wetlands, waterbodies, and other sensitive environmental resources. Furthermore, an SESC Plan and BMPs would be implemented during Program construction to minimize soil erosion and sedimentation to environmentally sensitive areas.

BMPs that may be implemented include, but are not limited to, the following:

- The area of proposed soil disturbance would be no larger than is necessary.
- Mulch or other erosion prevention/minimization methods would be used on slopes and other areas, as deemed necessary to protect from sedimentation and erosion.
- All SESC practices would be constructed in accordance with the most current version of The Standards for Soil Erosion and Sediment Control in New Jersey. These measures (i.e., inlet protection) would be installed prior to any major soil disturbance, in their proper sequence, and maintained until permanent protection is established.
- Paved roadways would be kept clean at all times. No fire or garden hoses would be used to clean roads unless runoff is directed to a proper sediment basin.

- All storm drainage inlets would be protected with gravel filters, fabric filter, or hay bales until vegetation has been established.
- All temporarily disturbed areas would be restored to their pre-existing condition and elevation and replanted with indigenous vegetative species of equal or greater value than currently exists.
- All erosion control devices (i.e., silt fences) would be inspected and maintained periodically.
- Any excavated areas that require backfill would be filled with clean soil meeting the NJTA's standards, as well as NJDEP requirements as set forth in the Technical Requirements for Site Remediation. No contaminated soils would be used as backfill.

Wetland mitigation would be required by the USACE and NJDEP for permanent impacts to wetland, wetland transition area, and WOTUS/SOWs impacts. Prior to initiating Program construction activities, an approved Wetland Mitigation Plan would be implemented to offset impacts to these resources. Mitigation could include: 1) on-site or off-site restoration (2:1 ratio), creation (2:1 ratio), and/or enhancement (typical ratios range from 3:1 to 10:1); 2) purchasing of credits at a wetland mitigation bank in the impacted wetlands' WMA; 3) a monetary contribution to NJDEP's in-lieu fee (ILF) program; 4) upland preservation (typically 27:1 ratio); and/or 5) land donation approved by the Wetland Mitigation Council (typically 27:1 ratio).

Mitigation requirements could be met by using one or a combination of all these types of mitigation methods. The preferred mitigation hierarchy for a larger disturbance is on-site mitigation followed by off-site mitigation or the purchase of credits from a mitigation bank, monetary contribution to NJDEP's ILF Program or upland preservation, and as a last alternative mitigation shall be in the form of a land donation. It is anticipated that roadside ditches would be replaced in-kind at a ratio of 1:1 by the construction of new roadside ditches along the proposed toe-of-slope of the new outer roadway lanes. In addition, SOW impacts would most likely be at a 1:1 creation ratio.

Mitigation banks within the same WMA as the Program where credits could potentially be purchased include Willow Grove Lake, Abbot Creek, Evergreen Oldmans Creek, and the tidal component of Stipson's Island.

Program construction could also result in temporary impacts to wetlands, wetland transition areas, and WOTUS/SOWs. If the temporary disturbance is within forested wetland, NJDEP requires either restoration of the area temporarily disturbed to a forested wetland or restoration of the area temporarily disturbed to a non-forested wetland, and in addition, one acre of mitigation for each acre of disturbance. All temporarily disturbed wetlands, wetland transition areas, and WOTUS/SOWs would be restored to their pre-existing condition upon completion of construction and planted with native indigenous species.

Additional minimization and mitigation strategies associated with the Program's impacts are discussed in Section 4.11 (Surface Water Resources).

4.16 ECOLOGY AND WILDLIFE

4.16.1 Methodology and Data Sources

4.16.1.1 Wildlife

Wildlife observed or known to be potentially present within the Program area based on habitat types were identified using various wildlife field guides, including Peterson Field Guides - Eastern Birds and Peterson Field Guides - Mammals, as well as direct field observations during wetland field delineations. Habitat types utilized by various wildlife species were determined by field reconnaissance and review of aerial photography.

Additionally, the New Jersey Turnpike Authority Interchange 6 to 9 Widening Program Executive Order No. 215 Environmental Impact Statement dated January 2007 was used as a reference to determine wildlife species that may also potentially utilize the Program area due to similar wildlife habitats along the same public highway. Although this Program area is more southern than the Interchange 6 to 9 Widening Program, a majority of the adjacent habitats are similar. One major difference for this Program that did not occur within the Interchange 6 to 9 Widening Program is the existence of tidal waterways and associated coastal wetlands and estuaries.

4.16.1.2 Fisheries

Sources reviewed to determine fisheries resources located within the Program area include the NJDEP Surface Water Quality Classifications to determine those streams which are designated as trout stocked, trout maintenance or trout production; the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NMFS) Section 7 Mapper to determine those streams which provide habitat for Endangered Species Act (ESA)-listed fishery resources, such as Atlantic or shortnose sturgeon species and critical habitat and; the NOAA Fisheries Essential Fish Habitat (EFH) Mapper to determine those streams which provide EFH for different life stages of aquatic species, Habitat Areas of Particular Concern (HAPC), and EFH Areas Protected from Fishing (EFHA). The figure titled; Essential Fish Habitat Map (Appendix B) shows the EFH areas within the study area.

4.16.1.3 Threatened and Endangered Species

Special Status Species habitats were assessed for a study area 200 feet from existing edge of Turnpike pavement between MP 3.5 and MP 36.5. This assessment consisted of background research and was supplemented by field investigation. The background research included information requests from the New Jersey Natural Heritage Program (NHP) and the USFWS IPaC system, as well as database information from the NJDEP Landscape Project (Version 3.3). In addition, information on Federally protected aquatic species was obtained from NOAA Fisheries. The field investigations were conducted during the wetland delineations to confirm previously identified protected habitats and to find new protected habitats not previously identified.

The NHP, USFWS, and NOAA Fisheries were requested to provide information regarding the presence or absence of endangered, threatened, or special concern species located within, or adjacent to, the study area. The NJDEP Landscape Project provides habitat mapping for state threatened, state endangered, and Federally listed (endangered or threatened) species. This

information was used to consider the potential impacts of the Program as well as assess mitigation approaches to avoid or minimize impacts. Such mitigation approaches could consist of seasonal timing restrictions and/or the creation, restoration, or preservation of impacted resources, including Special Status Species habitats. Additionally, the information will be used to determine wetland resource values and associated wetland transition area widths during the later permitting phase of the Program.

4.16.2 Affected Environment

4.16.2.1 Wildlife

Wildlife observed or known to occur within the Program area consists of those species commonly found in residential, commercial, and transportation areas within New Jersey. These species are adapted to human activity and often migrate on a daily or seasonal basis between foraging and nesting habitats. A list of wildlife observed or known to occur within the Program area is identified in **Table 4.16-1**.

Table 4.16-1: Wildlife Observed or Known to Occur Within the Program Area

Scientific Name	Common Name
Mammals	
Canis latrans	Coyote
Castor canadensis	Beaver
Didelphis marsupialis	Opossum
Marmota monax	Groundhog
Mephitis mephitis	Striped Skunk
Odocoileus virginianus	White-tailed Deer
Peromyscus leucopus	White-footed Mouse
Procyon lotor	Raccoon
Sciurus carolinensis	Grey Squirrel
Sylvilagus floridanus	Eastern Cottontail
Tamias striatus	Eastern Chipmunk
Vulpes vulpes fulva	American Red Fox
Reptiles/Amphibians	
Elaphe obsoleta	Black Rat Snake
Notophthalmus viridescens	Red-Spotted Newt
Rana catesbeiana	Bullfrog
Rana clamitans	Green Frog
Terrapene carolina	Eastern Box Turtle
Thamnophis sirtalis	Common Garter Snake
Birds	
Agelaius phoeniceus	Red-winged Blackbird
Aix sponsa	Wood Duck
Anas platyrhynchos	Mallard
Ardea alba	Great Egret
Ardea herodias	Great Blue Heron
Bonasa umbellus	Ruffed Grouse

Scientific Name	Common Name
Branta canadensis	Canada Goose
Buteo jamaicensis	Red-tailed Hawk
Cardinalis cardinalis	Northern Cardinal
Carpodacus mexicanus	House Finch
Cathartes aura	Turkey Vulture
Charadrius vociferus	Killdeer
Columba livia	Rock Dove
Coragyps atratus	Black Vulture
Corvus brachyrhynchos	American Crow
Cyanocitta cristata	Blue Jay
Dendroica petechia	Yellow Warbler
Dumetella carolinensis	Gray Catbird
Falco sparverius	American Kestrel (State-threatened)
Geothlypis trichas	Common Yellowthroat
Haliaeetus leucocephalus	Bald Eagle (State-endangered)
Icterus galbula	Northern Oriole
Larus argentatus	Herring Gull
Larus delawarensis	Ring-billed Gull
Meleagris gallopavo	Wild Turkey
Melospiza melodia	Song Sparrow
Mimus polyglottos	Northern Mockingbird
Nycticorax nycticorax	Black-crowned Night-heron (State-threatened)
Pandion haliaetus	Osprey (State-threatened)
Parus atricapillus	Black-capped Chickadee
Passer domesticus	House Sparrow
Picoides pubescens	Downy Woodpecker
Quiscalus quiscula	Common Grackle
Spinus tristis	American Goldfinch
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree Swallow
Troglodytes aedon	House Wren
Turdus migratorius	American Robin
Tyrannus tyrannus	Eastern Kingbird
Zenaida macroura	Mourning Dove

Source: *Peterson Field Guides – Mammals of North America*, 2006; *Peterson Field Guides to Eastern Birds*, 1980; *NJTA Interchange 6-9 Widening Program – EO 215 Environmental Impact Statement*, 2007; and Field Investigations, AECOM 2021.

Those species commonly identified during field investigations included American crow, white-tailed deer, grey squirrel, turkey vulture, red tailed hawk, Canada goose, eastern chipmunk, and American robin. Reptiles, amphibians, and fish were not often identified likely due to the high daytime temperatures during field investigations.

The variety and abundance of wildlife within a specific location is dependent on abiotic and biotic conditions, which are either beneficial or detrimental to a species within that environment. Abiotic conditions include temperature, air quality, water quality, geology, moisture regime, land use, and size and configuration of habitat. Biotic conditions include prey/food availability, presence of predators, and species' life stages requirements.

4.16.2.2 Fisheries

Fishery Resources, General: The many waterways that traverse the study area are known to provide healthy warmwater and inland coastal fisheries. Salem Canal and Game Creek in particular are known to provide excellent largemouth bass (*Micropterus salmoides*) fishing. Lake Narraticon (a.k.a. Swedesboro Lake), located immediately downstream of the Church Run tributary crossing at MP 11.2, is another notable freshwater fishing location adjacent to the Turnpike ROW and is seasonally stocked with trout by the NJDEP. Stewart Lake in Deptford/Woodbury is also a well-known local fishing lake located downstream and relatively close to the Turnpike crossing of Woodbury Creek. Oldmans, Raccoon, Mantua, and Big Timber Creeks have reported or confirmed spawning migrations of American shad (*Alosa sapidissima*) and river herring, including alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*). These waterways also provide migration, spawning, and/or forage habitat for other Federally managed species such as striped bass (*Morone saxatilis*) and American eel (*Anguilla rostrata*).

Essential Fish Habitat: The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth a requirement that Federal fishery management plans (developed by Regional Fishery Management Councils) be amended to designate EFH for all Federally managed species. According to NOAA Fisheries, EFH includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." The EFH Mapper (https://www.habitat.noaa.gov/apps/efhmapper/) and associated GIS data were used to identify species and associated life stages for which EFH has been designated in the study area; EFH in the study area are summarized in **Table 4.16-2**.

An EFH Assessment would be performed during Final Design and permitting to determine whether study area waterways are suitable for the identified species and their life stages, and to determine whether EFH may be adversely affected by the Program. Consultation with NOAA Fisheries would be conducted as the Program will require Federal permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

Table 4.16-2: Essential Fish Habitat Mapped in the Study Area

Associated Regional Fishery Management Council	Common Name	Scientific Name	Life Stage
Mid Atlantic Fishery Management Council	Atlantic Butterfish	*Peprilus triacanthus*	Larvae, Adult
	Black Sea Bass	*Centropristis striata*	Juvenile, Adult
	Bluefish	*Pomatomus saltatrix*	Juvenile, Adult
	Longfin Inshore Squid	*Doryteuthis pealeii*	Eggs
	Scup	*Stenotomus chrysops*	Juvenile, Adult
	Summer Flounder	*Paralichthys dentatus*	Juvenile, Adult
New England Fishery Management Council	Atlantic Herring	*Clupea harengus*	Juvenile, Adult
	Clearnose Skate	*Raja eglanteria*	Juvenile, Adult
	Little Skate	*Leucoraja erinacea*	Juvenile, Adult
	Red Hake	*Urophycis chuss*	Adult
	Windowpane Flounder	*Scophthalumus aquosus*	Juvenile, Adult
	Winter Skate	*Raja ocellata*	Juvenile, Adult

Source: NOAA Fisheries EFH Mapper Report.

Federally Endangered Sturgeon Species: Two Federally listed endangered species of sturgeon, the shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrhinchus oxyrinchus*), occur year-round in the Delaware River and, according to NOAA Fisheries, may occur in the associated tributaries in the vicinity of the Program. NOAA's GIS data depicts migrating and foraging habitat for both sturgeon species in Big Timber Creek at the Turnpike crossing; in Raccoon Creek beginning approximately one mile downstream of the Turnpike; and in the lower reaches of Oldmans Creek, Mantua Creek, Woodbury Creek, and the Cooper River. In 2017, NOAA issued a ruling (82 FR 39160) which designated critical habitat for the Atlantic sturgeon in the Delaware River. Consultation with NOAA Fisheries under Section 7 of the Endangered Species Act will be required if the Program is determined to have the potential to affect these species.

State Threatened Freshwater Mussel Species: According to the NJ Landscape Project data, the segment of Raccoon Creek immediately upstream of the Turnpike crossing contains habitat for the state threatened eastern pondmussel (*Ligumia nasuta*). This species occurs in the lower Delaware River and several of its tributaries. The need for surveys to confirm or deny the presence of this species in the study area will be determined during Final Design and permitting in coordination with the NJDEP Endangered and Non-game Species Program (ENSP).

4.16.2.3 Threatened and Endangered Species

The USFWS IPaC dated March 19, 2024 identified four Federally threatened species potentially located within or adjacent to the study area: rufa red knot (*Calidris canutus rufa)*, bog turtle *(Glyptemys muhlenbergii*), sensitive joint-vetch *(Aescynomene virginica)*, and swamp pink *(Helonias bullata*). Additionally, one Federally endangered species (northern long-eared bat*, Myotis septentrionalis*) and one Federally proposed-endangered species (tricolored bat, *Perimyotis subflavus*) were identified as potentially located within or adjacent to the study area. Note that the USFWS in their correspondence indicated that the Program is not expected to

affect red knots and further consultation is not required regarding this species. thattheNOAA Fisheries identified two Federal and state endangered fish species and the NJDEP identified several sensitive species in the study area. **Table 4.16-3** identifies the special status species, or their habitats, located within or adjacent to the study area. The figure titled, Special Status Species Map, in **Appendix B** provides a graphical representation of the location of habitat for Special Status Species. Correspondence from the NJDEP and USFWS regarding special species status is provided in **Appendix D**.

Table 4.16-3: List of Special Status Species

Common Name	Scientific Name	Rank	State Status	Federal Status
American Kestrel	*Falco sparverius* [123]	3	Threatened	N/A*
Atlantic Sturgeon	*Acipenser oxyrinchus*[3]	5	Endangered	Endangered
Bald Eagle	*Haliaeetus leucocephalus* [123]	4	Endangered	N/A
Barred Owl	*Strix varia*[123]	3	Threatened	N/A
Bobcat	*Lynx rufus*[123]	4	Endangered	N/A
Bobolink	*Dolichonyx oryzivorus*[123]	3	Threatened	N/A
Bog Turtle	*Glyptemys muhlenbergii* [123]	5	Endangered	Threatened
Brown Thrasher	*Toxostoma rufum*[123]	2	Special Concern	N/A
Cooper's Hawk	*Accipiter cooperii*[123]	2	Special Concern	N/A
Eastern Box Turtle	*Terrapene carolina*[123]	2	Special Concern	N/A
Eastern Meadowlark	*Sturnella magna*[123]	2	Special Concern	N/A
Eastern Pondmussel	*Ligumia nasuta*[123]	3	Threatened	N/A
Grasshopper Sparrow	*Ammodramus savannarum* [123]	3	Threatened	N/A
Great Blue Heron	*Ardea herodias*[123]	2	Special Concern	N/A
Horned Lark	*Eremophila alpestris*[123]	3	Threatened	N/A
Kentucky Warbler	*Oporornis formosus*[123]	2	Special Concern	N/A
Northern Long-eared Bat	*Myotis septentrionalis*[3]	5	Threatened	Threatened
Osprey	*Pandion haliaetus*[123]	3	Threatened	N/A
Peregrine Falcon	*Falco peregrinus*[3]	4	Endangered	N/A
Red Knot	*Calidris canutus rufa*[3]	5	Endangered	Threatened
Red-headed Woodpecker	*Melanerpes erythrocephalus*[3]	3	Threatened	N/A
Red-shouldered Hawk	*Buteo lineatus*[3]	4	Endangered	N/A
Savannah Sparrow	*Passerculus sandwichensis*[123]	3	Threatened	N/A
Sensitive Joint-vetch	*Aeschynomene virginica*[3]	5	Endangered	Threatened
Shortnose Sturgeon	*Acipenser Brevirostrum*[3]	5	Endangered	Endangered
Swamp Pink	*Helonias bullata*[23]	5	Endangered	Threatened
Tricolored Bat	*Perimyotis subflavus*[3]			
Upland Sandpiper	*Bartramia longicauda*[123]	4	Endangered	N/A
Vesper Sparrow	*Pooecetes gramineus*[123]	4	Endangered	N/A
Wood Thrush	*Hylocichla mustelina*[123]	2	Special Concern	N/A
Yellow-breasted Chat	*Icteria virens*[123]	2	Special Concern	N/A

* Not Applicable
[1] Within the Study Area
[2] Within the Immediate Vicinity of the Study Area
[3] Within 1 Mile of the Study Area

Sources: NJDEP Natural Heritage Program, Office of Natural Lands Management, July 2, 2021; USFWS, New Jersey Ecological Services Field Office, Chesapeake Bay Ecological Services Field Office, March 19, 2024.

4.16.2.4 Vernal Habitat

Vernal habitats within the Program area support a diverse range of species, characterized by their seasonal wetland nature. These habitats play a crucial role in supporting amphibian and invertebrate populations, particularly during the spring breeding season. **Table 4.16-4** contains a list of potential vernal habitats that have been identified by NJDEP within the 500-foot project study area. See Special Status Species map in **Appendix B**.

Table 4.16-4: Potential Vernal Habitat Area

Vernal Pool Habitat ID	Location (Approximate Milepost)
843	4.0-5.5 (SN & NS)
893	10.0-10.5 (SN & NS)
922	12.0-12.5 (SN)
979	16.5-17.0 (SN)
1021	19.0-19.5 (NS)
1066	23.5-25.0 (SN)
1089	24.5-25.0 (SN & NS)
1092	24.0-24.5 (NS)
1189	34.5-35.0 (SN & NS)
1201	35.5-36.0 (SN)
1209	36.0-36.5 (SN & NS)

Source: NJDEP NHP & Bureau of GIS

4.16.3 Environmental Consequences

4.16.3.1 No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, the Program would have no new direct or indirect impacts to aquatic and terrestrial ecology. Projects in the No-Build Alternative have the potential to impact Ecology and Wildlife; the sponsors of those projects would be required to comply with applicable regulations regarding such resources.

4.16.3.2 Initially Preferred Alternative

Mainline Improvements

Aquatic ecology: Making capacity improvements to existing mainline bridges or constructing new bridges to accommodate a widened mainline section could impact ecology and wildlife associated with both tidal and non-tidal waters. Oldmans, Raccoon, Mantua, and Big Timber Creeks have been identified as potentially containing Federally endangered Atlantic and shortnose sturgeon and are confirmed or reported anadromous fish spawning runs. Raccoon, Mantua, and Big Timber Creeks also have mapped EFH at or immediately downstream of the Turnpike crossings; these crossings would necessitate an EFH Assessment and consultation with NOAA Fisheries. Finally, the crossing of Raccoon Creek may be further regulated by the presence of a state-threatened freshwater mussel species, the habitat for which is mapped just upstream of the Turnpike.

Threatened and Endangered Species: The NJDEP Landscape Project reports several occurrences of both Federally listed and state listed threatened/endangered species, as well as special concern species, in the study area for the Turnpike mainline. In addition, the USFWS reported several species that may be present in the project area if suitable habitat exists. The study area is also in the range for both Atlantic and shortnose sturgeon.

Interchange 2

Aquatic Ecology: An intermittent UNT to Raccoon Creek runs through the southern portion of Interchange 2 flowing beneath the Turnpike mainline and the interchange. This minor waterway does not present a significant constraint to the Program improvements at the interchange but warrants impact minimization and mitigation as part of the Final Design and permitting process.

Threatened and Endangered Species: The NJDEP Landscape Project reports one or more occurrences of the Federally-threatened bog turtle (occupied habitat) and the state-endangered bald eagle (foraging habitat) in or near Interchange 2. In addition, the USFWS reported several species that may be present in the study area if suitable habitat exists. This area is also in the range of the eastern pondmussel.

Interchange 3

Aquatic Ecology: Beaver Brook and its UNTs flow along and through Interchange 3. The NJDEP-mapped head of tide is located downstream of the interchange; however, these waterways may be tidally influenced because they were the subject of a previous NJDOT roadway flooding improvement project along Route 168 at MP 6.63 (ref. 2005 Capital Plan Project # 02406). FEMA mapping depicts the estimated 100-year floodplain covering a large portion of the interchange area. Flood hazard areas and riparian zones along Beaver Brook and its tributaries will have to be verified and any impacts minimized and mitigated. Finally, fisheries resources must be fully considered when designing improvements along or adjacent to Beaver Brook and its tributaries, which are preliminarily identified as EFH.

Threatened and Endangered Species: No special status species are reported in or near Interchange 3.

Interchange 4

Aquatic Ecology: The North Branch of Pennsauken Creek flows beneath the Turnpike mainline and Interchange 4. A small UNT is also located at the base of the embankment, adjacent to the southbound exit ramp; the channel of the tributary may require modification if the embankment is expanded as part of the improvements. In addition, flood hazard areas and riparian zones along these waterways will require verification and impacts to these resources must be minimized and mitigated.

Threatened and Endangered Species: The NJDEP Landscape Project reports one or more occurrences of the state-endangered bald eagle (foraging habitat) in or near Interchange 4. In addition, the USFWS reported several species that may be present in the study area if suitable habitat exists. This area is also in the range of Atlantic and shortnose sturgeon.

4.16.4 Minimization and Mitigation

State and Federal environmental regulations will require that any adverse impacts of the Program to special status species, or their habitat, be avoided or minimized to the maximum extent practicable. Should avoidance or minimization not be possible, mitigation would be required in the form of creation, restoration, and/or preservation of habitat to offset the impacts to threatened/endangered species and their habitats.

In addition, environmental permits to be obtained during Final Design and the permitting phase for the Program will include construction conditions, such as seasonal timing restrictions, exclusion fencing, and/or species construction monitoring, to minimize adverse impacts to protected species during construction activities. Further coordination and consultation with NJDEP, USACE, and USFWS in accordance with state regulations and Section 7 of the ESA will continue throughout the Program design phases regarding the mitigation required, as well as conditions to be adhered to during construction. Activities may include potential species-specific surveys (e.g., bog turtle) and/or Biological Assessments for potentially impacted species.

Mitigation measures could include:

- Seasonal tree cutting timing restrictions;
- Seasonal in-water work timing restrictions;
- Implementation of SESC measures;
- Mitigation of wetland and riparian zone disturbances through utilization of an approved Wetland Mitigation Bank within the service area of the impact and/or the creation, restoration, or preservation of wetland and/or riparian zone habitats;
- Noise attenuation devices on construction equipment;
- Construction equipment utilization to follow all Federal, state, and local laws and ordinances pertaining to noise and air quality and time-of-day thresholds; and
- All temporarily disturbed areas would be restored to pre-construction conditions following project completion.

4.17 TERRESTRIAL VEGETATION

4.17.1 Methodology and Data Sources

For the purposes of this assessment, a study area extending 500 feet from either side of the Turnpike ROW was defined. A desktop survey was conducted utilizing NJDEP Bureau of GIS's Land Use/Land Cover of New Jersey 2015 layer, aerial photography, and surveyed tree lines. In addition, during field investigations a general habitat assessment was conducted. Investigators identified plant species within the study area and reviewed the USACE National Wetland Plant List for the Atlantic and Gulf Coastal Plain Region to determine the wetland indicator status of each plant.

The NJDEP Bureau of GIS's Land Use/Land Cover of New Jersey 2015 layer was used to calculate impacts to upland areas of agriculture land. Impacts to upland forested land and grass areas were calculated using a surveyed tree line that was verified by aerial photography.

The No Net Loss Reforestation Act (N.J.S.A. 13:1L-14.1 *et seq*.) requires state entities to provide a plan for compensatory reforestation for all areas at least ½ acre in size that are owned or maintained by that state entity and are scheduled for deforestation. A reforestation plan resulting in no net loss of existing forested area is required for areas subject to deforestation.

Pursuant to the No Net Loss Reforestation Act (N.J.S.A. 131L-14.1 to 14.4), an examination of potential impacts to regulated upland and wetland forested parcels within the study area was conducted. To determine forested grids, the USGS No Net Loss ½ acre grid system was utilized. Quadrangle grids that contained at least 33 percent of forested area were identified as regulated parcels under the No Net Loss Reforestation Act. A survey of the tree line was conducted and reviewed against aerial photography to determine forested areas. The surveyed tree line was overlain with ½ acre parcels in order to calculate the overall estimated acreage of forested land subject to the No Net Loss Reforestation Act.

4.17.2 Affected Environment

According to the NJDEP Bureau of GIS's Land Use/Land Cover of New Jersey 2015 layer, approximately 25 percent (or 1,234 acres) of the study area is forested land, 14 percent (or 699 acres) is agriculture land, and 0.04 percent (or 24 acres) is barren land. Grass area impact for the limit of disturbance is approximately 219 acres. The Existing Land Use Map (Appendix B) shows all existing land uses found within the study area.

During wetland field investigations, it was observed that upland communities within the study area are dominated by forested lands, grass areas, and agriculture lands. The general landscape within the study area consists of mowed grass areas along the edge of pavement bordered by forested land. Forested land was predominately mixed deciduous forests, which included but was not limited to oaks (*Quercus spp.*), hickories (*Carya spp*.), sweetgum (*Liquidambar styraciflua*), and American beech (*Fagus grandifolia*); however, small pockets of coniferous forests, which contained species such as pitch pine (*Pinus rigida*) and eastern white pine (*Pinus strobus*), were also observed. Agriculture lands, which are primarily located in the southern portion of the study area to approximately MP 18, are typically located adjacent to forested land. A small portion of the study area consists of barren lands and scrub-shrub, which are typically found in disturbed areas, such as utility ROWs or bordering agricultural lands.

Within the wetland study area, upland (UPL), facultative upland (FACU), facultative (FAC), facultative wetland (FACW), and obligate (OBL) species of trees, shrubs, vines, and herbaceous plants were identified. A composite species list of vegetation identified within the wetland study area, along with the scientific name and regional indicator status for each plant species as listed in the USACE National Wetland Plant List for the Atlantic and Gulf Coastal Plain Region, is included in Appendix D.

4.17.3 Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, the Program would have no direct or indirect impacts to terrestrial vegetation. Projects in the No-Build Alternative have the potential to impact terrestrial vegetation; the sponsors of those projects would be required to comply with applicable regulations regarding those resources.

Initially Preferred Alternative

Impacts to upland vegetation would occur as a result of mainline improvements, realignment of local roadways at bridge crossings, relocation of utility lines, and construction of SWM basins.

Mainline Improvements

Upland terrestrial impacts resulting from the mainline improvements would include approximately 177 acres of grass areas, 174 acres of forested land, and 10 acres of agriculture land. The No Net Loss grid analysis determined that approximately 127 acres of regulated upland and wetland forested parcels would be impacted by the mainline improvements.

Interchange 2

Upland impacts within the Interchange 2 study area would include approximately 13 acres of grass areas, eight acres of forested land, and 22 acres of agriculture land. The No Net Loss grid analysis determined that approximately five acres of regulated upland and wetland forested parcels would be impacted by the Interchange 2 improvements.

Interchange 3

Upland impacts within the Interchange 3 study area would include approximately 15 acres of grass areas and 15 acres of forested land. There would be no impact to agriculture land. The No Net Loss grid analysis determined that approximately 4 acres of regulated upland and wetland forested parcels would be impacted by the Interchange 3 improvements.

Interchange 4

Upland impacts within the Interchange 4 study area would include approximately 15 acres of grass areas and five acres of forested land. There would be no impacts to agriculture land. The No Net Loss grid analysis determined that approximately three acres of regulated upland and wetland forested parcels would be impacted by the Interchange 4 improvements.

4.17.4 Minimization and Mitigation

BMPs would be utilized by the NJTA to minimize impacts to upland terrestrial areas. The area of Program disturbance would be no larger than is necessary to construct and maintain the Turnpike and local roadways. Areas adjacent to the roadways that would be temporarily disturbed would be reseeded in accordance with an approved SESC Plan. In addition, the NJTA would comply with the No Net Loss Reforestation Act in implementing the Program. During Final Design, ways to further minimize impacts, such as steeper side slopes and/or retaining walls or barrier curb, would be considered.

Mitigation would be required for regulated forested impacts in accordance with the No Net Loss Reforestation Act and could include on-site reforestation, alternate-site reforestation, and/or monetary compensation. Mitigation measures would focus on replacement of lost trees within available portions of the Turnpike ROW, taking into consideration the required tree offset and clear zones needed for safety requirements. If land within the ROW is not sufficient to meet the No Net Loss Reforestation Act requirements, the NJTA would follow the mitigation hierarchy as outlined in the No Net Loss Compensatory Reforestation Program - Program Guidelines. A reforestation plan would be submitted to the NJDEP Division of Parks and Forestry for review and approval by the NJ Community Forestry Council.

4.18 GROUNDWATER RESOURCES

4.18.1 Methodology and Data Sources

An examination of the potential impacts to groundwater resources within the study area was conducted to ensure preventative measures would be implemented to avoid or minimize the potential for groundwater pollution and effect on groundwater recharge by the Program. The study area for groundwater impact assessment is 500 feet on either side of the edge of Turnpike ROW and 100 feet from the existing edge of local road crossings. GIS data from the NJDEP Bureau of GIS was analysed to determine the aquifer systems and Well Head Protection Areas (WHPAs) located within the study area. WHPA's are geographic areas surrounding a public water supply well or wellfield. Groundwater recharge rates and location of groundwater recharge areas were identified and assessed using NJDEP GIS data developed from the NJ Geologic and Water Survey's Groundwater Recharge. This GIS data yielded spatial and attribute data, which allowed for both a site-specific and a watershed-wide analysis.

The New Jersey Stormwater Management Rules (N.J.A.C. 7:8) address stormwater runoff quality, stormwater runoff quantity, and groundwater recharge standards. These standards were used to determine mitigation requirements. NJDEP's New Jersey Stormwater Best Management Practices Manual was used to clarify and explain the design and performance requirements of the Stormwater Management Rules. BMPs were used to outline the mitigation procedure that would be instituted by the NJTA to address potential long-term operational and construction effects of the Program to groundwater. In addition, the permit conditions of the NJPDES General Permit 5G3 for Construction Activity Stormwater were reviewed and would be incorporated into the Program to address potential short-term impacts to groundwater associated with construction activities.

4.18.2 Affected Environment

The New Jersey Coastal Plain aquifer system is the primary source of drinking water for southern New Jersey and has been designated as a sole source aquifer pursuant to Section 1424(e) of the Safe Drinking Water Act. Of the five aquifers that make up the New Jersey Coastal Plain aquifer system, three aquifers are found within the study area including: the Mount Laurel-Wenonah aquifer, the Englishtown aquifer, and the Marshalltown-Wenonah aquifer.

According to NJDEP GIS data of water purveyor service areas, public water supply systems (either municipally or privately operated) provide potable water to most communities in the study area. Communities along approximately 13 miles of the study area, mostly in Salem and southern Gloucester Counties and in a small area along the mainline, rely on private potable wells. Numerous Turnpike-adjoining properties in these areas also use private wells.

WHPAs were evaluated in this analysis because of their importance in preventing groundwater contamination. A WHPA consists of three tiers; each tier is based on the time it takes groundwater to travel to the well, referred to as Time to Travel (TOT). The outer boundaries of each tier have the following TOTs: Tier 1 has two years, Tier 2 has five years, and Tier 3 has twelve years. The TOTs are based on the need to assess the relative risk of contamination to the well. To assess the Program's potential impact on the wells, the TOT of the WHPAs located within the Program area were identified. While WHPAs are not regulated resources, they are delineated and targeted as priority areas for prevention and remediation of groundwater contamination pursuant to the USEPA's Safe Drinking Water Act Amendments of 1986.

Recharge to the New Jersey Coastal Plain aquifer system largely takes place through infiltration of precipitation over outcrop areas. Water that infiltrates the ground and reaches the water table is defined as groundwater recharge. The NJDEP GIS data for groundwater recharge rates, which was developed from the NJ Geologic and Water Survey's Groundwater Recharge rate data layer, were evaluated within the study area. Most of the study area has a low groundwater recharge rate ranging from 0 to 5 inches to 6 to 11 inches. Several areas within the study area have a medium recharge rate (12 to 14 inches). Although not consistently reflected in the NJDEP GIS data, areas covered by impervious surfaces, such as the existing Turnpike, have a recharge rate of zero. Additionally, recharge rates are not calculated in areas mapped as wetlands, SOWs, or in areas with hydric soils. The figure titled, Groundwater Recharge Areas Map, in Appendix B shows the groundwater recharge areas in the study area.

Mainline Improvements

Two WHPAs are located within the mainline study area. One WHPA, which is designated for a non-community well supply well, is located within Woolwich Township, Gloucester County. This WHPA is approximately 450 feet from the NS roadway at approximately MP 10.1. Only the Tier 3 zone of this well is located within the study area. The second WHPA, which is designated for a public community water supply well, is located within Mount Laurel Township, Burlington County, on Mount Laurel Township Municipal Utilities Authority property. This WHPA is approximately 300 feet from the SN roadway at approximately MP 34.9 and is designated solely as Tier 1. The figure titled, Wellhead Protection Areas Map (Appendix B), shows the locations of existing WHPAs in relation to the Program study area.

Throughout the study area, the Turnpike mainline is located within the Mt. Laurel-Wenonah aquifer, Englishtown aquifer, and the Marshalltown-Wenonah aquifer. The groundwater recharge rates vary considerably throughout the study area, ranging from zero to 13 inches per year.

Interchange 2

No WHPAs are located within the Interchange 2 study area.

Interchange 2 is located within the Mount Laurel-Wenonah aquifer. The groundwater recharge rate within this area ranges from one to 11 inches per year. Not included in the recharge calculations are mapped wetlands, SOWs, and hydric soils.

Interchange 3

No WHPAs are located within the Interchange 3 study area.

Interchange 3 is located within all three aquifers: the Mount Laurel-Wenonah aquifer, the Englishtown aquifer, and the Marshalltown-Wenonah aquifer. The groundwater recharge rate in this area ranges from 0 to 11 inches per year; yet much of the area has a recharge rate of zero inches per year due to the presence of impervious surfaces. Not included in the recharge calculations are mapped wetlands and SOWs.

Interchange 4

A WHPA for a public community water supply well is located at approximately MP 34.9. Details of this WHPA are noted above in the Mainline Improvements subsection.

Interchange 4 is located within the Marshalltown-Wenonah aquifer. The groundwater recharge rate in this area is relatively low, with much of the area exhibiting a rate of 0 inches per year due to the presence of impervious surfaces. Interspersed throughout this area is land rated from one to 12 inches per year. Not included in the recharge calculations are mapped wetlands, SOWs, and hydric soils.

4.18.3 Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, the Program would have no direct or indirect impacts to groundwater resources. Projects in the No-Build Alternative have potential to impact groundwater resources; the sponsors of those projects would be required to comply with applicable regulations for those resources.

Initially Preferred Alternative

Significant impacts to groundwater, as a result of long-term operational effects or short-term construction effects, are not anticipated because the NJTA would comply with the Stormwater Management Rules (N.J.A.C. 7:8) and apply strategic use of BMPs. The following discussion provides more detail to support this finding.

The Program would increase impervious surface area, potentially causing a long-term decrease in groundwater recharge rates, an increase in stormwater runoff, and introduction of additional automotive pollutants (i.e., oil, fuel) and deicing chemicals. Areas with higher groundwater recharge rates are assumed to have the highest potential for contamination and a reduction in recharge rates resulting from increased impervious surfaces. However, impacts to the groundwater aquifers would be minimized as stormwater associated with new impervious surfaces would be directed to SWM facilities to treat the stormwater prior to discharge to local surface waters and/or recharged into the groundwater. Deicing chemicals, which could enter the groundwater through infiltration from roadside snowbanks or from spray off passing cars and trucks, can affect the taste of water supplies, pose a health risk to salt-sensitive people on salt-restricted diets, and affect the hardness of water. Contaminants within the groundwater recharge areas have the potential to enter the aquifer and impact drinking water quality. The NJTA would maintain and monitor the implemented BMPs to minimize potential impacts to water quality and groundwater recharge.

Neither of the WHPAs located within the study area is anticipated to be impacted. Although the potential for contamination of a well within the Tier 3 zone is low, the NJTA would implement BMP measures over the long-term to ensure groundwater pollution does not occur. No impact to the Tier 1 WHPA would occur because of the distance of the Program to the well.

During construction of the Program, groundwater quality degradation has the potential to occur as a result of spills or leaks of oil-containing and oil-storage equipment. The potential for such impacts to groundwater would be addressed proactively by the NJTA by enforcing equipment and material staging requirements noted in the NJPDES General Permit 5G3 for Construction Activity Stormwater.

Short-term construction activities would result in the disturbance of land potentially resulting in soil erosion and sedimentation of waterways and wetlands. These water resources, as well as any surface conduits to the aquifer recharge area, have the potential to carry contaminants and sediment into the groundwater. These impacts are generally not quantifiable but are typically successfully controlled or minimized through the implementation of an approved SESC Plan and the installation of accepted SESC countermeasures. Therefore, short-term impacts due to construction activities are expected to be negligible.

4.18.4 Minimization and Mitigation

Adverse impacts to groundwater would be minimized by the NJTA by applying BMPs, which would treat stormwater before it is discharged to receiving waterbodies or before any groundwater recharge can occur. In addition, appropriate construction and operational procedures and design features that promote attenuation of pollutants in the unsaturated zone and prevent intrusion into the groundwater table would be implemented.

In order to mitigate the increase in impervious surface area and associated runoff, the Program would comply with the design and performance standards for SWM measures as outlined in the Stormwater Management Rules (N.J.A.C. 7:8). SWM measures would be designed to provide erosion control, groundwater recharge, stormwater runoff quantity control, and stormwater runoff quality treatment. These measures would control or reduce runoff of stormwater and

associated pollutants and induce or control the infiltration or groundwater recharge of stormwater. Program compliance with the green infrastructure requirements of the Stormwater Management Rules would be necessary in accordance with N.J.A.C. 7:8-5.3 and the 2020 Memorandum of Understanding between the NJDEP and the Transportation Agencies.

Impacts to groundwater from long-term operational effects would be minimized by directing water from the new impervious surface areas to SWM facilities. The Program proposes 170 SWM basins that would provide treatment for water quality, quantity, and groundwater recharge. The SWM basins would be designed as bioretention basins (107) and extended detention basins (9) and would include MTDs (54) in cases where additional water quality treatment is required to meet the regulatory requirements. In addition, stormwater would be treated before it infiltrates the groundwater table thereby also protecting WHPAs within the study area. The Program would also provide stormwater quality measures to reduce post-construction TSS in stormwater runoff generated from the Water Quality Design Storm, per N.J.A.C. 7:8-5.5(d), from the net increase of Motor Vehicle Surface and existing Regulated Motor Vehicle Surface that is currently receiving water quality treatment.

To comply with the conditions set forth in the NJPDES Highway Agency Stormwater General Permit (NJPDES General Permit No. NJG0153354) issued by NJDEP, the NJTA has an existing Stormwater Pollution Prevention Plan (SPPP) for the Turnpike. This plan regulates activities that contribute to the discharge of pollutants originating from the roadways owned and operated by the NJTA to waters via small Municipal Separate Storm Sewer Systems (MS4). The SPPP requires compliance with the SWM Rules and requires information such as: locations of all storm drain inlets and direct discharges to surface waters; inspection, cleaning, and maintenance of storm drain inlets and SWM facilities; inspection of outfall pipes and preventative and corrective maintenance performed; sweeping of roadways operated by the NJTA; and accounting for TMDL for any proposed project. By implementing these measures, the long-term operational effects to groundwater recharge, water quantity, and water quality would be minimized.

The NJTA and Program Contractors would complete the development of an SPCC Plan for Program construction activities in order to minimize the potential of contaminants entering the groundwater. This Plan would address additional concerns for water quality impacts during Program construction attributed to the materials and equipment being utilized for construction. Plan specifics would address fuel/lubricant handling and storage, containment measures, and unforeseen releases of fuel or hydraulic fluids from equipment breakdowns that could occur in areas that are not contained. Any spills or leaks that occur during construction would be cleaned up immediately by removing and disposing of impacted soils at an off-site location in a proper and legal manner. These measures would protect the groundwater quality as well as the WHPAs located within the study area.

During construction, the SPCC Plan would provide appropriate methodologies for implementation of BMPs, including type, size, location, and installation requirements. In accordance with the NJPDES General Permit 5G3 for Construction Activity Stormwater, any pesticides, fertilizers, fuels, lubricants, petroleum products, anti-freeze, paints and paint thinners, cleaning solvents and acids, detergents, chemical additives, and concrete curing

compounds shall be stored in containers in a dry covered area in order to prevent or minimize waste from these materials entering the stormwater discharge. Weekly inspections of construction area activities would be conducted and documented in order to identify areas contributing to the stormwater discharge and evaluate whether the SPPP is being properly implemented and maintained or whether additional measures are needed to implement the SPPP. Additional inspections would be conducted before and within 8 hours after a rain event, in accordance with the Stormwater Best Management Practices Guide. These inspections would assist in preventing and minimizing impacts associated with weather events.

During Final Design, further means to reduce the area of disturbance and amount of new impervious surfaces, and ways to preserve natural areas to the maximum extent feasible, would be evaluated for the Program. Also, a maintenance plan would be developed to outline the SWM measures being designed for the Program which would include additional mitigation and minimization strategies.

4.19 UTILITIES

4.19.1 Methodology and Data Sources

Existing utilities data was used to understand and plan for potential conflicts between the Program design, utilities, and the requirements of utility owners. Primary data sources used in this analysis were as-built utility plans provided by municipal utility authorities and other utility owners, as shown in the figure titled, Utilities Map (Appendix B).

4.19.2 Affected Environment

A preliminary review of utility resources indicates that numerous large and small utility facilities are located adjacent to or across the Turnpike's existing ROW. Both aerial and underground utilities are present as well as utilities attached to roadway bridges that cross over the Turnpike. Examples of utilities in the study area are:

- **Colonial Pipeline** – a 30-inch petroleum line that crosses the Turnpike near MP 19.38, then runs on the east side of the Turnpike from MP 19.38 through Interchange 4 at MP 34.50, approximately 30 feet from the easterly ROW boundary, and extends through the northern Program limits at MP 36.5,
- **Sunoco Pipeline** – a 16-inch petroleum line that crosses the Turnpike near MP 20.96, then runs on the east side of the Turnpike from MP 20.96 through Interchange 4 at MP 34.50, approximately 15 feet from the eastern Turnpike ROW boundary, and extends through the northern Program limits at MP 36.5,
- **Transco-Williams** – 20-inch and 12-inch natural gas lines that run along the west side of the Turnpike from MP 21.90 to MP 33.0 approximately 15 feet from the western Turnpike ROW boundary, with one continuing through Interchange 4 at MP 34.50 and through the northern Program limits at MP 36.5; and
- **Penta Fiber Optic** – located in Turnpike shoulder or the roadway berm approximately 10 feet from the pavement edge.

In addition to major utilities, other municipal and regional utilities are along and across the Turnpike ROW. Examples of these utilities are:

- **South Jersey Gas Company** service lines (MP 13.2 and MP 30.7);
- **Verizon Communications** conduits (various locations); and
- **Atlantic City Electric Company** aerial electric lines (various locations).

4.19.3 Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, no Program-related direct or indirect impacts on utilities would occur in the Program study area. Projects in the No-Build Alternative have the potential to impact utilities; sponsors of those projects would be responsible for identifying and managing potential utilities impacts.

Initially Preferred Alternative

Program activities would impact existing utilities as a result of ROW acquisition, reconstruction of bridges over and along the mainline, and other activities as described in the following subsections. These impacts would require the NJTA to relocate or otherwise accommodate the utilities with a minimum potential for disruption of utility services. Where utility disruptions are unavoidable, the owners of utility facilities may have restrictions on when a facility can be interrupted to accommodate relocation. These restrictions have the potential to affect the Program's cost and schedule.

Mainline Improvements

There are four major longitudinal utilities within the Program area, as noted in Section 4.19.2 (Affected Environment). In addition, 127 local utility crossings are adjacent to or cross the Turnpike's existing ROW and would be accommodated and/or relocated in accordance with NJTA and Program policies. These utilities are summarized in the table titled, Existing Utility Crossings (Appendix D).

Interchange 2

Program widening of Swedesboro Road (US Route 322) to provide a second westbound lane for vehicles turning from the proposed two left turn lanes would require relocation of approximately five utility poles carrying electric and telephone lines. Also, replacement of the Swedesboro Road overpass would require relocation of the utilities on the bridge. The existing utilities at Interchange 2 are summarized in **Table 4.19-1**.

Interchange 3

The proposed improvements at Interchange 3 would require additional ROW and approximately 1 acre for utility easements, thereby requiring the relocation of the 30-inch Colonial petroleum pipeline and the 16-inch Sunoco petroleum pipeline running along the southeastern edge of Ramp ST. The relocation of these pipelines would require coordination with the utility companies and significant lead time before Program construction efforts can begin. The existing utilities at Interchange 3 are summarized in **Table 4.19-2**.

Table 4.19-1: Existing Utilities at Interchange 2

Approx. MP	Location	Municipality	County	Utility
12.86A*	NJ Turnpike Interchange 2 over Mainline	Woolwich Township	Gloucester	Telephone
12.9	Mainline	Woolwich Township	Gloucester	Telephone
				Water
13.1	Mainline	Woolwich Township	Gloucester	Sewer
				Water
13.18*	US 322 (Swedesboro Rd) over Mainline	Woolwich Township	Gloucester	Telephone
13.2	Mainline	Woolwich Township	Gloucester	Gas
				Electrical

Source and Notes: *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program: Preliminary Design Report, Mainline - MP 3.5 to 36.5*. June 1, 2022. Refer to Appendix A and Appendix O of the Preliminary Design Report for Master Plans noting the location of Existing Utilities. *Utilities attached to roadway bridges.

Table 4.19-2: Existing Utilities at Interchange 3

Approx. MP	Location	Municipality	County	Utility
25.72*	Mainline over PRL RR Grenloch Br (Abandoned)	Borough of Runnemede	Camden	Electrical
				Sewer
				Electrical
25.88*	Mainline over NJ Route 168 (Black Horse Pike)	Borough of Runnemede	Camden	Telephone
				Cable
				Water
				Electrical
25.9	Mainline	Borough of Runnemede	Camden	Gas
26.0	Mainline	Borough of Runnemede	Camden	Fiber Optic
26.1	Mainline	Borough of Runnemede	Camden	Sewer
26.13R*	NJ Turnpike Interchange 3 over Mainline	Borough of Runnemede	Camden	Sewer Pump Station

Source and Notes: *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program: Preliminary Design Report, Mainline - MP 3.5 to 36.5.*. Refer to Appendix A and Appendix O of the Preliminary Design Report for Master Plans noting the location of Existing Utilities. *Utilities attached to roadway bridges

Interchange 4

The proposed improvements at Interchange 4 would impact underground gas and telephone utilities north of the existing bridge structure. There are various local utilities including gas, water, sanitary sewer, electric, telephone, communications, and cable television crossing the Turnpike at various locations. Each of these would need to be accommodated and/or relocated in accordance with NJTA and Program policies. The existing utilities at Interchange 4 are summarized in **Table 4.19-3**.

Table 4.19-3: Existing Utilities at Interchange 4

Approx. MP	Location	Municipality	County	Utility
34.49A*	NJ Turnpike Interchange 4 over Mainline	Township of Mount Laurel	Burlington	Gas
34.5	Mainline	Township of Mount Laurel	Burlington	Telephone
				Gas
34.8	Mainline	Township of Mount Laurel	Burlington	Sewer
34.9	Mainline	Township of Mount Laurel	Burlington	Water

Source and Notes: *New Jersey Turnpike Interchanges 1 to 4 Capacity Enhancements Program: Preliminary Design Report, Mainline - MP 3.5 to 36.5*. June 1, 2022. Refer to Appendix A and Appendix O of the Preliminary Design Report for Master Plans noting the location of Existing Utilities. *Utilities attached to roadway bridges

4.19.4 Minimization and Mitigation

The NJTA would further examine the potential for utility impacts during Final Design. At that time, the NJTA would coordinate the design work with affected utility operators. Coordination with the owners of the major pipelines and electric transmission lines would occur to identify minimization and mitigation measures. Coordination activities would also include planning to prevent utility service interruptions where possible. The NJTA would comply with utility owner notification requirements when there are potential outages. Utilities requiring relocation, adjustment, or modification would be accounted for in Program schedule and budget to avoid disruptions to customers and to ensure that Program construction can proceed with limited and temporary utility service interruptions.

During Final Design, adjacent overhead electric lines would be evaluated to determine whether potential impacts can be avoided or minimized. Coordination with utility companies for relocation of their facilities would continue during Final Design.

4.20 CONTAMINATED MATERIALS, HAZARDOUS WASTE, AND SOLID WASTE

4.20.1 Methodology and Data Sources

For the purposes of the hazardous materials sites and contaminated properties screening, a study area extending 500 feet from either side of the Turnpike ROW was defined. To determine if there are potential contamination issues within the study area, a review of a database of Federal and state regulatory agency records, aerial photographs, Sanborn fire insurance maps, and historic topographic maps provided by a commercial vendor was undertaken. Information on sites with documented environmental concerns was reviewed and recorded, and each site was located within the study area and mapped. For some active remediation sites, a site representative was contacted, including the NJDEP Licensed Site Remediation Professional (LSRP), where applicable.

A field reconnaissance of the study area was conducted in August 2021 to verify sites identified in the database report. The identified sites were observed to assess the presence of above-ground storage tanks (AST); storage of containers, drums, waste, or debris; staining of pavement or soil; stressed vegetation; and surface indications of underground storage tanks (UST) such as fill pipes or vents. The reconnaissance was conducted from public ROW. The NJ-GeoWeb ArcGIS Online platform was used to identify the presence of historic fill.

In accordance with the NJDEP Site Remediation Program, the identification of potential and confirmed hazardous waste sites that require site remediation for the Turnpike's Program would follow the Linear Construction Technical Guidance (N.J.A.C. 7:26).

4.20.2 Affected Environment

Several sites within the study area have the potential to contain contaminated soils, groundwater, or both. In addition to site-specific concerns, a review of geologic information indicates that potentially high acid-producing (sulfate) soils and sediments likely exist within the study area. These soils are defined as having a pH of 4.0 or less or containing iron sulfide and may require special management or disposal during construction. Acid-producing soils are addressed in detail in Section 4.10 (Soils and Geology) of this EIS.

As indicated in the table titled, Study Area Potential Contaminated Sites (Appendix D), and the figure titled, Contaminated Materials and Hazardous Waste Map (Appendix B), 56 potentially contaminated sites were identified within the study area using the methodology described above, although six of these sites are considered a *de minimis* concern or were previously remediated and closed. The remaining fifty sites have either the potential for soil and/or groundwater contamination or confirmed contamination that could potentially affect Program subsurface construction activities. The 56 sites are discussed below.

Mainline Improvements

Site 10 – Erdner Brothers Inc.

The Erdner Brothers Inc. is a logistics facility located at approximately MP 10.25 of the SN roadway at 31 Davidson Road, in Woolwich Township, Gloucester Township. One case (case 94-10-19-1138-53, PI 004429) was identified as closed. According to the UST Tank Summary, two 10,000-gallon diesel USTs, one 2,000-gallon motor oil UST, one 1,000-gallon unleaded gasoline UST, one 1,000-gallon motor oil UST, and one 1,000-gallon waste oil UST were removed between 1994 and 1995. During the field reconnaissance, several ASTs and a fueling area were observed.

Site 11 – 195 & 201 Monroeville Road

195 & 201 Monroeville Road is vacant land located at approximately MP 11 of the SN roadway at 195 and 201 Monroeville Road in Woolwich Township, Gloucester County. The site is identified with one active case (case 04-10-28-0054-12S DIELDRIN, PI 239017) under LSRP oversight. The site is listed as having known pesticide-contaminated soil since November 1, 2004. During the field reconnaissance, the site was observed from Monroeville Road as to be developed with a residential structure. Forested land obscured the agricultural portion of the site; therefore, AECOM was unable to verify the current use of the land along the Turnpike ROW.

Site 12 – Swedesboro Shell

Swedesboro Shell is a commercial fueling service station located at approximately MP 13 of the SN roadway at 1111 Route 322 in Woolwich Township, Gloucester County. A gas station with a convenience store and a Dunkin Donuts were observed during the field reconnaissance. According to the UST Tank Summary, the site has two 15,000-gallon unleaded gasoline USTs and one 15,000-gallon diesel UST currently in use since November 7, 1996.

This site has one active case (case 98-10-13-0712-52, PI 031704) under LSRP oversight. A leaking UST (ID 031704) was also reported for the site. The case was reported with a known source or identified-potential groundwater contamination.

Site 13 – MP 14.65 Drum and Tires Dump

The MP 14.65 Drums and Tires Dump was observed at approximately MP 14.65 of the SN roadway in East Greenwich Township, Gloucester County. AECOM observed one approximately 300-gallon metal AST, one deteriorated, 55-gallon metal drum, farm equipment, metal debris, and approximately ten tires within a forested area covered with leaf litter. The site is not listed on any searched environmental databases. The source of the dumped waste is unknown. Due to the presence of the leaf litter, the potential presence of surface staining could not be observed. However, no distressed vegetation was observed.

Site 14 – Together Citgo Inc.

Together CITGO is a commercial fueling service station located at approximately MP 21 of the SN roadway at 438 Glassboro Road in Woodbury Heights, Gloucester County. During the field reconnaissance, the site was occupied by Conoco and J.C. Auto Repair. According to the UST Tank Summary, the site has one 12,000-gallon unleaded gasoline UST, one 8,000-gallon diesel fuel UST, one 8,000-gallon unleaded gasoline UST, and four 4,000-gallon unleaded gasoline USTs currently in use since July 1999.

The site has one active case (case 99-07-13-1437-07, PI 033002) under LSRP oversight. Soil contamination was reportedly discovered during the removal of four gasoline USTs. The case is identified as a known source or release with groundwater contamination.

Site 15 – 313 Woodbury Lake Drive

313 Woodbury Lake Drive is a residential property located at approximately MP 21.5 of the NS roadway at 313 Woodbury Lake Drive in Deptford Township, Gloucester County. The site has an active case (case 19-12-06-1127-38, PI 840475). The case is related to a heating oil release, reported at the residence on December 16, 2019. According to NJDEP records, the case is active and awaiting documentation as of June 10, 2021.

Site 16 – Delsea Service Station

Delsea Service Station is a commercial gasoline service station located at approximately MP 22.5 of the SN roadway at 1350 Delsea Drive in Deptford Township, Gloucester County. During the field reconnaissance, the site was observed to be a vacant parking lot with maintained lawn. The site is listed as an active case (case 91-06-24-1636, PI 07339) with a known source or release with groundwater contamination. A 3.78-acre CEA was established for the site for the following contaminants: benzene, MTBE, synthetic organic chemicals, TBA, toluene, and xylene.

Site 17- Byerley Holdings

Byerley Holdings is an industrial building housing a commercial printing facility located at approximately MP 25 of the NS roadway at 400 Benigno Boulevard in Bellmawr, Camden County. The property was observed to be occupied by Hylton Paper Company, Inc. and B.G. Graphic Services, LLC. One active case was reported (case 94-07-06-1703, PI 030058) that was assigned to LSRP oversight. The case is reported with a known source or release with groundwater contamination. During the field reconnaissance, a groundwater treatment system was observed.

Site 18 – Trap Rock Industries Inc.

Trap Rock Industries, Inc. is an asphalt products manufacturing company located at approximately MP 25.75 of the NS roadway at 1201 North Black Horse Pike in Runnemede, Camden County. During site reconnaissance, the site was operated as Interstate Asphalt Products LLC. The property was gated, and the majority of the site was not observed.

Trap Rock Industries, Inc. is identified with two closed cases (case 04-03-06-1334-23 and E20150134, both PI 016277) and two active cases (case E20130005, PI 016277 and E20130005, PI 598850). Case 04-03-06-1334-23 was issued a No Further Action (NFA) letter with unrestricted use on June 2, 2011. Case E20150134 indicated that no contamination was identified, and a waiver was issued on July 29, 2015. Based on the case numbers, the active cases are most likely the same and the double listing is erroneous. The active case is under LSRP oversight and identified with a known source or release with groundwater contamination. Additionally, a third closed case (case E87B29, PI 011775) was reported for Vineland Transit Mix Concrete Co. in the vicinity of Trap Rock Industries Inc. and is presumably a former occupant of the site. Case E87B29 was issued an NFA status on July 29, 1988. Vineland Transit Mix Concrete Co. also reported the removal of one 4,000-gallon diesel fuel UST on October 1,1988. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present on the site.

Site 19 – Beaverbrook Motors Inc.

Beaverbrook Motors Inc. is an automotive services and gasoline service station located at approximately MP 25.8 of the NS roadway at 1253 North Black Horse Pike in Runnemede, Camden County. The site was gated during site reconnaissance; however, a maintenance garage and vehicle and trailer parking were observed from the access road during site reconnaissance.

The site is identified with one active remediation case (case 04-03-06-1334-23, PI 000714) that is under LSRP oversight with a known source or release with groundwater contamination. The case reportedly was related to a release from a UST, reported December 16, 2004. Additionally, an estimated 50 gallons of diesel fuel was released from a towed vehicle and a spill of an oil-like substance was reported from an asphalt truck in August 1992 and May 1997, respectively.

Site 20 – 300 South Black Horse Pike

300 South Black Horse Pike is a Wendy's fast-food restaurant located at approximately MP 25.8 of the SN roadway in Bellmawr, Camden County. The site was previously a fueling service station between 1976 and 1985. The site has one active case (case 20-10-13-1342-01, PI 919920) that is under LSRP oversight and has a known source or release with groundwater contamination. During the field reconnaissance, monitoring wells and two 55-gallon drums labeled non-hazardous purge water and soil were observed. Additionally, an estimated 40 gallons of cooking grease was spilled from a drum in the parking lot that reached a nearby storm drain and fluids leaked from a vehicle that was washed down a storm drain on May 23, 1996, and in July 2001, respectively.

According to Ms. Kristin Heimburger, site LSRP, the site is currently under remedial investigation for a petroleum discharge that was reported to be at very low levels. Ms. Heimburger indicated that off-site contamination is not expected to be a concern, soil remediation is not required, and groundwater remediation is still undetermined. Ms. Heimburger stated that currently the only constituent of concern is total inorganic carbon (TIC).

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present on the site.

Site 21 – North Star Holding

North Star Holding is developed as a Surestay Hotel located at approximately MP 25.9 of the NS roadway at 341 South Black Horse Pike in Bellmawr, Camden County. According to the UST Tank Summary, one 3,000-gallon No. 2 heating oil UST was abandoned in-place on January 9, 2006 and one 4,000-gallon No. 2 heating oil UST was removed on July 21, 2021.

The site is identified with one closed case (case 06-01-10-1053-48, PI 247669) and one active case (case N247669UCL2 10001, PI 247669). Case 06-01-10-1053-48 was issued a Response Action Outcome (RAO) with unrestricted use on September 3, 2014. Case N247669UCL2 10001 indicated that contamination was not found as of August 20, 2021. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present on the southwest corner of the site.

Site 22 – John O'Malley Auto Service LLC

John O'Malley Auto Service LLC is a fueling and service station located at approximately MP 27 of the NS roadway at 700 Clement Bridge Road in Barrington, Camden County. During the field reconnaissance, the site was operated as John's Citgo. According to the UST Tank Summary, there are three 10,000-gallon USTs in use at the site since July 15,1988 and one 10,000-gallon diesel fuel UST in use since January 1, 1968. One 5000-gallon waste oil UST was removed on June 10, 2002.

One active case (case 05-04-13-1301-10, PI 000030) with a known source or release with groundwater contamination occurs at the site. The case is under LSRP oversight. According to the environmental database, this site has had petroleum discharges from on-site UST systems that have contaminated soil and/or groundwater. A leaking UST (ID 0000307) was reported on June 10, 2002. A second release was reported in the vicinity of a UST on April 13, 2005, and an additional leaking UST was reported on August 8, 2005.

Site 23 – Bright Lights USA

Bright Lights USA is an industrial equipment supplier located at approximately MP 27.25 of the NS roadway at 141 Shreve Avenue in Barrington, Camden County. During the field reconnaissance, the site was operated as DelRen HVAC, Inc. One active case (case E2019179471, PI 836891) is under LSRP oversight. The case indicates that there was no contamination found on April 6, 2020.

Site 24 – 1 Commerce Drive Holdings @ Barrington

1 Commerce Drive Holdings @ Barrington is an industrial building in an office park located at approximately MP 27.5 of the SN roadway at 1 Commerce Drive in Barrington, Camden County. During field reconnaissance, the site was developed as the Barrington Business Center and was occupied by FedEx, BBC/PAE Logistics, AAHobbies, Chep, and Camden International.

The site is identified as 1 Commerce Drive Holdings @ Barrington under PI 606480 with two closed cases (cases 06-11-7-1037-39 and E20160049) and four active cases (cases 13-04-25-1222-26, E2017166197, E2019175338, and E2021185293). Case 06-11-7-1037-39 was issued an NFA with unrestricted use in 2009 and case E20160049 was issued an exempt finding in 2016. The nature of contamination for cases E2017166197 and E2019175338 is not yet determined. Case E2017166197 is also listed under Barrington Business Center, PI 767891. Contamination was not found for case E2021185293. Case 13-04-25-1222-26 is identified with a known source or release with groundwater contamination. A 0.87-acre Groundwater Classification Exemption Area (CEA) was established on July 6, 2020, for this case for benzene, pentachlorophenol, tetrachloroethylene, and trichloroethylene. The CEA is beneath the site parking lot located along the western side of the property.

The site is also identified as Owens Corning Fiberglas Corp, under PI 010212, with two closed cases (cases E93563 and 89-01-13-0833) both issued NFAs with unrestricted use in 1998 and 1992, respectively.

Site 25 – First Transit Inc. # 55812

First Transit Inc. is a freight company located at approximately MP 27.75 of the SN roadway in Lawnside, Camden County. According to the UST Tank Summary, one 300-gallon waste oil UST was reported as exempt. One 1,500-gallon waste oil UST was abandoned in-place. Twelve other USTs were removed from the site.

Three closed cases (cases 98-09-23-1546-51, N00-0854, and 07-08-20-1052-02, all PI 004023) and one active case (case 20-05-13-1359-38, PI 004023) were reported for the site. The closed cases were issued NFAs or an RAO with unrestricted use. Case 20-05-13-1359-38 is under LSRP oversight, and the remedial level is not yet determined. According to the environmental database, release of waste oil was reported on March 30, 1979. Two releases, totaling an estimated 95 gallons of diesel fuel, were reported on March 6, 1987 and March 11, 1987. Both releases reached a nearby storm drain. Soil contamination was reported during the removal of four USTs on September 23, 1998. An NFA letter was issued on May 27, 1999. A motor vehicle accident occurred in the vicinity of the site that resulted in a release on April 2, 2002. A release of 90 gallons of diesel fuel from ASTs on-site occurred on October 30, 2013, which contaminated the surrounding soil. A release was reported on May 4, 2020, from an UST. This case has since been closed with no contamination identified.

Site 26 – First Student Inc. # 11840

First Student, Inc. is a busing company located at approximately MP 27.75 of the NS roadway at 270 Gloucester Pike in Lawnside, Camden County.

During the field reconnaissance, a maintenance building, fueling station, and school bus parking were observed. According to the UST Tank Summary, one 12,000-gallon diesel fuel UST and one 6,000-gallon unleaded gasoline UST are currently in use at the site. One 10,000-gallon diesel fuel UST, one 6,000-gallon unleaded gasoline UST, one 1,000-gallon unleaded gasoline UST, and one 275-gallon waste oil UST were removed from the site on August 17, 1993.

One closed case (case 93-08-17-1040, PI 010833) was issued an NFA with limited restricted use on May 2, 2012. Another case (case 19-11-20-1526-00, PI 010833) was issued an RAO with unrestricted use on December 1, 2020. One case (case 96-06-13-1610-20, PI 010833) is reported as pending, with contamination undetermined. A 0.16-acre CEA was established for an on-site tetrachloroethylene plume. According to the environmental database, this site has reported multiple releases from leaking gasoline USTs in 1992 and 1996. An additional release of 30 gallons of motor oil was reported on August 8, 1994, when a hose disconnected from a wall-mounted hose reel. It was also reported that remediation had been completed. On October 16, 2020, a release in the equipment maintenance area of the site was reported.

Site 27 – Clean Machine Dry Cleaning & Laundromat

Clean Machine Dry Cleaning & Laundromat was a former dry cleaner located at approximately MP 27.75 of the NS roadway at 200 North White Horse Pike in Lawnside, Camden County. During the field reconnaissance, the site was observed to be a strip mall. The site is presumed to be currently occupied by the Oriental Palace restaurant. One closed case (no case number, PI G000039347) was reported and was issued an NFA with limited restricted use on January 28, 2003. A 0.87-acre CEA was established for an on-site tetrachloroethylene plume.

Site 28 – Transcontinental Gas Pipeline Lawnside M&R

Transcontinental Gas Pipeline Lawnside M&R is a gas pipeline located at approximately MP 27.75 on the NS roadway in Lawnside, Camden County. One closed case (case 01-07-12-0032-04, PI 586624) was issued an RAO with unrestricted use. Based on the current regulatory status, this site is not expected to have environmentally impacted the Program ROW.

Site 29 – Lawnside Lukoil Service Station

Lawnside Lukoil Service Station is a defunct fueling station located at approximately MP 27.9 of the NS roadway at 100 White Horse Pike in Lawnside, Camden County. According to the UST Tank Summary, two 8,000-gallon mixture USTs, one 8,000-gallon unleaded gasoline UST, and one 8,000-gallon diesel fuel UST were removed from the site on August 21, 2017.

One closed case (case 88-12-09-1332, PI 001728) and one active case (UCL170001/17-09-29-1624-08, PI 001728) are reported at the site. Case 88-12-09-1332 was issued an RAO with limited restricted use. A 1.01-acre CEA was established for benzene, ethylbenzene, MTBE, synthetic organic chemicals, TBA, and xylenes. Case UCL170001/17-09-29-1624-08 is identified with a soil contamination that is under LSRP oversight.

Site 30 – Valero

Valero is a fueling station located at approximately MP 27.9 of the NS roadway at 111 White Horse Pike in Lawnside, Camden County. The site was historically operated as a G5 Fuel Service Inc. According to the UST Tank Summary, two 12,000-gallon unleaded gasoline UST and one 12,000-gallon diesel fuel UST are currently in use. One closed case (case 04-10-31-1109-29, PI 023164) is reported at the site. The case was issued an NFA with unrestricted use on May 12, 2021. Based on the current regulatory status, this site is not expected to have environmentally impacted the Program ROW.

Site 31 – 31 East Oak Avenue

31 East Oak Avenue is a residential property located at approximately MP 28.5 of the SN roadway at 31 East Oak Avenue in Lawnside, Camden County. A spill was reported at the site on April 30, 2013. A known source or release with groundwater contamination was reported (case 13-04-30-1227-37, PI 608614) on May 30, 2013. The case involves an unregistered heating oil tank. No obvious signs of contamination or remediation were observed during the field reconnaissance.

Site 32 – Ryder Truck Rental # 0144

Ryder Truck Rental #0144 is a vacant property located at approximately MP 29.7 of the NS roadway at 1401 Haddonfield-Berlin Road in Cherry Hill Township, Camden County. During the field reconnaissance, fueling and vehicle maintenance was observed. According to the UST Tank Summary, one 20,000-gallon diesel fuel UST, one 12,000-gallon unleaded gasoline UST, one 4,000-gallon motor oil UST, one 3,000-gallon waste oil, one 1,000-gallon waste oil UST, one 1,000-gallon lubricating oil UST, one 1,000-gallon lubricating oil UST, two 1,000-gallon industrial wastewater USTs, and one 600-gallon lubricating oil UST are currently in use at the site.

In addition, eight USTs were removed from the site in 1993. Additionally, one 8,000-gallon heating oil UST was reported as removed at this address but identified as Melitta Inc. (adjoining property to the east). One closed case (case 93-01-18-1408, PI 005036) was reported and issued an RAO with unrestricted use on May 10, 2016.

Site 33 – Victory Refrigeration Co.

Victory Refrigeration Co. is a vacant property located at approximately MP 29.7 of the SN roadway at 110 Woodcrest Road in Cherry Hill Township, Camden County. During the field reconnaissance, the site was under construction to be used as an apartment complex. Five closed cases (cases E85715, E89412, E96530, E99384, E20140295) and one active case

(case 21-01-28-1510-27) are reported for the site under PI G000013168. The closed cases were issued NFAs in 1987, 1990, 1996, and 1999 and an RAO in 2015, all with unrestricted use. The active case was initiated on January 27, 2021, is under LSRP oversight, and identified as soil contamination only.

Site 34 – MAIA Properties Inc.

MAIA Properties, Inc. is a fueling station at approximately MP 29.8 of the NS roadway at 1498 Haddonfield-Berlin Road in Cherry Hill Township, Camden County. During field reconnaissance, the site was occupied by both a Lukoil for fueling and a Food Mart convenience store. According to the UST Tank Summary, one 15,000-gallon unleaded gasoline UST, one 7,000-gallon unleaded gasoline UST, and one 5,000-gallon diesel fuel UST were reported as in use at the site since December 21, 2018. Five USTs were previously removed from the site in 1992 and 2018.

One closed case (case UCL180001, PI 006249) was reported and issued an RAO with unrestricted use on July 29, 2020. One active case (case 87-12-24-0300, PI 006249) was reported with a known source or release with groundwater contamination on April 29, 1992. A 0.86-acre CEA was established on February 27, 2002, for BTEX, MTBE, and TBA.

The environmental database indicated the site reported a release of gasoline and diesel fuel from USTs on October 25 and 31, 1990. The tank and surrounding soil were removed. Two gallons of gasoline were released on June 27, 1995, when a filter was replaced. A failure of a 10,000-gallon UST occurred during testing in August 1997. The tank was emptied and repaired. A release was reported on March 23, 1999, due to a faulty flex connector at a turbine pump. The release was contained in the sump. A release was reported on May 26, 2000, that reached the Cooper River, contaminating the nearby soil and water. A spill was reported from two service pumps on October 6, 2011. A release was reported at the site on June 11, 2020.

Mr. John Mateo, site LSRP, indicated that a remedial investigation was conducted which resulted in active remediation of the site. A monitored natural attenuation (MNA) technique was instituted to monitor and control the groundwater contamination on-site which extends west across Haddonfield-Berlin Road.

Site 35 – Cherry Hill Public Works

Cherry Hill Public Works is a maintenance facility located at approximately MP 31.7 of the SN roadway at 1 Perina Boulevard in Cherry Hill Township, Camden County. According to the UST Tank Summary, five USTs were removed from the site in 1989 and 1992.

Two closed cases (case 95-09-27-0849-23 and 93-01-21-1153), one administratively closed case (case 07-12-21-1155-48S), and one active case (case 21-04-09-1344-59) are reported for the site under PI 005287. The closed cases were issued an RAO in 2016 and an NFA in 1993 with unrestricted use, respectively. The active case is under LSRP oversight and reported as only soil contamination.

The environmental database indicated that a leaking UST was reported on July 19, 1989 and January 21, 1993. An NFA was issued for the incident on November 22, 1993. One 10,000-gallon gasoline UST and one 6,000-gallon diesel fuel UST were removed in 1995. Contamination was identified and remediated. A release of five gallons of gasoline was reported during the overfilling of a vehicle from an aboveground storage tank on June 5, 1996. It was reported and clean-up was completed. A release was reported that occurred at the rear of the Cherry Hill Public Works yard on December 21, 2007. A release of sewage was reported on-site on August 27, 2011. A release was reported on March 23, 2019, due to improper disposal/storage on-site.

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present along the northwest boundary and center of the site.

Site 36 – SourceOne Healthcare Tech, Inc.

SourceOne Healthcare Tech, Inc. is a commercial property located at approximately MP 32.9 of the SN roadway at 4 Esterbrook Lane in Cherry Hill Township, Camden County. During field reconnaissance, the site was occupied by Riggs Distler & Company, a general contractor. The site is identified under PI 10257 and PI 57895. Four closed cases (cases E20010271, E20010390, E20020366, and E97564) and one active case (case E20040557) are reported for the site under PI 10257 and PI 57895. The closed cases were issued NFAs with unrestricted use in 1998, 2001, 2002. The active case is under LSRP oversight and is identified with a known source or release with groundwater contamination. A 0.92-acre CEA was established on February 7, 2021 for ammonia, arsenic, benzene, cadmium, chromium, lead, nickel, and nitrate. According to the UST Tank Summary, one wash water UST was removed from the site in 1990; the UST capacity was not listed.

According to the environmental database, soil and groundwater samples were taken near an 11,000-gallon UST on March 2, 1998. The samples indicated soil and groundwater contamination. The site is listed as brownfield site 5198 with groundwater contamination established since December 22, 2004. The site has been enrolled in the Brownfields Voluntary Clean-up Program (VCP) since May 31, 2007.

Ms. Kristin Heimburger, site LSRP, indicated that the site is currently in the remedial action work plan phase of remedial investigation for a release of ammonia thiosulfate in the early 2000s. An ecological evaluation is being conducted for copper. No other soil issues are under investigation. It was also reported that the confirmed groundwater contamination is contained on-site.

Site 37 – Gandalf Systems Corp.

Gandalf Systems Corp. is an industrial facility located at approximately MP 33.25 of the SN roadway at 9 North Olney Avenue in Cherry Hill Township, Camden County. During field reconnaissance, the facility was occupied by Hikma, a pharmaceutical company. The site is identified under PI 012141, PI 023343, PI 579599, and PI 800482. One closed case (cases E91327, PI 023343) and four active cases (cases E2018173350, E2021188435, E91326/E92082, and Equivest Management, PI 023343 and 800482) are reported for the site.

Case E91327 was issued an NFA in 1991. Cases E91326/E92082, Equivest Management, and E2018173350 were reported with a known source or release with groundwater contamination. Contamination was not yet determined at Case E2021188435.

PI 023252 reports that one 2,000-gallon "other" UST was abandoned in-place in 1972 and one 3,000-gallon heating oil UST is identified as "other." It is not clear if the heating oil UST is still at the site. Four USTs were removed in 1995 and reported under PI 023343.

Site 38 – Cherry Hill Industrial Park Buildings 5 and 6

Cherry Hill Industrial Park Buildings 5 and 6 are adjoining industrial buildings located at approximately MP 33.3 of the SN roadway at 4 Olney Avenue North (now known as 2080 Springdale Road) in Cherry Hill Township, Camden County. Two closed cases (cases 97-09-16-1227-04 and 98-4-15-1325-07) and one active case (case 17-12-18-1148-24) are reported for the site under PI 031944. Case 97-09-16-1227-04 was issued an NFA with unrestricted use in 2010. Case 98-4-15-1325-07 was issued an NFA with limited restrictive use in 2001. Case 17-12-18-1148-24 is under LSRP oversight and identified with a known source or release with groundwater contamination. A 1.01-acre CEA was established on October 15, 2020, for benzene, MTBE, and tetrachloroethylene.

Mr. Richard Werner, site LSRP, indicated that the sources of tetrachloroethylene were identified within the site building and remediation via excavation and *in situ* chemical oxidation. Residual groundwater contamination remains within the site. It was reported that tetrachloroethylene concentrations are less than 2.0 micrograms per litre (µg/L). Groundwater flow direction is east towards Springdale Road.

Site 39 – 2090 Springdale Road

2090 Springdale Road is a commercial property, part of Cherry Hill Industrial Park, located at approximately MP 33.4 of the SN roadway at 2090 Springdale Road in Cherry Hill Township, Camden County. During field reconnaissance, the site was occupied by Millennium Surgical Center. Three unlabelled 55-gallon drums were observed northeast of the parking lot on the site. One active case (case 98-04-17-16-0454, PI 217008) is under LSRP oversight and identified with a known source or release with groundwater contamination. According to the environmental database, the site was assigned as a brownfield site (site 5253) on December 4, 2003, for known contamination of groundwater. A release was reported at the site on January 3, 2020.

Site 40 – Republic Services of NJ LLC

Republic Services of NJ LLC is a solid waste collection facility located at approximately MP 34 of the SN roadway in Mount Laurel Township, Burlington County. According to the UST Tank Summary, one 10,000-gallon diesel fuel UST is currently in use. One 4,000-gallon diesel fuel UST and one 1,000-gallon waste oil UST were listed as abandoned in-place. Four USTs were removed from the site in 1991 and 1995.

One closed case (no case number) and one active case (case 91-12-17-1220) were reported for the site under PI 012541. The closed case was issued an NFA for unrestricted use in 1992. The active case indicated that only soil contamination exists and that the remediation is considered Post NFA Monitoring.

A 4,000-gallon diesel fuel UST was removed on December 17, 1991, that revealed soil contamination. An NFA was issued on December 19, 1992. On April 10, 1996, a drum of naphthalene distillates fell off a truck resulting in the release of one-half gallon of distillates. The affected area was reportedly managed by Safety Kleen. Engineering controls have been instituted for the site since October 29, 2003. Radioactive material was released on-site in November and December 2004. The source and the extent of the impact were not reported. A release was reported at the site on June 22, 2016.

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present along the northwest boundary of the site.

Site 41 – PBP Enterprises, Inc.

PBP Enterprises, Inc. is a commercial property located at approximately MP 34 of the SN roadway in Mount Laurel Township, Burlington County. This site appeared to be related to the adjoining Republic Services of NJ LLC. One closed case and one active case (no case numbers for either) for PI G000033414. The closed case was issued an NFA with restricted use in 2003.

The active case indicated that the remediation of a multi-phase RA with unknown or uncontrolled discharge to soil or groundwater was complete and the entire site had restricted use. A 1.29-acre deed restriction was established for the site for benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[g,h,i]perylene, benzo[k]fluoranthene, ideno[1,2,3-cd]pyrene, dibenzo[a,h]anthracene, chrysene, and carcinogenic polycyclic aromatic hydrocarbons (CaPAH).

According to the environmental database, the site is designated as restricted use for a discharge to soil or groundwater that occurred on February 9, 1998. Engineering controls are in-place in the form of an asphalt cap across the entire property. This site is designated as brownfield site 4997 since December 18, 2003. Institutional controls consist of biennial certification.

Site 42 – Lukoil Station #5770

Lukoil Station #5770 is a commercial gasoline service station located at approximately MP 34.5 of the NS roadway at 921 Fellowship Road (NJ-73) in Mount Laurel Township, Burlington County. According to the UST Tank Summary, two 12,000-gallon unleaded gasoline USTs, one 8,000-gallon unleaded gasoline, and one 8,000-gallon diesel fuel UST are currently in use since August 1, 1997. Four USTs were removed from the site in 1997.

One closed case (case 93-09-17-1213, PI 007208) was issued an NFA with unrestricted use in 1995. One active case (case 92-04-14-1319, PI 007208) was reported as under LSRP oversight and with a known source or release with groundwater contamination. Two CEAs were established: one on March 4, 2014; and one on January 25, 2006; for benzene, MTBE, TBA, and toluene.

According to the environmental database, a release occurred due to a faulty automatic shutoff valve on a pump nozzle on May 4, 1999. Remediation was conducted and a nearby storm drain was tested. A release was reported on January 18, 2000 that contaminated soil and groundwater. A second release was reported on May 3, 2000 that contaminated soil on the property. The site has had leaking USTs from 2006 to 2009 and one reported in 2012.

Site 43 – Greyhound Bus Terminal

Greyhound Bus Terminal is a commercial bus station located at approximately MP 34.5 of the NS roadway at 538 Fellowship Road in Mount Laurel Township, Burlington County. One active case (case 00-02-08-1234-29, PI G000042244) was reported for the site. The case is reported as under LSRP oversight and with a known source or release with groundwater contamination.

According to the environmental database, a release was reported that contaminated on-site soil on February 8, 2000. The site is identified as brownfield site 5003 with known groundwater contamination. The site was assigned to the program on November 30, 2000. Another release was reported on July 21, 2007 in the parking lot of the site. Unknown soil and groundwater contamination were reported for the site on June 11, 2019. Rakesh Ganta, site LSRP, reported that a remedial investigation was conducted for the site and submitted to the NJDEP.

Site 44 – American Biltrite Rubber Co.

American Biltrite Rubber Co. was a commercial plastics manufacturer located at approximately MP 35.4 of the NS roadway at 106 Gaither Drive in Mount Laurel Township, Burlington County. During the field reconnaissance, the site was occupied by Inventek, a chemical manufacturer. Empty drums, totes, and ASTs were observed southeast of the site building.

The site is listed on the Site Remediation Program (SRP) under Plastic Suppliers Inc. (PI 001898) and Inventek (PI 761555). Four closed cases (cases E20100267, E84262, E89910, and E20170345) and one active case (case E2021187276) are reported for PI 001898. Case E20170345 is also identified under PI 761555. Case E20100267 was determined to be exempt from ISRA in 2010. Case E84262 and case E89910 were issued NFAs in 1984 and 1990, respectively. Case E20170345 was issued an RAO with unrestricted use in 2018. Case E2021187276 is under LSRP oversight and contamination is yet undetermined. According to the UST Tank Summary, one 10,000-gallon heating oil UST was removed from the site in 1982.

According to the environmental database, a release of suspected petroleum was reported coming from an unknown source in the facility floor on February 5, 1998. A citizen reported the release had been ongoing for a week. A remedial investigation was conducted for the site on June 15, 2021.

Site 45 – Sunoco 0012-2697

Sunoco 0012-2697 is a defunct commercial fueling service station located at approximately MP 35.5 of the SN roadway at 712 South Church Street in Mount Laurel Township, Burlington County. According to the UST Tank Summary, one 20,000-gallon unleaded gasoline UST, one 12,000-gallon diesel fuel UST, and one 8,000-gallon unleaded gasoline UST are identified as out-of-service since April 7, 2020. Six UST were reported as removed from the site in 1989 and 2016.

Two closed cases (cases 92-12-10-1003 and N16-06800) and one active case (case 21-02-18-1111-35) are reported for the site under PI 016424. Case 92-12-10-10032 was issued an RAO with limited restricted use in 2015. Case N16-06800 was issued an RAO with unrestricted use in 2018. Case 21-02-18-1111-35 is under LSRP oversight with a known source or release with groundwater contamination.

According to the environmental database, soil contamination was reported on August 23, 2007. It was noted that the release date occurred on December 10, 2001. Leaking USTs have been reported for the site from 2006 to 2010 and 2012. Institutional controls have been established for benzene and ethylbenzene since October 17, 2014. A release was reported on February 18, 2021 which resulted in soil contamination.

Site 46 – Colonial Pipeline Co.

Colonial Pipeline Co. is a commercial petroleum transporter located at approximately MP 35.8 of the SN roadway in Mount Laurel Township, Burlington County. Two active cases (cases 03-06-10-1748-43 and E20150342) are reported for the site under PI 196506. Case 03-06-10-1748-43 is under LSRP oversight with a known source or release with groundwater contamination. Case E20150342 is under LSRP oversight and is reported with multiple sources with release to multimedia including groundwater. A 6.01-acre CEA was established on June 4, 2019 for BTEX, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, methylnaphthalene (2-), MTBE, naphthalene, synthetic organic chemicals, and TBA.

According to the environmental database, a Colonial Pipeline employee recognized stressed vegetation around the tank farm dike on June 10, 2003. Approximately 236 barrels of product were released from a failed AST. It was determined the failure occurred at a weld where the floor plate met the sump. It was reported that all 236 barrels of product were recovered. The AST was repaired and returned to service on November 15, 2005. The site was identified as brownfield site 4984 for known groundwater contamination. The site was assigned to the program on August 26, 2003. The site was also enrolled in the VCP program in August 2003. Multiple releases were reported on September 14, 2007, December 8, 2008, and on April 27, 2019.

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present along the northwest boundary of the site.

Site 49 – Historic Fill

No structures were observed within the Turnpike ROW during the field reconnaissance. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present along the Turnpike.

Site 50 – Friends of Israel Gospel Ministry Inc.

The Friends of Israel Gospel Ministry Inc. is a religious organization located at approximately MP 24.25 of the NS roadway at 1179 Almonesson Road in Deptford Township, Gloucester County. One case (case N98-0740, PI 009383) was identified for soil contamination. The case was issued an NFA with unrestricted use on August 12, 1999. According to the UST Tank Summary, one 3,000-gallon heating oil UST was removed on October 19, 1998; and one 1,000-gallon UST, one 550-gallon diesel UST, and one 300-gallon heating oil UST were removed on January 7, 1994.

Site 51 –Bellmawr Landfill Redevelopment

The Bellmawr Landfill Redevelopment is a former landfill located at approximately MP 24.5 of the NS roadway in Deptford Township, Gloucester County. The site has one active case (case 050728011232) that is under LSRP oversight and has unknown or uncontrolled discharges to soil or groundwater. A deed notice has been recorded for the site. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present.

Site 54 – Clara Barton Service Area 1S

Clara Barton service area 1S is a commercial travel plaza and fueling station located at approximately MP 5.4 of the NS roadway in Oldmans Township, Salem County. According to the UST Tank Summary, five 10,000-gallon unleaded gasoline USTs and one 10,000-gallon diesel UST are in service at the site. Four USTs were removed from the site.

Two closed cases (cases 91-07-15-1103 and N01-0543) and two active cases (cases 18-09-17-1502-50 and 92-02-19-1546) were reported for the site under PI 013307. The closed cases were issued NFA status with unrestricted use in 2006 and 2002, respectively. The active cases are reported as under LSRP oversight with a known source or release with groundwater contamination. A 13.9-acre CEA was established for the site on February 26, 2004, for BTEX, MTBE, naphthalene, synthetic organic chemicals and TBA.

A Remedial Action Progress Report, prepared by First Environment, dated August 2020, identified eight AOCs:

- AOC-1: Three former gasoline USTs and related subsurface piping located on the northwest side of fuel dispensers (Remedial Action Activities On-going);
- AOC-2: Current and former gasoline and diesel USTs and associated piping located on the south side of fuel dispensers (Remedial Action Activities On-going),
- AOC-3: Drainage Ditch (No Further Investigation Recommended),
- AOC-4: Former 5,000-gallon heating oil UST (F-7) (NFA Issued June 4, 2002),
- AOC-5: Former 550-gallon waste oil UST (E-8) (NFA Issued December 9, 1994),
- AOC-6: Former 6,000-gallon heating oil UST (E-17) (NFA Issued April 22, 2002),
- AOC-7: Wastewater Treatment Plant: Former 300-gallon leaded gasoline UST (E-10) (NFA Issued August 3, 2006); and,
- AOC-8: Wastewater Treatment Plant: Former 1,000-gallon heating oil UST (E-9) (NFA Issued August 3, 2006).

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present at the site.

Site 55 – John Fenwick Service Area 1N, Sunoco 0368-294

John Fenwick service area 1N is a commercial travel plaza and fueling station located at approximately MP 5.4 of the SN roadway in Oldmans Township, Salem County. According to the UST Tank Summary, five 10,000-gallon unleaded gasoline USTs and one 10,000-gallon diesel UST are in service at the site. Eight USTs were removed from the site. One closed case (case N01-0570) and two active cases (cases 92-02-19-1551 and 18-09-17-1454-28) were reported for the site under PI 013308. The closed case was issued NFA status with unrestricted use in 2002. The active cases are reported as under LSRP oversight with a known source or release with groundwater contamination. A 21.66-acre CEA was established for the site on November 24, 1996, for BTEX, lead, MTBE, and TBA.

A Remedial Action Progress Report, prepared by First Environment, dated August 2020, identified three AOCs:

- AOC-1: Former gasoline/diesel UST systems (Remedial Action Required),
- AOC-2: Former 6,000-gallon heating oil UST (NFA Issued April 29, 2002); and,
- AOC-3: Former 550-gallon waste oil UST (NFA Issued November 25, 1996).

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present.

Site 56 – Walt Whitman Service Area 3S

Walt Whitman service area 3S is a commercial travel plaza and fueling service station located at MP 30.2 of the NS roadway in Cherry Hill Township, Camden County. According to the UST Tank Summary, five 10,000-gallon unleaded gasoline USTs and one 10,000-gallon diesel UST are in service at the site. Three USTs were removed from the site. Two closed cases (cases C92-2263 and 18-10-12-1043-55) and two active cases (cases 05-05-13-1002-05 and 86-05-28-0300) were reported for the site under PI 013305. The closed case was issued NFA and RAO status with unrestricted use in 2002 and 2021. The active cases are reported as under LSRP oversight and are either undetermined or with a known source or release with groundwater contamination. An 8.19--acre CEA was established for the site on April 26, 2015, for BTEX, lead, methylnaphthalene (2-), MTBE, and TBA.

A Remedial Action Progress Report, prepared by First Environment, dated September 2020, identified ten AOCs:

- AOC-1: Historical observation of petroleum in Tindale Run (1980s) (No further investigation recommended),
- AOC-2: Former 1,000-gallon No. 2 fuel oil UST (No further investigation recommended),
- AOC-3: Former 10,000-gallon No. 2 fuel oil UST (No further investigation recommended),
- AOC-4: Former 550-gallon waste oil UST (NFA Issued August 27, 1993),
- AOC-5: Concrete pad/suspected former heating oil UST (No further investigation recommended),
- AOC-6: Basement sump/potential Vapor Intrusion (VI) pathway (Addressed as part of AOC-10),
- AOC-7: Three former 10,000-gallon gasoline USTs (Remedial Action Required),
- AOC-8: Former underground product piping (No further investigation recommended),
- AOC-9: Active gasoline and diesel USTs (No further investigation recommended); and,
- AOC-10: Site-wide groundwater (Remedial Action Required).

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present.

Interchange 2

Site 48 – Interchange 2

Interchange 2 is located at approximately MP 13 of the NS roadway in Woolwich Township, Gloucester County. A toll booth structure, office building, electric equipment shed, and backup generator were observed at Interchange 2 during the site reconnaissance. According to the UST Tank Summary, one 3,000-gallon heating oil UST and one 290-gallon diesel UST were removed from Interchange 2 on July 9, 1997 and November 1, 1995, respectively. Mr. Christopher Rossi, NJTA Senior Environmental Manager, confirmed that there are currently no USTs at Interchange 2.

According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present at Interchange 2.

Interchange 3

Site 52 – Interchange 3

Interchange 3 is located at approximately MP 26.1 of the NS roadway in Runnemede, Camden County. A toll booth structure, office building, electric equipment shed, and backup generator were observed at Interchange 3 during the site reconnaissance. In addition, a public notification sign indicating “Environmental Investigation/Cleanup in Progress at This Site” (PI 013173, posted August 24, 2009), groundwater monitoring wells, and one 55-gallon drum of purge water labelled as non-hazardous waste were observed.

Two cases were reported for Interchange 3: one closed case (case 95-10-31-1443-20, PI 013173) with an NFA of unrestricted use on August 12, 1996 and one active (case 97-7-14-1618-53, PI 013173) under LSRP oversight since May 8, 2012. A Deed Notice and CEA were submitted to NJDEP for the active case in March 2020 and December 2020, respectively. Indane and 1-methlynaphthalene were present in groundwater at Interchange 3 at concentrations exceeding NJDEP Groundwater Quality Standards (GWQS). The deed restricted and CEA areas are both located west of the toll plaza.

According to the UST Tank Summary, one 3,000-gallon heating oil UST and one 290-gallon diesel UST were removed from Interchange 3 on July 14, 1997 and October 31, 1995, respectively. Mr. Christopher Rossi, NJTA Senior Environmental Manager, confirmed that there currently are no USTs at Interchange 3. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present at Interchange 3.

Interchange 4

Site 53 – Interchange 4

Interchange 4 is located at approximately MP 34.5 of the NS roadway in Runnemede, Camden County. A toll booth structure, office building, electric equipment shed, and backup generator were observed at Interchange 4 during the site reconnaissance. According to the UST Tank Summary, one 3,000-gallon heating oil UST and one 290-gallon diesel UST were removed from

Interchange 4 on July 16, 1997 and November 30, 1995, respectively. Mr. Christopher Rossi, NJTA Senior Environmental Manager, confirmed that there currently are no USTs at Interchange 4. According to the NJ-GeoWeb ArcGIS Online platform, historic fill is present at Interchange 4.

4.20.3 Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, the Program would have no direct or indirect impacts to contaminated materials, hazardous waste, or solid waste. Projects in the No-Build Alternative have the potential to impact sites with contaminated materials or hazardous waste, and to be new sources for solid waste; the sponsors of those projects would be required to comply with applicable regulations regarding these resources.

Initially Preferred Alternative

The majority of known contaminated sites are beyond the Program area of disturbance, but several would be impacted by Program construction activities. As the Program involves improvements to an existing highway that extends for 33 miles, the NJTA would comply with the Linear Construction Project regulations and criteria outlined in the New Jersey Linear Construction Guidance (N.J.A.C. 7:26C).

Several of the contaminated sites are suspected or confirmed historic fill. Historic fill contains construction debris, dredge spoils, incinerator residue, fly ash materials and other similar materials that often contain concentrations of contaminants above New Jersey soil remediation standards. These suspected or confirmed sites are typically treated as contaminated sites and mitigated accordingly. However, historic fill may also be reused in other areas of the Program that also contain historic fill as backfill in trenches or as fill to raise grades; provided it is placed beneath an appropriate cap (i.e., clean soil, asphalt, or concrete). Excess historic fill that cannot be reused within the Program area would be properly disposed off-site.

With many sites having confirmed contamination, the NJTA would diligently work to avoid disturbing these sites during Final Design. There are five known contaminated sites within the Program area that have the potential to be disturbed as part of Program construction activities. Where reasonably feasible, subsurface construction activities would avoid these sites to prevent further contamination. In addition, care would be taken to avoid disturbing active USTs.

Soil contamination may warrant replacement of soils in certain contaminated sites where Program excavation occurs. In compliance with N.J.A.C. 7:26E, stockpiled contaminated material intended for off-site disposal would be removed and replaced from the site as soon as possible, but no longer than 180 days, pursuant to applicable solid waste requirements, and no longer than 90 days for material characterized as hazardous waste.

As part of Final Design, the NJTA would develop and implement Health and Safety Plans and Material Management Plans for use during the construction and operation phases of the Program. These plans would establish protocols for working in areas where potential or known contaminated materials and hazardous waste exist.

4.20.4 Minimization and Mitigation

During Final Design, further investigations of known sites that would be impacted by the Program would be conducted as required by state regulations and NJTA protocols. The results of these investigations could lead to specific minimization and mitigation measures that would become part of the construction and operational plans for the Program.

If Program construction activity encounters previously unidentified contaminated materials or hazardous waste, the NJTA and its contractors would implement the Health and Safety Plans and Material Management Plans, which would prescribe the minimization and mitigation measures to be taken to protect the safety of workers and the general public.

4.21 SUSTAINABILITY AND RESILIENCY

4.21.1 Sustainability

Introduction

As defined by the USEPA, “Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations.” Federal and state policies and regulations pursue sustainability utilizing a broad spectrum of environmental, social, and economic principles.

The purpose of this assessment of sustainability is to examine and document the goals of the Program and how they align with the environmental, social, and economic principles of sustainability. This is accomplished by examining the Program through its treatment of sustainability principles such as environmental protection, safety, mobility, community cohesion, and asset management. This is an important step in the Program planning process in that it seeks to encourage increased stakeholder participation, allows for the tracking and assessing of progress, and evaluates current best practices while also meeting Federal and state policies and regulations.

Although funding for the Program would be financed through the sale of revenue bonds, the NJTA understands the importance of sustainability goals outlined in various Federal and state policies and regulations and voluntarily strives to incorporate sustainability measures into the Program design.

Methodology and Data Sources

This assessment of sustainability draws from existing research and inventories previously developed for the *New Jersey Turnpike Interchanges 1 to 4 Capacity Improvements, Preliminary Design Report Mainline – MP 3.5 to 36.5* (NJTA, 2022).

The following qualitative assessment reviews applicable existing Federal, state, and local sustainability policies and regulations. Then, the Program is evaluated to identify how the NJTA and the Program would achieve those policies and regulations.

Affected Environment

The following sections outline the Federal and state policies and regulations that are applicable to the Program.

Infrastructure Investment and Jobs Act (Public Law 117-58)

The Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law") was signed into law by President Biden on November 15, 2021. This law provides a long-term Federal infrastructure investment framework that will provide $550 billion over the fiscal years 2022 through 2026 for infrastructure, including bridges, roadways, mass transit, water, resilience, and broadband. The Federal government will invest $350 billion from 2022 through 2026 on highway projects alone. The Bipartisan Infrastructure Law will create more than a dozen new highway programs that will focus on "rehabilitating bridges in critical need of repair, reducing carbon emissions, increasing system resilience, removing barriers to connecting communities, and improving mobility and access to economic opportunity."[2]

Although funding for the Program would be financed through the sale of revenue bonds, the NJTA recognizes the importance of the IIJA's goals and strives to implement those goals that are both feasible and reasonable. Applicable goals are outlined in **Table 4.21-1.**

Federal Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

Executive Order (EO) 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis was issued on January 20, 2021 and directs Federal agencies "to immediately review, and take action to address Federal regulations promulgated and other actions taken during the last four years that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce GHG emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and employment."[3]

[2] FHWA website https://www.fhwa.dot.gov/bipartisan-infrastructure-law/
[3] Executive Order (EO) 13990: Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis was issued on January 20, 2021

Although funding for the Program would be financed through the sale of revenue bonds, the NJTA recognizes the importance of the EO's policies and strives to implement those goals that are both feasible and reasonable. Applicable goals are outlined in **Table 4.21.1**.

Federal Executive Order 14008: Tackling the Climate Crisis at Home and Abroad

EO 14008: Tackling the Climate Crisis at Home and Abroad was issued on January 27, 2021. EO 14008 "put[s] the climate crisis at the center of United States Foreign Policy and National Security." EO 14008's Section 213 (Sustainable Infrastructure) is applicable to the Program and seeks to ensure that Federal infrastructure investment shows a reduction in climate pollution and that such infrastructure projects consider the effects of greenhouse gas emissions and climate change. Section 213 states:

- (a) The Chair of the Council on Environmental Quality and the Director of the Office of Management and Budget shall take steps, consistent with applicable law, to ensure that Federal infrastructure investment reduces climate pollution, and to require that Federal permitting decisions consider the effects of greenhouse gas emissions and climate change. In addition, they shall review, and report to the National Climate Advisor on, siting and permitting processes, including those in progress under the auspices of the Federal Permitting Improvement Steering Council, and identify steps that can be taken, consistent with applicable law, to accelerate the deployment of clean energy and transmission projects in an environmentally stable manner.
- (b) Agency heads conducting infrastructure reviews shall, as appropriate, consult from an early stage with state, local, and tribal officials involved in permitting or authorizing proposed infrastructure projects to develop efficient timelines for decision-making that are appropriate given the complexities of proposed projects.[4]

Although funding for the Program would be financed through the sale of revenue bonds, the NJTA recognizes the importance of the EO's policies and strives to implement those goals that are both feasible and reasonable. Applicable goals are outlined in **Table 4.21-1**.

United States Department of Transportation Strategic Plan for FY 2018-2022

The United States Department of Transportation's (USDOT) key goal in the Strategic Plan for FY 2018 – 2022 is the Sustainable Highway Initiative. This initiative's goal is the stimulation of economic growth of American workers and businesses through increasing the state of the nation's highways through "assessing vulnerabilities, considering communities and resilience in the transportation planning process, incorporating resilience in asset management plans, and addressing resilience in project development and design."[5]

[4] Executive Order 14008: Tackling the Climate Crisis at Home and Abroad. Federal Register / Vol. 86, No. 19 / Monday, February 1, 2021 / Presidential Documents, page 7619 – 7633.
[5] U.S. Department of Transportation Strategic Plan for FY 2018-2022.

Table 4.21-1: Relationships of Sustainability Measures between Programs

Bipartisan Infrastructure Law Goals & Benefits	Sustainable Highway Initiatives	NJTA Strategic Plan Core Values (CV) and Goals (G)	Benefits / Objectives	Performance Measures
Rehabilitating bridges in critical need of repair and increasing system resilience	Asset Management (Economic)	State of Good Repair (CV), (G)	• Enhancement of infrastructure life span • Increase design innovation • Saving maintenance cost • Minimization of waste • Completion on time and achievement of project objectives	• International Roughness Index (IRI) • Manhour maintenance • National Bridge Inspection Standards (NBIS) rating • Capital expenditures
Reducing carbon emissions	Environmental Protection (Environmental)	Resiliency and Sustainability (CV)	• Minimize environmental impacts • Protect native wildlife • Minimizing carbon footprints and energy use • Protection of water and land quality • Air quality, noise and vibration minimization	• Fuel usage • Level of Service (LOS) • Number of EV charging stations
Removing barriers to connecting communities	Livability (Social)	People (G)	• Community acceptance • Preserving community connections	• Customer satisfaction level • Stakeholder relationships
Improving mobility and access to economic opportunity	Mobility (Economic)	Resiliency and Sustainability (CV), Mobility (G)	• Improved travel time • Reduced fuel usage	• Vehicle miles traveled • Travel times • Fuel usage
Create safe streets and roads through highway safety improvement programs	Safety (Social)	Safety (CV), (G)	• Reduce accidents and fatalities • Reduce work zone crashes • Reduce toll collection incidents	• Number of accidents per year

Source: Bipartisan Infrastructure Law (https://www.fhwa.dot.gov/bipartisan-infrastructure-law/); FHWA Sustainable Highway Initiatives (https://www.sustainablehighways.dot.gov/default.aspx); The New Jersey Turnpike Authority's (NJTA) Strategic Plan 2020 – 2029; and Amiril, A., *et al*, Transportation Infrastructure Project Sustainability Factors and Performance, 2014, Procedia-Social and Behavioral Sciences.

Although funding for the Program would be financed through the sale of revenue bonds, the NJTA recognizes the importance of the initiatives of this Plan and strives to implement those goals that are both feasible and reasonable. Applicable goals are outlined in **Table 4.21-1.**

New Jersey Executive Order No. 215

EO 215 of 1989 seeks to reduce or eliminate any potential adverse environmental impacts of projects initiated or funded by the state. EO 215 states that an environmental assessment or environmental impact statement must be prepared in support of major construction projects.[6] As stated in the introduction section of this chapter, this Program identifies the direct, indirect, and cumulative impacts of the Program as required by EO 215.

New Jersey Turnpike Authority Strategic Plan 2020 – 2029

The NJTA's Strategic Plan 2020 – 2029 addresses resiliency and sustainability in their Core Values in addition to safety, diversity, innovation, transparency, state of good repair, customer satisfaction, and long-term financial stability. It also sets out a series of goals (i.e., safety, finance, mobility, state of good repair, and people) and provides specific metrics to measure success while also allowing for updating on an annual basis, where necessary.

Table 4.21-1 shows how these various regulatory and planning issues are in sync with one another and how some of the same performance measures can be used to track progress.

As an example, aspects of the NJTA's mobility goal are resilience and sustainability. One way the NJTA explains the enhanced mobility goal is the implementation of technological solutions and modification of the NJTA's business practices to improve mobility without widening roads. Another solution to enhancing mobility is the reduction of travel time in high congestion areas.

Aspects of the NJTA's good repair goal are also resiliency and sustainability. Maintaining a state of good repair means that existing assets are functioning as designed and are sustained through preventative maintenance and replacement programs. State of good repair increases the useful life of the NJTA's assets, results in cost savings over time, and is vital to customer safety.

Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. The NJTA would continue implementing the elements of its Strategic Plan 2020 – 2029 involving resiliency and sustainability in their Core Values. The sponsors of projects in the No-Build Alternative may also be guided by specific planning for sustainability and resiliency as their projects are implemented.

Initially Preferred Alternative

The Federal and state policies and regulations applicable to the Program are outlined in **Table 4.21-2**.

[6] https://nj.gov/infobank/circular/eok215.htm.

Table 4.21-2: Public Policies, Programs and Plan Compliance Summary

Policies and Regulations	Project Applicability
Infrastructure Investment and Jobs Act – IIJA (Public Law 117-58)	The Program is consistent with the following IIJA Eligible Activities: • Bridge Investment Program: The Program would replace and/or rehabilitate bridges and culverts listed on the NBI. • National Highway Performance Program (NHPP): The NJTA would continue to support the function of the Turnpike as an NJ Coastal Evacuation Route. The NJTA would undertake further study of these events or occurrences during final design. Also, bio-retention basins with underdrains would be added to help mitigate stormwater impacts. The bio-retention basins are described in greater detail in Section 4.11 (Surface Water Resources)
Federal Executive Order 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis	The Program is consistent with the following Executive Order 13990 Eligible Activity: • Section 5: Accounting for the Benefits of Reducing Climate Pollution. The Program would improve forecasted LOS and function of ramps to contain traffic queues within Interchanges 3 and 4. Smoother flow of traffic would help mitigate air pollution from idling cars and trucks.
Federal Executive Order 14008: Tackling the Climate Crisis at Home and Abroad	The Program is consistent with the following Executive Order 14008 Eligible Activity: • Section 219. Policy. Securing Environmental Justice and Spurring Economic Opportunity. The Program would maintain connections with and access to existing roadways that connect to Interchanges 2, 3, and 4. In addition, the Program would maintain or replace structures that support local roadways across the mainline, thereby benefiting all populations, including EJ populations.
United States Department of Transportation Strategic Plan for FY 2018-2022	The Program is consistent with the following USDOT Strategic Plan Objectives: • Safety Strategic Objective 1: Systemic Safety Approach. The NJTA would identify and address safety risks in final design. The Program would be consistent with municipal and county land use plans and would support existing land use patterns and zoning by increasing mainline capacity and improving traffic operations at Interchanges 2, 3, and 4. • Infrastructure Strategic Objective 1: Project Delivery, Planning, Environment, Funding, and Finance. With collaborative planning and design, the Program would improve the existing infrastructure to better stimulate growth and economic competitiveness. • Infrastructure Strategic Objective 2. Life Cycle and Preventive Maintenance. The Program would keep the Turnpike in a state of good repair by replacing and/or upgrading elements of the existing system. • Infrastructure Strategic Objective 4. Economic Competitiveness and Workforce. An upgraded and improved Turnpike in the Program area would allow for the better movement of goods, people, and services throughout the network. The Program interchange improvements would improve access to areas that

Policies and Regulations	Project Applicability
	are primarily commercially zoned and serve as focal points for economic growth and development.
New Jersey Executive Order No. 215	The Program is consistent with the following NJ Executive Order No. 215 Guideline: • The Program would cost more than $5 million and would impact more than 5 acres; therefore, the Program is required to prepare an Environmental Impact Statement.
New Jersey Turnpike Authority Strategic Plan 2020 – 2029	The Program is consistent with the following NJTA Strategic Plan Core Values: • State of Good Repair. The Program would repair/replace aging infrastructure including interchanges, culverts, and overhead structures. • Resiliency and Sustainability. The Program would make the network more resilient to future weather events and allow the system to continue to be a Coastal Evacuation Route. A focus of drainage design activity would also preserve water quality and meet the recharge standards in the NJDEP Stormwater Management Rules. The drainage design is described in greater detail in Section 4.11 (Surface Water Resources). • Safety. The Program would be made safer by implementing modern design standards. Program capacity and operational improvements would improve forecasted LOS and the function of ramps to contain traffic queues within Interchanges 3 and 4.

Source: AECOM 2022.

The NJTA recognizes the importance of the Program being consistent with applicable Federal and state sustainability policies and regulations. As shown in **Table 4.21-2**, the Program is consistent with applicable Federal and state sustainability policies and regulations.

4.21.2 Resiliency

Introduction

As described in Section 1.4 (Purpose of the Program), the purpose of the Program is to accommodate existing and foreseeable future traffic demand on the Turnpike mainline and its Interchanges 2, 3, and 4; thereby, achieving the goals stated in the NJTA's enabling legislation to construct, maintain, improve, manage, repair, and operate the Turnpike in a manner that:

- Facilitates vehicular traffic operations;
- Removes existing handicaps and hazards; and
- Addresses safety needs.

Not only does the NJTA strive to provide the capacity and infrastructure needed for the Turnpike to achieve these goals into the foreseeable future in this Program, but also to implement a management program for the Turnpike that ensures the roadway is resilient in the face of foreseeable events and occurrences. This assessment of resilience is a qualitative evaluation of the potential for the Turnpike's assets in the Program area and its management program for the Turnpike to be resilient, meaning its ability to withstand or recover quickly from foreseeable events and occurrences.

Such events or occurrences may be climate or weather-related, such as storm surges, flooding, and sea-level rise. A storm surge is the rising level of the ocean in response to a storm. A storm surge can extend up into freshwater creeks and waterways, raising the level of those waterways to higher-than-normal levels. Future sea-level rise is an increase in the surface elevation of the ocean compared to historic levels. Unlike a storm surge that is temporary in duration, sea-level rise is a permanent condition. Other events requiring management for resilience include incidents on the Turnpike roadway that temporarily impair normal traffic operations.

Another consideration related to Program resilience is the designation of the Turnpike by the New Jersey Office of Emergency Management as a Coastal Evacuation Route. This designation means the Turnpike is a roadway that is part of a network of designated roadways that should be used to leave one's home or workplace during an emergency, such as a tropical storm, to seek shelter. This designation reinforces the importance of maintaining Turnpike operations during events or occurrences.

This section identifies the events or occurrences for which resilience planning and management will be needed for the Program to achieve the purpose of the Program, the goals of the NJTA's enabling legislation, and the Turnpike's function as a NJ Coastal Evacuation Route in the Program area. This section outlines the actions the NJTA will take to build resilience into the design and management of the Turnpike in the Program area as reasonably feasible.

Methodology and Data Sources

The assessment relies on the following information resources that identify the events and occurrences for which resilience planning and management is needed for the Program:

- New Jersey Office of Emergency Management, Coastal Evacuation Route Maps (https://nj.gov/njoem/plan-prepare/evacuation-routes.shtml)
- New Jersey Office of Emergency Management, Storm Surge Maps (https://nj.gov/njoem/plan-prepare/evacuation-routes.shtml)
- NJDEP's Flood Mapper Data resource (https://www.njfloodmapper.org/datasources)
- NJDEP's 2021 Sea-Level Rise Guidance for New Jersey (https://www.nj.gov/dep/bcrp/resilientnj/docs/dep-guidance-on-sea-level-rise-2021.pdf)
- Incidents on the Turnpike in the Program area; see Section 3.5 (IPA Safety Conditions)

The NJTA examined each of these data sources and identified if and where in the Program area events or occurrences have the potential to occur. To address the potential for these events or occurrences to affect the Program, the NJTA identified how resilience will be built into the design and management of the Turnpike in the Program area.

Affected Environment: The NJTA undertook studies during Preliminary Design to identify areas with the potential for storm surges as well as future sea-level rise. The NJTA consulted NJDEP's storm surge database that identifies the following six waterways that intersect the Turnpike in the Program area that are vulnerable to storm surges:

- MP 3.5 to M.P. 4.0: Delaware Bay;
- MP 8.0: Oldmans Creek;
- MP 12.0: Raccoon Creek;
- MP 17.5: Edwards Run;
- MP 18.5: Mantua Creek; and
- MP 24.5 to MP 26.0: Big Timber Creek.

In addition, the NJTA consulted NJDEP's Flood Mapper and Sea-Level Rise Guidance for New Jersey to identify locations of concern. The Flood Mapper is a resource for maps and other tools that illustrate where flooding can be expected to occur as a result of a variety of climate, weather, and other events. The guidance presents the projections for sea-level rise in New Jersey and provides direction for decision-makers in state and local governments as well as private entities and individuals. Based on this research, the NJTA identified the following six waterways that intersect the Turnpike in the Program area that are vulnerable to flooding; as indicated, some of these waterways are also vulnerable to future sea-level rise:

- MP 3.6: Game Creek (future sea-level rise);
- MP 22.1: Tributary Woodbury Creek (flooding and potential future sea-level rise);
- MP 24.9: Beaver Creek (flooding and potential future sea-level rise);
- MP 31.6: North Branch Cooper River (flooding);
- MP 33.0: Tributary South Branch Pennsauken Creek (flooding); and
- MP 34.9: North Branch Pennsauken Creek (flooding and potential future sea-level rise).

The NJTA also considered other events that require management including incidents on the Turnpike roadway that temporarily impair normal traffic operations. Section 3.5 (IPA Safety Conditions) describes the potential for incidents and Section 2.5 (Overview of Construction Activities) describes construction activity related to the Program.

Environmental Consequences: Considering the findings described in the Affected Environment section above, the Turnpike is vulnerable to storm surges, flooding, and future sea-level rise at several locations in the Program area. Storm surges, flooding, and future sea-level rise have the potential to result in impacts to the Turnpike roadway in those locations, such as flooding, infrastructure damage, and inability of the Turnpike to function as a Coastal Evacuation Route. In addition, incidents and construction on the roadway have the potential to temporarily impact roadway operations on the Turnpike in the Program area.

For these reasons, and to address the purpose of the Program, the goals of the NJTA's enabling legislation, and to support the function of the Turnpike as an NJ Coastal Evacuation Route, the NJTA would undertake further study of these events or occurrences during the Final Design phase of the Program. Further study will consist of:

- Examining the data in the context of the Program design;
- Refining the Program design to build in resilience and to avoid or minimize the potential for events or occurrences to impair Turnpike function in the Program area to the extent reasonably feasible; and
- Developing a management plan for the Program that focuses on the Turnpike being able to withstand or recover quickly from foreseeable events or occurrences.

Minimization and Mitigation: Further study during Final Design would identify measures and design solutions the NJTA would take to build in resilience and to avoid or minimize the potential for events or occurrences to impair Turnpike function in the Program area to the extent reasonably feasible.

The NJDEP has issued NJ Protecting Against Climate Threats (PACT) regulations. These rules define reforms to 'stave off the worst impacts of climate change and adapt to unavoidable impacts already occurring across the State'. These regulations will be reviewed in the permitting and Final Design phases of the Program in consultation with the NJTA's Resilience & Sustainability Program to determine implementation strategies. Additionally, the NJTA has hired a consultant to review their assets and assess areas of improvement in regards to resiliency. The recommendations made will be considered and potentially implemented by the NJTA.

4.22 ENVIRONMENTAL JUSTICE

This section identifies minority and/or low-income populations (collectively environmental justice or "EJ" populations) in the study area. Ensuring environmental justice calls for assessing whether the direct and indirect effects of a proposed action would be disproportionately high and adverse to EJ populations.

4.22.1 Methodology and Data Sources

Environmental Justice as defined by the USEPA is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations, and policies. Anticipating the need for the Program to demonstrate compliance with Federal regulations under NEPA, the methodology of EJ analysis is consistent with Federal guidance and USDOT statutes. Among the guidance is the 1997 Council on Environmental Quality (CEQ) guidelines which provide specific thresholds for determining if a "minority population" is present:

- The minority population exceeds 50 percent in the impacted area.
- The minority population percentage in the impacted area is "meaningfully greater" than the minority population in the general population or other appropriate geographic area.
- There is more than one minority group present and the minority percentage, as calculated by summing all minority persons, meets one of the thresholds presented above.

The CEQ guidance and USDOT Order 5610.2(a) does not specify thresholds used for identifying low-income populations. In the absence of specific guidance, this analysis applies the same thresholds for low-income populations[7] as for minority populations (i.e., the 50 percent test and the 'meaningfully greater' test).

This assessment also follows the guidance and compliance requirements of Federal Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The following definitions regarding minority and low-income individuals and populations apply to this analysis:

Minority Individual: The US Census Bureau classifies a minority individual as belonging to one of the following groups: American Indian or Alaskan Native, Asian American, Native Hawaiian or Other Pacific Islander, Black (not of Hispanic Origin), or Hispanic or Latino.

Minority Populations: Any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed program, policy, or activity.

Low-income Individual: A person whose household income is at or below the US Department of Health and Human Services poverty guidelines.

Low-income Population: Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed program, policy, or activity.

[7] Low-income is defined as households with a median income at or below the Department of Health and Human Services poverty guidelines for a family of four in a year.

EJ Block Groups: For this analysis, EJ census block groups are defined as those that meet the CEQ guidelines for determining if an EJ community is present as described above.

Disproportionately High and Adverse Effect on Minority and Low-income Populations: An adverse effect that:

- Is predominately born by a minority population and/or a low-income population, or
- Will be suffered by the minority populations and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

The study area is inclusive of census block groups that fall within 500 feet of the Turnpike ROW. The demographic composition of the study area was benchmarked and compared against the four counties in the study area (Salem County, Gloucester County, Camden County, and Burlington County). The study area reflects the geographic area most likely to experience the direct impacts and indirect environmental impacts from the construction of the Program and future operations of the Turnpike.

In addition to Federal requirements and guidance, this assessment also considers New Jersey's Environmental Justice Law (N.J.S.A. 13:1D-157). This law requires NJDEP to evaluate the contributions of certain facilities to existing environmental and public health stressors in overburdened communities when reviewing certain permit applications. The State of New Jersey has defined an "overburdened community" as any census block group, as determined in accordance with the most recent United States Census, in which: (1) at least 35 percent of the households qualify as low-income households; (2) at least 40 percent of the residents identify as minority or as members of a state-recognized tribal community; or (3) at least 40 percent of the households have limited English proficiency. In this EJ assessment, the identification of "overburdened communities" within the study area will be compared to the NJDEP parameters to determine if a more conservative assessment is required.

The identification of minority and low-income populations in this report is preliminary and based on U.S. Census Bureau data. As environmental studies, design, and public outreach activities for the Program continue, more information about the study area communities will be collected. This additional information could change the preliminary findings in this EJ assessment, potentially identifying additional EJ populations, for example.

4.22.2 Affected Environment

In each of the four counties, the proportion of minority individuals living within the study area is lower than the county average. In Camden County, the difference between the county and study area is 11 percent, the greatest difference between the two geographies. The difference between the number of minority individuals in Gloucester County and the proportion of county residents living within the study area is 1.3 percent; the smallest difference between the two geographies. In Salem County, the county average is 3.4 percent greater than the average of those living within the study area. In Burlington County, the county average is 5.1 percent greater than the average of those living within the study area. The portions of minority and low-income persons of the four counties, as well as those populations within the study area, are identified in **Table 4.22-1** below.

Table 4.22-1: Minority and Low-Income Persons Distribution

	Salem County	Gloucester County	Camden County	Burlington County
Total Persons within County:	62,385	291,636	506,471	445,349
Percent Minority	25.7%	21.5%	43.3%	32.6%
Percent Low-Income	26.9%	17.3%	27.0%	16.3%
Persons within Study Area:	8,334	41,764	40,479	10,558
Percent Minority	18.4%	20.2%	32.3%	26.8%
Percent Low-Income	23.5%	11.2%	15.9%	11.2%

Source: US Census Bureau. ACS 5-year 2019 tables, specifically B03002 and C17002.
Note: Portions of block groups that intersect the potential limit of disturbance are included in these calculations.

Out of the 57 block groups in the study area, six exhibit a percentage of minority residents greater than 50 percent. All six of these block groups are located in Camden County. These blocks are summarized in **Table 4.22-2** and depicted in the figure titled, Environmental Justice Map (Appendix B).

Table 4.22-2: Census Blocks with Percent Minority Persons above 50 Percent

Location	County	Census Tract	Block Group	% Minority
Vicinity of Interchange 3 MP 25.5 to MP 26.5 (SN roadway)	Camden	6072	2	51.4%
North of Interchange 3 MP 27.5 to MP 28.0 (Both SN and NS roadways)	Camden	6065	1	92.8%
North of Interchange 3 MP 28.0 to MP 29.0 (SN roadway)	Camden	6065	3	95.3%
North of Interchange 3 MP 28.5 to MP 29.5 (Both SN and NS roadways)	Camden	6065	2	94.2%
North of Interchange 3 MP 29.0 to MP 30.0 (SN roadway)	Camden	6035.05	2	64.7%
North of Interchange 3 MP 32.5 to MP 33.5 (NS roadway)	Camden	6034	3	62.0%

Source: US Census Bureau. ACS 5-year 2019 tables, specifically B03002 and C17002.
Note: Census Tract 6065, Block Group 1 is also identified as a census block group with a high percent of low-income persons.

Table 4.22-3 presents data for the one census block group with a percentage of low-income persons above 50 percent.

Table 4.22-3: **Census Block with Percent Low-Income Persons above 50 Percent**

Location	County	Census Tract	Block Group	% Low Income
North of Interchange 3 MP 27.5 to MP 28.0 (Both SN and NS roadways)	Camden	6065	1	51.4%

Source: US Census Bureau. ACS 5-year 2019 tables, specifically B03002 and C17002.
Note: Census Tract 6065, Block Group 1 is also identified as a census block group with a high percent of minority persons.

NJDEP Overly Burdened Communities

New Jersey's overburdened communities include the six census block groups identified in **Tables 4.22-2** and **4.22-3**. The state has also identified one census block group in Deptford Township, Gloucester County as a low-income community; one census block group in Bellmawr Borough, Camden County as a minority community; one census block group in Cherry Hill Township, Camden County as a minority community; and one census block in Mount Laurel Township, Burlington County as a minority community.

4.22.3 Environmental Consequences

No-Build Alternative

Under the No-Build Alternative, the Program would not be undertaken, and the Turnpike would remain in its current configuration. Consequently, the Program would cause no new direct or indirect impacts on EJ populations in the Program study area. Projects in the No-Build Alternative have the potential to impact EJ populations; sponsors of the projects may be required to address potential impacts of their projects on EJ populations.

Initially Preferred Alternative

Census block groups with a percentage of low-income persons as well as census blocks groups with a percentage of minority persons have been identified. The populations are communities of concern for the purposes of evaluating the potential for the Program to have a disproportionately high and adverse effect on environmental justice populations.

Mainline Improvements

Based on the U.S. Census Bureau data, all minority or low-income populations are in the Camden County portion of the study area roughly between MP 25.5 and MP 33.5. Most census blocks straddle the NS and SN roadways. The three block groups in Lawnside Borough are identified in **Table 4.22-4**. All three block groups are also identified as an overly burdened community by NJDEP. Lawnside Borough is considered an overburdened EJ community with minority and low-income populations. The borough is historically notable as the first African American community to be incorporated as a municipality in New Jersey.

Table 4.22-4: Census Block with Percent Low-Income Persons above 50 Percent, Lawnside Borough

Location	County	Census Tract	Block Group	% Minority
North of Interchange 3 MP 27.5 to MP 28.0 (Both SN and NS roadways)	Camden	6065	1	92.8%
North of Interchange 3 MP 28.0 to MP 29.0 (SN roadway)	Camden	6065	3	95.3%
North of Interchange 3 MP 28.5 to MP 29.5 (Both NS and SN roadways)	Camden	6065	2	94.2%

Source: US Census Bureau. ACS 5-year 2019 tables, specifically B03002 and C17002.
Note: Census Tract 6065, Block Group 1 is also identified as a census block group with a high percentage of minority persons.

Bridge replacement at Warwick Road (CR 669) is required for the Program because the roadway bridge over the Turnpike would be replaced. Replacement is required to accommodate the wider SN and NS roadways, address conflicts with the existing bridge piers,

and provide the desirable minimum vertical clearance on the Turnpike. The realignment and raising of the Warwick Road bridge and roadway profile on the bridge approaches would require additional ROW acquisition along Warwick Road. As described in Sections 4.3 (Property Acquisitions and Displacements) and 4.4 (Community Cohesion and Community Facilities), ROW acquisition is required from several properties in Lawnside Borough for the Program. Community facilities, a business, and residences would be affected by ROW acquisition, including displacement of one business and at least two residences on the property of that business.

During Preliminary Design, the NJTA began coordinating with Lawnside Borough representatives about the Program and its potential impacts. As the Program advances to Final Design, the NJTA would consider ways to avoid or minimize the impacts described in this report, and the NJTA would continue coordinating with borough representatives. At that time, the NJTA would also coordinate with affected property owners with the goal of identifying reasonably feasible mitigation measures that can help the NJTA avoid disproportionately high and adverse effects to the community.

Interchange 2

Based on the U.S. Census Bureau data, no minority or low-income populations are within the study area in the vicinity of Interchange 2. Therefore, the Program would have no potential effect on EJ populations at Interchange 2.

Interchange 3

Census Tract 6072, Block Group 2, located east of the SN roadway between MP 25.5 to MP 26.5, is near Interchange 3. Minority persons within this block group make up 51.4 percent of the total population and the block group is designated as an overburdened community by the NJDEP. As described in Section 4.3 (Property Acquisitions and Displacements), ROW acquisition is required from 2 properties on the eastern side of Interchange 3 to shift the interchange ramps as a result of the mainline capacity improvements and bridge lengthening. The affected properties include 1 residential and 1 commercial parcel.

Interchange 4

Based on the U.S. Census Bureau data, no minority or low-income populations are within the study area in the vicinity of Interchange 4. Therefore, the Program would have no potential effect on EJ populations at Interchange 4.

4.22.4 Minimization and Mitigation

As stated above, the NJTA would continue coordinating with representatives of potentially affected EJ populations during Final Design of the Program. In addition, the NJTA would engage affected property owners regarding potential property acquisitions and displacements. These coordination activities would help inform refinements to the design of the Program with the goal of avoiding or minimizing impacts to EJ populations to the extent reasonably feasible. In addition, coordination activities would help inform the identification of minimization and mitigation measures to address impacts and avoid a disproportionately high and adverse effect on EJ populations.

4.23 ENVIRONMENTAL PERMITS

Permits, approvals, and/or coordination with agencies required to construct the Program improvements include, but are not necessarily limited to, the following:

4.23.1 Federal

4.23.1.1 U.S. Army Corps of Engineers (USACE) Section 404 Permit

Section 404 authorizes projects that include the discharge of dredged or fill material into waters of the United States (WOTUS), including wetlands, that are in compliance with Section 404 of the Clean Water Act. NJDEP has assumed regulatory control over the Section 404 program; however, the USACE retains program oversight and jurisdiction in some parts of the state (i.e., coastal waterways or wetlands, waterfront development areas, other waterways within 1,000 feet of ordinary high water or mean high tide, along the Delaware River, adjacent to Greenwood Lake, and in the Hackensack Meadowlands). Impacts to areas under the USACE jurisdiction would require a USACE Section 404 permit.

4.23.1.2 USACE Section 10 Permit

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable WOTUS, the excavation from or deposition of material in these waters, or any obstruction or alteration in these waters. As the Program would result in impacts to navigable waters, a Section 10 permit would be required.

4.23.1.3 USACE Jurisdictional Determination (JD)

A JD is a document issued by the USACE indicating the location of jurisdictional WOTUS (which includes wetlands) regulated by the USACE under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899. A JD verifies the boundaries of wetlands and WOTUS. An application for a JD was submitted to the USACE for verification of the wetland boundary lines on January 30, 2023.

4.23.1.4 U.S. Coast Guard (USCG) Approval

All tidal waters or formerly tidal waters are considered navigable WOTUS. The USCG authorizes the construction of new bridges and modification of existing bridges over navigable waters and imposes any necessary conditions relating to the maintenance and operation of these bridges in the interest of public navigation. It is anticipated that tidal waters or formerly tidal waters within the Program would be placed in the USCG Advance Approval category pursuant to 33 CFR 115.70, and once formally identified as such, would be exempt from the requirement to obtain a formal USCG Bridge Permit.

4.23.1.5 Section 106 of the National Historic Preservation Act of 1966

Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their undertakings on historic properties. Undertakings are projects Federal agencies carry out, assist, fund, permit, license, or approve. If a Federal or Federally-assisted project has the potential to affect historic properties, a Section 106 review is required.

4.23.1.6 Section 7 of the Endangered Species Act (ESA)

Under Section 7 of the ESA, Federal agencies must consult with the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the USFWS to ensure that the actions they authorize, fund, or carry out do not jeopardize the existence of any species listed as threatened or endangered under the ESA, or destroy or adversely modify designated critical habitat of any listed species. Thus, Section 7 requires consultation by the Federal “action agency” (the agency authorizing, funding, or carrying out the action) with the appropriate regulatory agency, either NOAA Fisheries for marine species or the USFWS for terrestrial and freshwater species. Consultation would be required with these agencies.

4.23.1.7 Essential Fish Habitat (EFH)

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth a requirement that Federal fishery management plans (developed by Regional Fishery Management Councils) be amended to designate EFH for all Federally managed species. According to NOAA Fisheries, EFH includes "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Species and associated life stages for which EFH has been designated has been identified in the study area. An EFH Assessment would be performed to determine whether study area waterways are suitable for the identified species and life stages and to determine whether EFH may be adversely affected by the Program. Consultation would be required as Federal permits would be obtained for the Program.

4.23.2 State

4.23.2.1 NJDEP Executive Order No. 215 (EO 215) Environmental Impact Statement (EIS)

All departments, agencies, and authorities of the state, or projects funded by the same, are required to prepare and submit to the NJDEP an Environmental Assessment (EA) or EIS in support of major construction projects. Projects with anticipated construction costs in excess of $3 million are subject to the preparation of an EA, while projects with both construction costs in excess of $7 million and land disturbance in excess of five acres are subject to the preparation of an EIS. As project construction cost would exceed $7 million and land disturbance would be more than five acres, the Program requires preparation of an NJDEP EO 215 EIS. The subject of this EIS is the Turnpike northbound and southbound roadways (mainline) between MP 3.5 and MP 36.5, and Interchanges 2, 3, and 4. Additional EISs will be prepared for other components of the Program as project design advances.

4.23.2.2 Waterfront Development Permit (WDP)

The New Jersey Coastal Zone Management Rules (N.J.A.C. 7:7) address the Waterfront Development Law, N.J.S.A. 12:5-3 (waterfront development permits). The Waterfront Development Law regulates development in all tidal waters up to the mean high water line, as well as adjacent land areas extending as much as 500 feet from the mean high water line in some circumstances. The Program would result in unavoidable impacts to tidal waters and/or their adjacent area; therefore, a WDP would be required.

4.23.2.3 Coastal Wetlands Permit

The New Jersey Coastal Zone Management Rules (N.J.A.C. 7:7) address the Wetlands Act of 1970, N.J.S.A. 13:9A-1 *et seq*. (coastal wetland permits). Coastal wetlands are mapped under the Wetlands Act of 1970. The NJDEP may impose wetland buffers up to 300 feet along coastal wetlands. The Program would result in unavoidable impacts to coastal wetlands; therefore, a Coastal Wetlands permit would be required.

4.23.2.4 Tidelands Conveyance

Tidelands claim areas include lands now or formerly flowed by the tide which are owned by the State of New Jersey and managed by the Tidelands Resource Council. Claimed tidelands exist where the New Jersey Turnpike crosses several waterbodies within the project area. It is believed the NJTA has appropriate Tideland's conveyances for the existing bridges; however, additional design and research is needed to verify claim status and to identify needed modifications to the Tidelands conveyances to accommodate the Program. All Tidelands claims must be reconciled prior to or along with the NJDEP Coastal Zone permits.

4.23.2.5 Letter of Interpretation (LOI)

An LOI is a document issued by the NJDEP under N.J.A.C. 7:7A-3 indicating the presence or absence of freshwater wetlands, SOWs, or transition areas; verifying or delineating the boundaries of freshwater wetlands, SOWs, and/or transition areas; and assigning a freshwater wetland resource value classification. An application for a LOI – Line Verification was submitted to the NJDEP on January 30, 2023.

4.23.2.6 Freshwater Wetlands General Permit (FWGP) No. 12

The New Jersey Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A) govern activities within freshwater wetlands, transition areas, and/or SOWs. An FWGP No. 12 is required for surveying and investigative activities. Soil borings would be necessary to conduct subsurface geotechnical investigations for the Program. An FWGP No. 12 would be required for any borings located within freshwater wetlands, transition areas, and/or SOWs.

4.23.2.7 Freshwater Wetlands Individual Permit (FWIP)

The New Jersey Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A) govern activities within freshwater wetlands, transition areas, and/or SOWs. The Program would result in unavoidable impacts to freshwater wetlands, freshwater wetland transition areas, and SOWs; therefore, an FWIP would be required.

4.23.2.8 Flood Hazard Area Individual Permit (FHAIP)

The New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) govern activities within flood hazard areas and the 100-year floodplain. The objective of these rules is to minimize potential damage to public or private property, to protect and enhance the public's health and welfare by minimizing the degradation of water quality from point and non-point sources discharging into the flood hazard area, and to protect wildlife and fisheries by preserving and enhancing water quality and the environment associated with the floodplains. An FHAIP would be required for the construction, installation or alteration of any structure or permanent fill along, in or across, the channel or floodplain of any watercourse, or for any alteration of, or discharge into the watercourse itself.

4.23.2.9 Flood Hazard Area Verification

According to the New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13), a verification is required prior to, or concurrent with, an authorization under a general permit or an individual permit as set forth at N.J.A.C. 7:13-5.5. A Flood Hazard Area verification provides NJDEP's official determination of the flood hazard area design flood elevation, the flood hazard area limits, the floodway limits, and/or the riparian zone limits. As part of the NJDEP permitting process, Flood Hazard Area verifications would be required for all regulated waters in the study area under N.J.A.C. 7:13.

4.23.2.10 Water Quality Certificate (WQC)

A WQC is required pursuant to Section 401 of the Federal Clean Water Act; however, the WQC is issued by NJDEP. NJDEP cannot issue a permit or approval for any activity that is inconsistent with the statewide or area-wide Water Quality Management (WQM) Plan. A consistency determination is the review conducted by the NJDEP to determine whether or not a particular regulated activity conflicts with the statewide or area-wide WQM Plan. WQC review is conducted concurrently with review of Freshwater Wetlands and Coastal Zone permit applications. This certification would be issued simultaneously with these other permits by the NJDEP.

4.23.2.11 Stormwater Management Approval

If a project or activity meets the definition of a "major development", then the project or activity shall comply with the Stormwater Management Rules (N.J.A.C. 7:8). "Major development" means an individual "development" as well as multiple developments that individually or collectively result in: 1) the disturbance of one or more acres of land since February 2, 2004; 2) the creation of one-quarter acre or more of "regulated impervious surface" since February 2, 2004; 3) the creation of one-quarter acre or more of "regulated motor vehicle surface" since March 2, 2021; or a combination of 2 and 3 that totals an area of one-quarter acre or more. The same surface shall not be counted twice when determining if the combination area equals one-quarter acre or more. Disturbance for the purpose of this rule is the placement or reconstruction of impervious surface or motor vehicle surface, or exposure and/or movement of soil or bedrock or clearing, cutting, or removing of vegetation. Projects undertaken by any government agency which otherwise meet the definition of "major development" but which do not require approval under the Municipal Land Use Law, N.J.S.A. 40:55D-1 *et seq*., are also considered "major development". As the Program would result in the disturbance of more than one acre of land and would create new impervious surface of one-quarter acre or more, the project must comply with the Stormwater Management Rules.

4.23.2.12 New Jersey Pollutant Discharge Elimination System (NJPDES) General Permit 5G3 for Construction Activity Stormwater

A stormwater construction general permit is required under the NJDEP NJPDES program. This authorization applies to point source stormwater discharges from construction activities (e.g., clearing, grading, excavating) that disturb one acre or more.

4.23.2.13 Linear Construction Report

The Administrative Requirements for the Remediation of Contaminated Sites Rules (N.J.A.C. 7:26C) establishes requirements for linear construction projects. This technical guidance applies to any person conducting a linear construction project that excavates more than 200 cubic yards of contaminated soil over the duration of the linear construction project. These requirements are to ensure that contamination encountered during the project is handled in a manner that is protective of human health, safety, and the environment. As part of this requirement, a Linear Construction Project Notification form should be submitted at least 45 days before the start of the construction to inform the NJDEP that a linear construction project is being initiated. Upon completion of the linear construction project, a Final Linear Construction Report should be prepared that summarizes the history of investigations and material management activities as they pertain to the construction of the project.

4.23.2.14 New Jersey Historic Preservation Office (NJHPO) Approval

The New Jersey Register of Historic Places Act Rules (N.J.A.C. 7:4) is designed to ensure that historic properties listed on the New Jersey Register of Historic Places (NJRHP) are given consideration during the planning and execution of regulated activities undertaken by a public agency. These activities include, but are not limited to, construction, rehabilitation, and repair, permits, and grants. Whenever a proposed activity requiring state involvement or approval has the potential to encroach upon a historic property listed in the NJRHP, consultation must be undertaken with the NJHPO. An Application for Authorization under the New Jersey Register of Historic Places Act must be submitted by any state, county, or local government agency whose proposed activity may encroach upon a New Jersey Register-listed property.

4.23.2.15 Green Acres Program

Approval from the NJDEP Green Acres Program, the Commissioner of the NJDEP, and the State House Commission is required for impacts to open space and/or parkland that was procured using state funding. As the Program improvements would impact Green Acres-encumbered property, approval from the Green Acres Program would be required.

4.23.2.16 Agriculture Retention and Development Act (N.J.S.A. 4:1C – 11 et seq.)

If the power of eminent domain is going to be used for the acquisition of land in either a municipally-approved farmland preservation program or land from which a development easement has been conveyed, the governor must declare that the action is necessary for the public health, safety, and welfare and that there is no immediately apparent feasible alternative. In addition, the governor may elect to require the public body to file a notice of intent with the State Agriculture Development Committee and the Agriculture Development Board in the affected counties, and to prepare an Agricultural Impact Assessment. According to the Agriculture Retention and Development Act, if the acquisition of real property or commencement of construction activity within an Agricultural Development Area (ADA) is necessary, the County Agriculture Development Board (CADB) must receive notice of the proposed activity. If the CADB finds that the proposed action would cause unreasonably adverse effects on the ADA or state agricultural preservation and development programs, the CADB may direct that no action be taken for 60 days, during which time public hearings are conducted (N.J.S.A. 4:1C-19). If the Program improvements would impact ADA's, it would be necessary to notify the CADB.

4.23.2.17 No Net Loss Reforestation Act Approval

The No Net Loss Reforestation Act (N.J.S.A. 13:1L-14.1 to 14.4) requires state entities to provide a plan for compensatory reforestation for all areas at least ½ acre in size that are owned or maintained by that state entity and scheduled for deforestation. A reforestation plan resulting in no net loss of existing forested area is required for areas subject to deforestation. This Plan must be submitted to the NJDEP Division of Parks and Forestry for review and approval by the Community Forestry Council. As the Program improvements would impact more than ½ acre of forested area, a reforestation plan would be required.

4.23.2.18 NJDEP Endangered and Nongame Species Program (ENSP)

The ENSP conducts reviews and provides input with respect to applications to the NJDEP Division of Land Resource Protection for permits, LOIs, and/or habitat suitability determinations that may involve endangered or threatened wildlife or plants. Protection and management actions may be necessary if any listed species may be impacted. Consultation would be required if the Program is determined to have the potential to affect any listed species and if any species surveys are required.

4.23.3 County

CSCD, GCSCD, CCSCD, and BCSCD – SESC Plan Certification. Approval of development by all public agencies is conditioned upon approval of a plan for SESC. Certification is required for any activity that disturbs more than 5,000 square feet of surface area of land. Certification is also required for demolition of structures, construction of parking lots, public facilities, operation of mining or quarrying activities, and for clearing or grading of land for other than agricultural or horticultural purposes. Public facility means any building, pipeline, highway, electricity, telephone, or other transmission line; or any other structure to be constructed by a public utility, municipality, county, or state, or any agency or instrumentality thereof. The Program improvements would disturb more than 5,000 square feet of surface area of land; therefore, SESC Plan Certification would be required. As the Program spans four counties, approval would be required from the CSCD, GCSCD, CCSCD, and BCSCD.

4.23.4 Other

Delaware River Basin Commission (DRBC) Approval

The DRBC must approve any project having a substantial effect on the water resources of the Delaware River Basin before it is undertaken by any person, corporation, or governmental authority. The DRBC is required to approve a project whenever it finds and determines that such project would not substantially impair or conflict with the Comprehensive Plan and may modify and approve as modified or may disapprove any such project whenever it finds and determines that the project would substantially impair or conflict with the Comprehensive Plan. According to Section 401.35(a)(10) of the Administrative Manual Rules of Practice and Procedure (18 CFR Part 401), bridges and highways, unless they would pass in or across an existing or proposed reservoir or recreation project area, are deemed not to have a substantial effect on the water resources of the Basin and are not required to be submitted for review to the DRBC. Coordination with the DRBC will be undertaken to verify the need for project authorization.

4.24 SUMMARY OF EIS FINDINGS

Table 4.24-1 provides a summary of the benefits and effects of the IPA as described in this chapter.

Table 4.24-1: Summary of Effects of IPA

Description of IPA Effects
Traffic and Safety (Chapter 3)
Benefit: Achieves NJTA's benchmark of LOS C on the mainline (Section 3.5.4.1)
Benefit: Addresses congestion and operating constraints at Interchange 2 by achieving LOS D or better (Section 3.5.4.2)
Benefit: Improves function of ramps to contain traffic queues within Interchange 3 (Section 3.5.4.2)
Benefit: Improves function of ramps to contain traffic queues within Interchange 4 (Section 3.5.4.2)
Impact: During Final Design and Program construction, the NJTA would develop and implement a construction plan and maintenance of traffic plan to avoid or minimize temporary impacts to traffic operations along the mainline and at Interchanges 2, 3, and 4 during Program construction (Sections 3.5.4.3 and 3.5.4.4)
Benefit: During Final Design, the NJTA would evaluate, design, and implement appropriate operational safety elements, modify incident management plans, coordinate with emergency service personnel, and develop operational protocols and procedures to be followed in the Program area
Benefit: During Final Design and Program construction, the NJTA would develop and implement safety protocols and procedures to be followed during Program construction, focusing on worker and public safety
Land Use Patterns, Zoning, and Consistency with Plans (Section 4.1)
Benefit: Consistent with municipal and county land use plans (Section 4.1)
Benefit: Program would support existing land use patterns and zoning by increasing mainline capacity and improving traffic operations at Interchanges 2, 3, and 4 (Section 4.1)
Economic Development (Section 4.2)
Benefit: Interchanges 2, 3, and 4 are within or provide access to areas that are primarily commercially zoned and serve as focal points for economic growth and development (Section 4.2)
No impact: Temporary changes in access to private properties (residences and businesses) could occur during Program construction, but access to these properties would be maintained (Section 4.2)
Property Acquisitions and Displacements (Section 4.3)
Impact: Number of potential permanent partial property (parcel) acquisitions (Section 4.3): 40 Residential; 14 Commercial; 14 Institutional facilities; 2 Industrial facilities; 24 Vacant; 14 Farmland; 5 Preserved Farmland; 113 Total
Impact: Number of potential permanent full property (parcel) acquisitions (Section 4.3) 6 Residential; 1 Commercial; 1 Institutional facilities; 0 Industrial facilities; 3 Vacant; 0 Farmland; 0 Preserved Farmland; 11 Total
Community Cohesion and Community Facilities (Section 4.4)
No impact: Program improvements to the existing Turnpike would be primarily within existing NJTA ROW and would not split or fragment existing residential or business communities (Section 4.4)
No impact: Program would preserve access across the mainline using existing or replaced structures during operations (Section 4.4)

Description of IPA Effects
Impact: Program would require permanent ROW from 12 existing community (institutional) facilities (Section 4.3)
Potential impact: Potential for Program construction activity to require a temporary change in access to Grace Bible Presbyterian Church in Runnemede; the NJTA would coordinate with the church during construction plan development to ensure church access is preserved (Section 4.4)
Parks, Recreation Areas, and Open Space (Section 4.5)
Benefit: Program improvements would not eliminate access to existing parks, recreation areas, and open space (Section 4.5)
Impact: The Program potentially would require permanent ROW from two park properties (Section 4.5)
Impact: Program ROW needs have the potential to permanently impact four properties encumbered by the New Jersey Green Acres Program and would require approval through that program (Section 4.5)
No impact: Temporary changes in access to two parks, recreation areas, and open space could occur during Program construction (Section 4.5)
Historic and Archaeological Resources (Section 4.6)
Potential impact: The Program has the potential to impact archaeological sites (Section 4.6)
Impact: The Program has the potential to impact eight historic properties, resulting in an adverse effect under Section 106 of the National Historic Preservation Act (Section 4.6)
Visual and Aesthetic Effects (Section 4.7)
Impact: The Program would cause visual changes during construction and operations (Section 4.7)
Air Quality (Section 4.8)
Benefit: Program capacity and operational improvements would improve forecasted LOS, thereby reducing vehicular emissions and benefiting air quality along the mainline and at Interchanges 2, 3, and 4 (Section 4.8)
Impact: Potential for temporary air quality impacts during Program construction (Section 4.8)
Noise (Section 4.9)
Impact: Potential number of noise impacts during Program operation (Category 2 = where people sleep such as residences; Category 3 = daytime institutional or office use) 570 Category B; 3 Category C (Section 4.9)
Soils and Geology (Section 4.10)
No impact: Soils disturbed during temporary Program construction activities would be permanently stabilized according to an approved SESC Plan, resulting in no long-term soils impacts (Section 4.10)
Impact: Temporary soil disturbance during construction has the potential to encounter acid-producing soils (Section 4.10)
Surface Water Resources (Section 4.11)
Impact: The Program would permanently widen existing bridges and/or culverts over waterways along the mainline and at Interchanges 3 and 4; state permits would be required for those improvements (Section 4.11)
Impact: Program construction at bridges over waterways could temporarily impact the waterways; state permits would be required (Section 4.11)
Impact: Capacity improvements would result in 128 acres of new motor vehicle surface area in the Program area; the Program would expand the SWM system to accommodate the additional runoff generated by the new impervious surfaces; a state permit would be required to expand the SWM system (Section 4.11)

Description of IPA Effects
Coastal Zone Considerations (Section 4.12)
Impact: A portion of the Program is located within the NJ Coastal Zone (Section 4.12)
Floodplains and Riparian Zones (Section 4.13)
Impact: The Program would impact floodplains of 21 streams and approximately 9 acres of riparian zones, requiring a NJ Flood Hazard Area Permit (Section 4.13). During the Program's permitting phase, additional analysis of waterways identified during field investigations would be conducted to determine the presence of additional regulated floodplains.
Navigability (Section 4.14)
No impact: The Program would not permanently impair or change the navigability of existing waterways (Section 4.14)
Wetlands (Section 4.15)
Impact: The Program would impact approximately 20 acres of freshwater wetlands/SOWs, requiring permits from both NJDEP and the USACE (Section 4.15). Impacts to wetland transition areas would be identified and assessed during the permitting phase of the Program.
Ecology and Wildlife (Section 4.16)
Impact: The Program would permanently impact the ecology and wildlife habitat in the Turnpike ROW and in additional ROW areas by removing trees and vegetation (Section 4.16)
Impact: The Program has the potential to permanently impact habitat that is suitable for known threatened and endangered species (Section 4.16)
Terrestrial Vegetation (Section 4.17)
Impact: The Program would permanently impact 446 acres of existing trees and vegetation within the Turnpike ROW; the NJTA would be required by state regulation to replace trees lost in impacted riparian zones (Section 4.17)
Groundwater Resources (Section 4.18)
Impact: The Program would permanently reduce the ground surface area in the Turnpike ROW and additional ROW areas that is available for infiltration of precipitation and runoff to groundwater in the existing condition; state permits would be required (Section 4.18)
No impact: The Program would not permanently or temporarily impact existing wellhead protection areas (Section 4.18)
Utilities (Section 4.19)
Impact: The Program would require relocation of existing utilities within and across the Turnpike ROW as well as utilities in additional ROW areas; the NJTA would coordinate with utility providers during Final Design and construction planning (Section 4.19)
Contaminated Materials, Hazardous Waste, and Solid Waste (Section 4.20)
Potential impact: Program operations could be a source of accidental fuel spills because fuel-hauling vehicles operate on the Turnpike (4.20)
Potential impact: Program operations and temporary construction activity have the potential to introduce additional oils and fuels that could drip from vehicles within the Turnpike ROW and in additional ROW areas (Section 4.20)
Potential impact: Program construction has the potential to impact or be impacted by potentially contaminated sites within the Program area; the NJTA's construction and safety protocols and

Description of IPA Effects
procedures would outline actions to be taken to protect workers and the public if contaminated materials are encountered during Program construction (Section 4.20)
Sustainability and Resiliency (Section 4.21)
Benefit: The Program would be consistent with Federal and state sustainability policies and regulations (Section 4.21)
Benefit: During Final Design, the NJTA would further study ways to build resiliency into the Program (Section 4.21)
Environmental Justice (Section 4.22)
Impact: Program ROW needs have the potential to permanently impact properties, and potentially displace residents and businesses in existing EJ areas; the NJTA would further examine ROW needs in EJ areas as well as minimization and mitigation measures during Final Design and in coordination with affected municipalities and property owners (Section 4.22)
Benefit: The Program would address capacity and operational needs on the mainline and at Interchanges 2, 3, and 4, thereby benefiting all the populations in the traveling public, including minority and low-income populations that use the existing roadway (Section 4.22)
Benefit: The Program would maintain connections with and access to existing roadways that connect to Interchanges 2, 3, and 4; in addition, the Program would maintain or replace structures that support local roadways across the mainline, thereby benefiting all populations, including EJ populations (Section 4.22)

Source: AECOM, 2022.

Environmental Impact Statement

Chapter 5 Public and Agency Outreach

June 2024

Prepared for

Prepared by

AECOM

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5 PUBLIC AND AGENCY OUTREACH

From the initiation of the Program, planning, public, and agency involvement has been a key element. This chapter describes the outreach and coordination activities undertaken by the NJTA.

5.1 PUBLIC OUTREACH

Public outreach is an essential component of the Program as it establishes and maintains a collaborative decision-making process that engages the public and stakeholders in the development of the Program's purpose and need, the evaluation of alternatives, selection of an IPA, and evaluation of the IPA. The objectives of public outreach are to:

- Inform and educate the public and stakeholders about the Program;
- Provide opportunities for meaningful input and dialogue throughout the alternatives' development and evaluation processes;
- Understand community values in order to better develop alternatives; and,
- Foster productive public relations.

5.1.1 Public Outreach Communication Methods

The multiple means of communication the NJTA uses to share Program information with the public and obtain public input are explained below:

- **Virtual meetings** – The NJTA has held multiple rounds of virtual meetings with elected officials at all levels of government, including with representatives from the municipalities, counties, and state and federal legislative districts along the Program Corridor. The first round of meetings, held in Spring/Summer 2021, provided an overview of the Program. The second round, held in 2022, allowed stakeholders to review and comment on plans for overpassing structures and potential local detours. A third round, which is currently underway with stakeholders and county emergency response personnel, is focused on addressing specific issues related to their locality and the Program.
- **Program Webpage** – The NJTA maintains a page on their website that communicates information regarding Program activities including location, description, and schedule. The webpage provides a link to a downloadable Program fact sheet. The Program website can be accessed through the NJTA's website (https://www.njta.com/capitalprojects).
- **Virtual room** – The NJTA provides a 3-D virtual consultation room, which is an online resource containing information about the Program. The room is interactive, allowing the viewer to move around a virtual "room" to view static and active displays in an open house. The virtual room can be accessed through the NJTA's website (https://www.njta.com/capitalprojects).

- **Fact sheet** – To date, the NJTA has provided a Program fact sheet that is available on the Program website, in the virtual consultation room, and at virtual meetings. The fact sheet provides information about the Program including public and agency outreach activities and provides information on how to contact the NJTA regarding the Program.
- **Call Line** – The NJTA maintains a phone number (855-277-8282) that interested persons can use to contact them about the Program.
- **Email** – The Program maintains an email address (nj1to4wpquestions@aecom.com) for the public to submit comments and questions about the Program.

5.1.2 Summary of Public Outreach Activities and Themes

Public outreach activities included elected officials' briefings, meetings with municipal and county officials, and hot line and email activity. These activities and the entities involved are described in the following subsections. The table titled, Summary of Elected and Public Officials' Briefings (Appendix D), summarizes meetings with elected officials and municipal and county officials. **Table 5.1-1** summarizes hot line and email activities. Each table presents the content of the outreach, the input received from the outreach activity, and the NJTA's response to the input.

The following are key themes communicated to the NJTA during public outreach activities for the Program to date:

- Existing traffic congestion, especially around existing interchanges
- Preserve existing or create new direct access points
- Provide emergency access points for first responders
- Community engagement is important for the Program
- Need for coordination with municipalities during the Program
- Potential impacts to residents
- Concerns about Program construction impacts, including temporary ROW needs, road closures, new bridge structures, and effects on traffic operations
- Concerns about Program construction in areas where other projects are planned
- Concerns about additional ROW needs and impacts
- Concerns about Program impacts to existing utilities
- Impacts of the Program on businesses and residents; effects of planned development
- Stormwater and drainage impacts from the Program; existing drainage issues
- Natural environmental impacts
- Historic resources impacts
- Community facility impacts
- Traffic noise impacts; potential for noise barriers
- Concerns about Program cost and source of funding

Table 5.1-1: Summary of Hot Line and Email Activities

Public Correspondence			Key Comment Themes	NJTA Response Actions
Date & Location	**Types**	**Objective**		
6/24/2021. Area of concern: Salem County	E-mail	Public petition to close Courses Land Road	Request from Salem County for coordination with the NJTA regarding the petition to close Courses Landing Road	The NJTA responded by e-mail to the County providing a general description of the Program in the vicinity of the bridge carrying Courses Landing Road over the Turnpike
7/8/2021. Area of concern: Mt. Laurel	Letter	Property ownership. Subject property: 385 Pleasant Valley Ave. in Mt. Laurel	Property has different owner than the address on the notice of field investigation letter	The NJTA noted this information
7/8/2021. Area of concern: Mt. Laurel	E-Mail / Letter	Objection to Program	Letter to Senator Troy Singleton's office addressing concerns about negative impact of noise and traffic flow on the Roger's Walk development in Mt. Laurel adjacent to Interchange 4. Voiced their formal objection to any planned expansion	The NJTA is considering these concerns in the Program design
7/9/2021. Area of concern: Carney's Point	E-Mail	Resident questions. Subject property: 268 Route 40, Carneys Point	Email from Salem County Engineer James McKelvie regarding a resident's concern about the schedule of wetland delineations. General questions were asked; phone number provided	The NJTA's Program Team called the resident and left a voice message. No return call from the resident
7/12/2021. Area of concern: Carney's Point	Voice Mail	Resident question. Subject property: Block 238, Lot 1, Carneys Point	Request for Program information including nature of field investigations	The NJTA shared Program information with the resident by phone on 7/12/2021
7/23/2021. Area of concern: West Deptford	Voice Mail	Property Manager question. Subject property: Block 376 Lot 3.01	Question about noise monitoring location (NML-08) at Heather Ridge Apartments	The NJTA's Program consultant will be onsite during noise measurements and will be available to answer questions

Public Correspondence			Key Comment Themes	NJTA Response Actions
Date & Location	**Types**	**Objective**		
8/31/2021. Area of concern: Mt. Laurel	E-Mail	Resident question	Concern about traffic congestion on roads near Interchange 4	NJDOT is progressing a project to construct improvements along N.J. Route 73 between the I-295 interchange to the north of the Turnpike and the Church Road intersections south of the interchange. These improvements will address congestion along the corridor, including connections with the Turnpike
11/15/2021. Area of concern: Carney's Point	Letter	Noise barrier request in the vicinity of the Layton Lake development	Request for noise barriers	The NJTA's Program consultant is evaluating the warrant for noise barriers and will make a recommendation to the NJTA based on the noise study results and applicable regulations
1/4/2022. Area of concern: Pilesgrove	E-Mail	Resident question. Subject property: Block 2.08, Lot 2	Concern if property would be impacted by the Program	The NJTA's Program consultant responded 1/4/22, asking for property development plans that would be considered during Preliminary Design
3/15/2022. Area of concern: East Greenwich	E-Mail	Gloucester County request for data at Turnpike and East Cohawkin Rd (CR 667)	Request for utilities GIS data	The NJTA noted this request
4/29/2022.	E-Mail	Resident question	Request for more Program information than is on the Fact Sheet	The NJTA will provide more Program information in the Virtual Room
5/16/2022. Area of concern: Interchange 2	E-Mail	Township request	Concern about traffic at Interchange 2 and need for NJDOT coordination	The NJTA had a meeting on 5/16/2022 with NJDOT and developers
6/14/2022.	E-Mail	Resident request	Request to be added to the Program mailing list	The NJTA added this resident to the Program mailing list

Public Correspondence			Key Comment Themes	NJTA Response Actions
Date & Location	**Types**	**Objective**		
7/20/2022. Area of concern: Lawnside	Telephone call	Borough request	Request for meeting regarding the Program and potential effects on Lawnside, including the historic Peter Mott House	The NJTA met with Lawnside on 8/16/2022 on these issues; coordination with Lawnside is on-going
3/30/23. Via Teams Camden County Historical Society	Meeting	Overview of the Program	Society would like to coordinate with the Authority to preserve historic properties and artifacts	The NJTA will continue to coordinate with the Society

Source: AECOM 2022.

5.2 AGENCY COORDINATION

In the context of NEPA and New Jersey Executive Order No. 215, agency coordination establishes and maintains a collaborative decision-making process that engages the agencies with jurisdiction in the Program area in the development of the Program's alternatives, selection of an IPA, and evaluation of the IPA. The objectives of agency coordination are:

- Inform and educate the agencies about the Program;
- Provide opportunities for meaningful input and dialogue throughout the alternatives' development and evaluation processes;
- Understand the agencies' jurisdictions and regulatory requirements in order to better develop alternatives; and,
- Foster productive agency relations.

5.2.1 Summary of Federal and State Agency Coordination Activities

The NJTA is coordinating with Federal and state agencies with jurisdiction in the Program area. **Table 5.2-1** lists these agencies and the table titled, Summary of Agency Meetings and Workshops (**Appendix D),** summarizes the NJTA's coordination activities with these agencies to date. The NJTA keeps these agencies informed of Program activities by means of periodic meetings and other consultation processes such as Section 106 of the NHPA, as amended. In addition, the NJTA has actively considered the agency input it has received, particularly in regard to comparing the alternatives' ability to avoid or minimize impacts, identifying potential strategies to minimize or mitigate adverse impacts, assessing future ability to obtain permits during subsequent design, complying with applicable assessment methodologies, and documenting results. For example, input from the USACE informed the NJTA's evaluation of potential Program impacts to wetlands and waterways.

The following are key themes communicated to the NJTA during agency outreach activities for the Program to date:

- Water resources identification protocols (wetlands, flood hazard areas, and waterways)
- Permits and approvals regarding potential Program impacts to water resources
- Threatened and endangered species
- NJDOT's planned improvements to roadways near interchanges
- Need for coordination with Federal and state agencies during the Program
- Federal environmental review requirements under NEPA
- Requirements under Section 106 of the NHPA

Table 5.2-1: List of Involved Agencies

Federal Agencies
Federal Highway Administration (FHWA)
United States Army Corps of Engineers (USACE)
State Agencies
New Jersey Department of Environmental Protection (NJDEP)
New Jersey Department of Transportation (NJDOT)
New Jersey Historic Preservation Office (HPO)
New Jersey State Police
Other Agencies
Delaware River Port Authority (DRPA)

Source: AECOM 2022

5.2.2 Section 106 Consultation

The NHPA requires that the NJTA considers the effects of the Program on historic properties, which means historic and archaeological resources including above-ground (architectural) and below-ground (archaeological) “districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture” and are eligible for inclusion in or are listed in the National Register of Historic Places (NRHP). In accordance with Section 106 of the NHPA, the NJTA initiated consultation with the New Jersey Historic Preservation Office (NJHPO) in (August 18, 2021, Appendix C). Through consultation, historic and archaeological resources are being identified and the potential effects of the IPA upon these resources are being evaluated. The NJTA is also engaging with other consulting parties in this evaluation process.

5.2.3 Agency Coordination After the EIS

Following completion of the EIS, the NJTA will continue agency coordination to obtain required permits and approvals for the Program. The role of the regulatory agencies will be to evaluate the Program in the context of applicable Federal, state, and other laws and regulations; consider the impacts of the Program on the environment; guide the NJTA toward measures to avoid or minimize harm to the environment through design refinement and assist the NJTA in identifying appropriate mitigation commitments to address impacts as part of obtaining regulatory approvals.

5.3 ROLE OF INPUT IN THE SELECTION OF THE IPA

The NJTA’s selection of the IPA is the result of considering the engineering, environmental, stakeholder, public, and agency input during the conceptual and preliminary design phases of Program development. Comments and information provided by elected officials, government representatives, and regulatory agencies helped the NJTA design the Program improvements in ways that consider other projects that are planned in the Program study area, coordinate with

the sponsors of those plans (such as NJDOT), and avoid or minimize impacts to the natural and built environment to the extent practicable.

5.4 NEXT STEPS

As the Program advances to Final Design, the NJTA will continue public and agency outreach activities. These activities will continue to inform the Program design and decision-making, and allow the NJTA to continue responding to public and agency concerns in the following ways:

- Continue to address concerns about the Program; and
- Refine the Program design to reduce or eliminate impacts.

As required by NJ Executive Order 172, the NJTA is required to undertake public outreach for the Program. This requirement will be fully achieved during Final Design when public and agency outreach continues through the design and environmental permitting processes.