NASSAU HUB TRANSIT INITIATIVE ALTERNATIVE ANALYSIS UPDATE

Alternatives Analysis Final Report

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Executive Summary

The Nassau Hub Transit Initiative Alternatives Analysis (AA) Update Report identifies a preferred bus rapid transit (BRT) service alternative that extends Nassau County's 2014 Initial Operating Segment (IOS) to the Long Island Rail Road (LIRR) Main Line. The service extension will further the County's efforts to address congestion, create enhanced connectivity between major destinations and the LIRR, and provide increased service to vulnerable, underserved, and disadvantaged communities. The AA's Study Area (Study Area) includes the Nassau Veterans Memorial Coliseum (Nassau Coliseum), and is home to multiple commercial, downtown, and institutional activity centers that will benefit from expanded transit access (see Figure E-1).

Figure E-1: Alternatives Analysis Update Study Area (Left) and Study Area Location on Long Island (Right)

In 2014, Nassau County undertook an Alternatives Analysis (2014 AA) to identify a transportation alternative to connect the Village of Hempstead, the Nassau Coliseum, and the Village of Mineola. The 2014 AA identified a transit alternative, known as the Locally Preferred Alternative (2014 LPA), that provided the aforementioned connections, in addition to other key ridership Generators. To advance service, the County pursued implementation of an initial operating segment (IOS) of the 2014 LPA using BRT technology. The IOS balances transit benefits to the community, capital costs, operations and maintenance costs, and construction time. The IOS connects the Village of Hempstead

to Roosevelt Field Mall, with stops at key destinations such as Nassau Community College and the future development at the Nassau Coliseum site.

In 2019, Nassau County initiated the process of further analyzing Alternatives to connect the IOS to the LIRR Main Line due to changes in trip-making characteristics, growth, and infrastructure investment. New transit and development opportunities, such as the LIRR Third Track Project, the potential to connect to the LIRR via underutilized existing transit infrastructure, New York State's Downtown Revitalization Initiative to transform downtowns into vibrant, walkable communities, and other transit-oriented development around LIRR stations provided the County with a basis to explore a connection between the IOS and the LIRR Main Line. This project, referred to as the Nassau Hub Transit Initiative AA Update (Project), examines opportunities for introducing realistic and practical transit improvements within the Study Area. This report summarizes the work associated with the development and evaluation of BRT Alternatives for a new LPA that extends from the IOS to the LIRR Main Line.

Purpose and Need, Goals and Objectives

The purpose of the AA Update is to identify an Alternative within the Study Area that extends from the IOS, addresses congestion on County roadways, provides more efficient connections between major destinations, and supports new condensed development patterns, such as potential future development at the Nassau Coliseum site. New housing and business developments within the Nassau Hub area, enhancement of LIRR train service along its Main Line, and the shift in attitude toward alternative modes of transportation provide new connectivity opportunities that were not anticipated in previous work.

The Alternatives developed and evaluated intend to achieve the following purposes for the Study Area:

- Improve public transit service to, from, and within the congested Nassau Hub area by providing increased transit capacity, more reliable and less time-intensive service, and convenient access to and from major Nassau County employment and activity centers, such as the Nassau Coliseum site, for residents, employees and visitors.

- Enhance regional connectivity to and from the Nassau Hub area by expanding and connecting local transit services and the IOS with the LIRR Main Line in Nassau County, and improve intermodal transit hubs where rail, bus, automobile, bicycle, and pedestrian links connect.

- Increase transit ridership by expanding transit services and facilities in an area with ever-increasing travel demand that can no longer be met by existing or proposed roadway facilities.

- Mitigate congestion through the provision of attractive, efficient transit options.

- Support transportation solutions that will be instrumental in improving the economic vitality and continuing redevelopment in the Nassau Hub area.

- Improve mobility for residents, employees, and visitors to employment, educational, recreational, medical, healthcare, research and retail centers.
- Improve regional air quality by reducing or slowing the growth in automobile emissions.
- Support local and regional land use plans and facilitate municipalities' efforts to direct redevelopment opportunities in condensed development patterns.

The following are the needs identified for the Study Area that are addressed through the implementation of BRT service proposed in the AA Update:

- Support transit-oriented economic development opportunities and land use plans.
- Expand transportation system capacity.
- Increase travel choices.
- Provide more reliable travel times.
- Improve transit access and connectivity and prioritize equitable transit access.
- Better integrate the expanded LIRR service into local and regional transit options.
- Provide improved off-peak and reverse-peak trip-making options.
- Improve operational efficiency.
- Improve environmental quality.

Following the identification of the Project's Purpose and Need, the following Goals and Objectives were defined for the Project.

- **Goal 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.**
    - Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible.
    - Develop a public transportation Alternative that has the best potential to attract a maximum number of riders, including non-transit-dependent riders (i.e., choice riders) and transit-dependent riders.
    - Increase public transportation options as a means of access to, from, and within the Study Area.
    - Develop a transit Alternative that encourages use of alternate modes of transportation other than by automobile to access the transit system (e.g., walking, bicycling, carpooling, and other travel demand management methods).
    - Identify a transit Alternative that is capable of growing and adapting to changes in the demand for service.

- **Goal 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.**
    - Provide improved transit access for choice and non-choice riders to, from, and within the Study Area and serve vulnerable and underserved populations, including disadvantaged communities and environmental justice (EJ) communities.
    - Maximize benefits and new opportunities presented by LIRR service enhancements (i.e., Main Line Third Track and Eastside Access).
    - Develop an Alternative that will have a capital cost that is consistent with anticipated financial resources and operating and maintenance (O&M) costs that can be funded with federal, state, and local resources.
    - Develop an Alternative that provides travel time savings compared to existing options.
    - Reduce travel time and costs associated with congestion.
    - Develop an Alternative that is capable of being funded for construction through traditional or Alternative funding/financing mechanisms.
    - Explore Alternatives that can be phased incrementally and are consistent with available funding.
    - Develop an Alternative that is conducive to implementation through Alternative project delivery structures.
    - Develop transit infrastructure that can be reasonably adapted to changes in technology.
- **Goal 3: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.**
    - Use transit to better serve existing and planned activity centers and connect to existing and planned development opportunities.
    - Support the Nassau Coliseum site as directly as possible from the LIRR Main Line.
    - Develop a seamless, convenient and integrated regional transportation system that connects to existing and planned activity centers and connects to existing and planned development opportunities.
    - Use transit to support concentration of growth in designated areas, including transit-oriented developments.
    - Locate transit to enhance the economic competitiveness of the Study Area, creating new job opportunities, and support existing business.
    - Develop a transit Alternative that can be supported by local land use plans and development policies.
- **Goal 4: Develop transit improvements that enhance quality of life and promote sustainability.**

- Coordinate transit infrastructure and services with land use to promote sustainability, livability, and enhance quality of life.
- Use transit as part of a regional approach to address congestion-related air quality concerns and regional air quality conformity; mitigate greenhouse gas emissions; and mitigate overall energy consumption for trip making.
- Encourage uses at street level that will support a lively streetscape at a pedestrian scale with diverse activity in the vicinity of station areas.
- Incorporate alternative fuels and energy sources into the transit Alternative, as appropriate.

- **Goal 5: Develop transit improvements that are resilient and address physical, social, economic, and technological challenges.**
  - Develop adaptive transit infrastructure that can maintain or restart operations under various conditions.

ALTERNATIVES EVALUATION SCREENING PROCESS

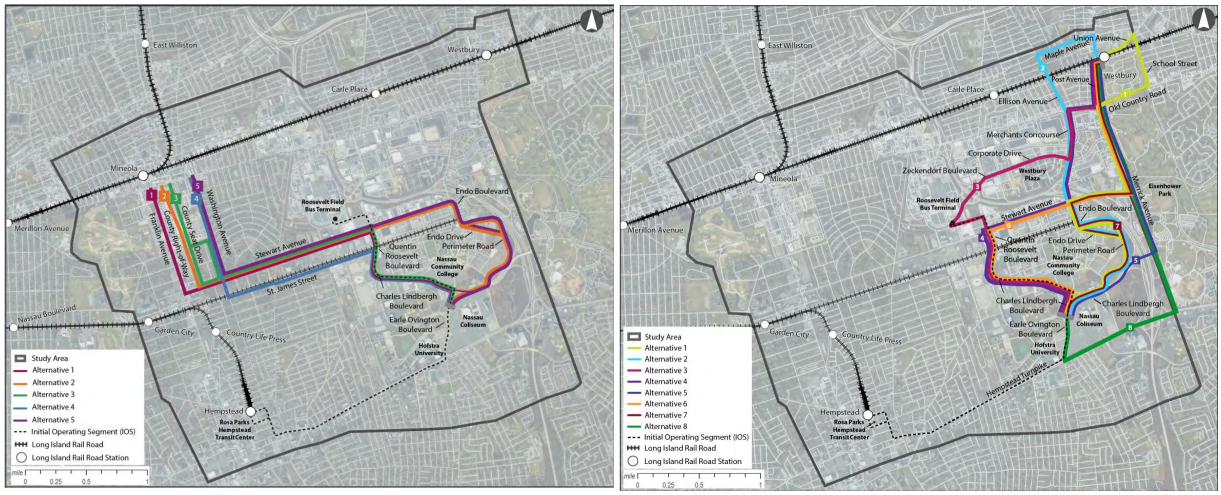
A three-tiered screening evaluation process was used to identify the BRT Alternative that best met the Goals and Objectives of the Project. Each tier of screening builds upon the other and utilizes specific evaluation criteria and metrics established specifically for the Project. The results of the three-tiered screening are as follows:

Tier 1 Screening: Long List Screening

The Long List Screening evaluated the Project's five goals and corresponding objectives against 13 BRT Alternatives proposed to establish a connection from the IOS to the LIRR Main Line in either the Village of Mineola or the Village of Westbury, referred to as the Main Line Connection (see Figure E- 2).

- Mineola Alternatives: Three out of five Alternatives (Alternatives 2, 3, and 5) met the Goals and Objectives and were advanced to the next screening tier. Two Alternatives (Alternatives 1 and 4) did not satisfy the Goals and Objectives related to existing traffic conditions along the alignment and compatibility with surrounding land uses and roadway capacity, respectively, and were not advanced to the Tier 2 Screening.
- Westbury Alternatives: Four out of eight Alternatives (Alternatives 5, 6, 7, and 8) met the Goals and Objectives and were advanced to the next screening tier. Three Alternatives (Alternative 1, 3, and 4) did not meet the Goals and Objectives related to operational constraints (number of turns). Alternative 2 did not meet the Goals and Objectives related to compatibility with surrounding land uses and roadway capacity. Alternatives 1, 2, 3, and 4 were not advanced to the Tier 2 Screening.

Figure E- 2: Long List Alternatives Mineola (Left) and Westbury (Right)

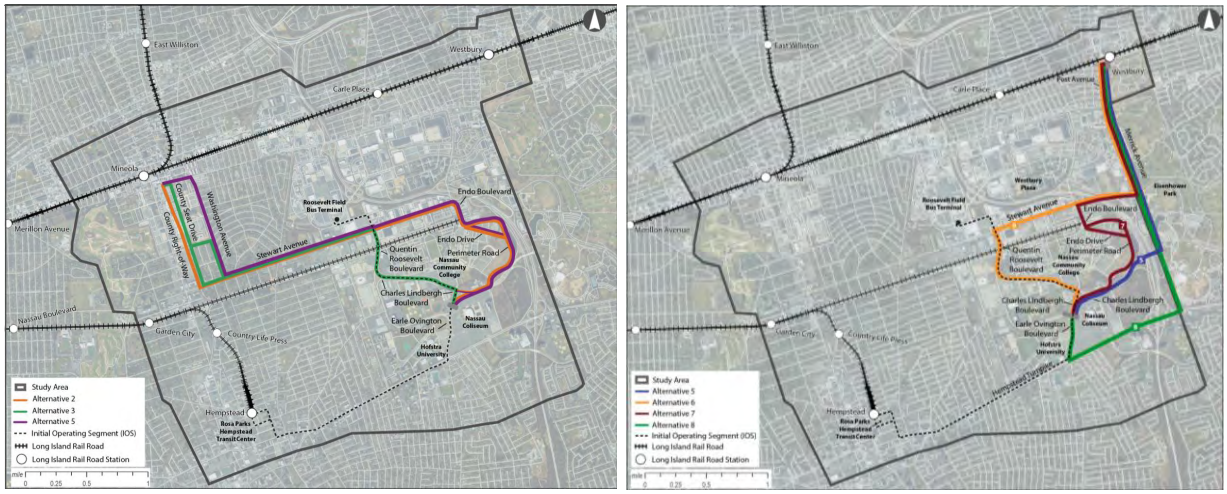


Tier 2 Screening: Refined Long-List Screening

The Refined Long-List Screening evaluated the seven remaining Alternatives against Goals 1, 2, and 3 and corresponding objectives (see Figure E- 3). Goals 4 and 5 were not evaluated because all remaining Alternatives would support them. Additionally, the Refined Long-List Screening utilized a two-phase screening process to prioritize travel time as the most important factor, followed by an analysis of the other Goals and Objectives.

- Mineola Alternatives: Alternative 2 best satisfies the Goals and Objectives and provides the fastest travel time and best access to infill development that are supportive of BRT service, compared to Alternatives 3 and 5. Coordination with key decisionmakers for the Main Line Connection to Mineola did not proceed far enough to advance the Mineola Alternatives. Therefore, no Mineola Alternatives were advanced to the Tier 3 Screening.
- Westbury Alternatives: Alternatives 5, 6, and 7 best satisfy the Goals and Objectives, and balance travel time and access to key destinations that are likely to generate ridership. Alternative 6 provides slightly better access to Attractors and Generators compared to Alternative 7 because of its two stops adjacent to Nassau Community College. Alternative 5 provides less access to key destinations compared to Alternatives 6 and 7. Alternative 8 had the longest travel time compared to the three other Alternatives and was not carried forward to the Tier 3 Screening.
- Coordination with key decisionmakers for the Main Line Connection to the Westbury LIRR station progressed throughout this AA Update process. As a result, all three remaining Refined Long List Alternatives to the Westbury LIRR station (Alternatives 5, 6, and 7) were advanced to the Tier 3 Screening.

Figure E- 3: Refined Long-List Alternatives for the Mineola (Left) and Westbury (Right) Mainline Connection



Tier 3 Screening: Short List Screening

The Short List Screening evaluated the remaining three Alternatives against the Goals 1, 2, and 4 and corresponding objectives against Westbury Alternatives 5, 6, and 7, which were further refined after the Refined Long-List Screening to include an operational variation "A" for Alternatives 5 and 7 (see Figure E- 4). Under Alternatives 5A and 7A, the near-term IOS Phase One service would continue to run in addition to the proposed Main Line Connection service. Operational variation "A" would not be implemented for Alternative 6 as it would provide overlapping service with the near-term IOS Phase One service, except for the connection to between Stewart Avenue and Roosevelt Field Mall. Subsequent to the Refined Long-List Screening, the remaining Westbury Alternatives were further analyzed for their physical and operational characteristics, capital, operations and maintenance costs, ridership, and potential for environmental impacts.

- Westbury Alternative 6 best met all Goals and Objectives for the Short-List Screening compared to Alternatives 5, 5A, 7, and 7A. Alternative 6 connects the Village of Hempstead to the Village of Westbury via the IOS alignment, Stewart Avenue, Merrick Avenue, and Post Avenue. **Alternative 6 was recommended to advance as the LPA for the Nassau Hub Transit Initiative Main Line Connection BRT service.**

Figure E- 4: Short-List Screening Alternatives for the Westbury Mainline Connection

TECHNICAL ADVISORS, STAKEHOLDER AND PUBLIC ENGAGEMENT

Throughout the alternative evaluation screening process, the Nassau County Transit Initiative engaged with technical advisors, stakeholders, and the public to develop the Main Line Connection BRT service.

Nassau County solicited input from Technical Advisors and Stakeholders as part of the AA process. Technical Advisors, representatives from municipal, county, and federal agencies and select service providers operating within the immediate Study Area, were engaged throughout the Project and their inputs were used to refine alignment Alternatives. Regular meetings occurred with the Federal Transit Administration (FTA) Region 2 and Nassau Inter-County Express (NICE) Bus, and representatives from the Metropolitan Transportation Authority (MTA), LIRR, New York State Department of Transportation (NYSDOT) Region 10, the New York Metropolitan Transportation Council (NYMTC). Nassau County Commissioners were asked to provide input and guidance as needed. Stakeholders were also engaged at key points in the Project to offer feedback on how alignment Alternatives could better service their constituents and the public. Stakeholders included representatives from local and regional business organizations, institutions, community and environmental groups, and other civic entities, as well as elected officials and governmental entities.

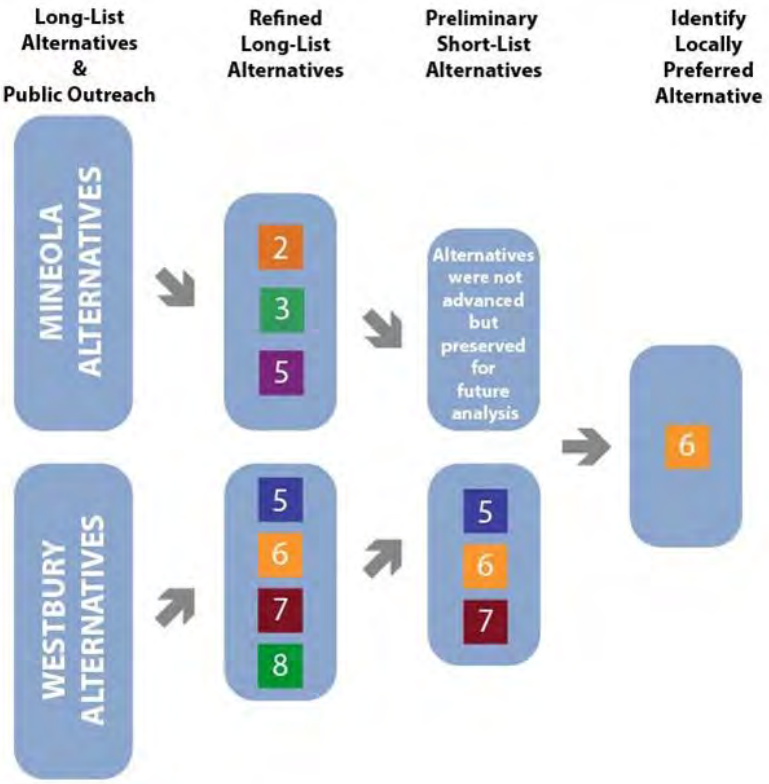
A virtual public meeting was held in January 2023 to obtain feedback and address questions about the Project. The meeting outlined the Goals and Objectives of the Nassau Hub Transit Initiative, including identifying realistic and practical travel options, enhancing mobility and supporting transit equity, supporting sustainable and transit-friendly land use patterns and economic development, and increasing quality of life while minimizing adverse environmental impacts, among others.

Additionally, the meeting reviewed the proposed Main Line Connection and Recommended Long-List Alternatives. Responses to questions and comments received during the public meeting and comment period were posted on the Project's website (www.nassauhubtransit.com).

LOCALLY PREFERRED ALTERNATIVE AND NEXT STEPS

The AA's three-tier screening process resulted in the selection of Alternative 6 as the preferred alternative and, subsequently, the AA Update's LPA for the Nassau Hub Transit Initiative Project (see Figure E- 5).

Figure E- 5: Alternative Analysis Three-Tiered Refinement Process



Alternative 6 connects the Village of Hempstead to the Village of Westbury and provides the best balance between travel time savings, connections to Attractors and Generators, and maximizes existing County investment. Alternative 6 utilizes approximately 95 percent of capital work being completed for the implementation of the IOS alignment to Roosevelt Field Mall. Alternative 6 serves five ridership Attractors and Generators, including two stops that serve Nassau Community College on the north and south side of the campus. This allows for enhanced access to Nassau Community College from either the Westbury or Hempstead terminus. Alternative 6 could potentially connect to four Nassau Inter-County Express Bus routes and serves four infill residential developments within the Study Area. Comparably, Alternative 6 has the highest projected ridership and total new riders out of all three Short-List Alternatives This translates to the lowest annualized operations and maintenance cost per trip and the highest farebox recovery ratio.

Key quantitative characteristics of Alternative 6 include:

- Uses 95 precent of the IOS alignment
- Annual Ridership: 1,790,256
    - 1,102,920 transit dependent riders
    - 687,336 non-transit dependent riders
- Daily Ridership: 5,738
- Capital Cost Estimate: $1.9 million ($2023)
- Operations and Maintenance Annual Estimate: $7.4 million ($2023)
- Operations and Maintenance Estimate per trip: $4.12 ($2023)
- Farebox Recovery Ratio: 67 percent

Figure E- 6: Locally Preferred Alternative for the Westbury Mainline Connection: Alternative 6

The AA and the selection of an LPA satisfies the FTA requirements for a project to be eligible for federal funds. Nassau County intends to pursue federal Small Starts funds, among other sources, for the design and construction of the Main Line Connection. Next steps for the project include the following:

- Ongoing coordination with the FTA and stakeholders as project development advances.
- Ongoing coordination with the leaseholder and development team of the Nassau Coliseum site (Las Vegas Sands), as it pertains to future development.
- Identifying state and local funding opportunities and working with local entities to refine funding sources.
- Refining project costs as the LPA is developed in more detail during the design phases.
- Completing the environmental review phase of project planning.
- Developing a detailed cash flow analysis and refining the overall financial plans.

1 Introduction

The purpose of the Nassau Hub Transit Initiative Alternatives Analysis (AA) Update Report is to identify a preferred bus rapid transit (BRT) service Alternative that extends the 2014 Initial Operating Segment (IOS) to address congestion, create enhanced connectivity between major destinations and the Long Island Rail Road (LIRR), and provide increased service to vulnerable, underserved, and disadvantaged communities. The Nassau Hub Transit Initiative AA Update Study Area (Study Area) includes the Nassau Veterans Memorial Coliseum (Nassau Coliseum), and is home to multiple commercial, downtown, and institutional activity centers in the communities of Uniondale, Westbury, Carle Place, Mineola, Garden City, and Hempstead. New transit-oriented and commercial development, expansion of LIRR train service along the Main Line resulting from the Third Track Project, and a shift in attitude towards public transportation have provided an opportunity to extend the IOS developed previously for the 2014 Nassau Hub Alternatives Analysis Report (2014 AA).[1]

In the 2014 AA, 14 alternative alignments to connect key employment, transit, and entertainment activity centers were developed and analyzed. These Alternatives focused on connecting the Mineola and Hempstead LIRR stations and the Nassau Coliseum site to various Attractors using BRT or light rail service. From the 14 alignments, a Locally Preferred Alternative (2014 LPA) alignment was identified by Nassau County, and an IOS was developed and advanced for BRT service. This current effort would provide an extension of the IOS and associated BRT service, and expand the connections to the LIRR Main Line.

Nassau County is home to over 1.35 million residents who commute to jobs, schools, and activities throughout the region. The County's proximity to New York City (NYC) has led to historically strong east-west public transportation options to access NYC market opportunities. While LIRR service connects north, central, and southern Nassau County to terminals located in Brooklyn, Queens, and Manhattan, the County lacks strong north-south transit connections to emerging job and activity centers. Providing intra-county north-south transit connections is a critical component for achieving the County's current planning objectives to incentivize residential development near transit and promote alternate modes of transportation over cars.

North-south connections in Nassau County are predominately served via private cars or Nassau Inter-County Express (NICE) Bus service. Both options compete for constrained roadway capacity in a network which experiences congestion during peak-hour commutes. Most County residents choose to drive to work rather than take public transportation. Over 70 percent of commuters drive or carpool, options that only exacerbate traffic congestion.[2] As the County continues to develop infill employment and residential hubs, a shift towards first-tier public transportation options are needed to connect residents to these new destinations and encourage the use of transit.

1 http://nassauhubtransit.com/
2 United States Census Bureau American Community Survey 2019 5-Year Estimate (Commute to Work) Nassau County, New York

On any given day the Nassau Hub area experiences widespread transportation issues that contribute to both economic and environmental challenges. Inadequate transportation services and widespread suburban sprawl have led to an ever-increasing dependency on automobiles.[3] This dependency has led to congested roadways during peak hours and an increase in commuting time to jobs, schools, and other activities. The New York Metropolitan Transportation Council (NYMTC), the region's metropolitan planning organization, forecasts that congestion in Nassau County will only get worse as population and employment continue to grow. These transportation problems not only affect daily commuters, but limit the County's ability to capitalize on economic development opportunities and preserve the high-quality suburban lifestyle that residents and businesses expect. New housing and business developments may increase the reliance on automotive travel if the area is not adequately served by efficient public transportation options.

The AA Update Report identifies a preferred BRT Alternative and service that would extend from the IOS, and could address congestion and create enhanced north-south connectivity in the Nassau Hub area. This report is structured as follows:

- **Section 2, Existing Conditions,** discusses updated socioeconomic and demographic data.
- **Section 3, Purpose and Need, Goals and Objectives,** identifies the Study Area's needs that should be addressed by the proposed BRT service and establishes the Goals and Objectives used to measure the proposed BRT Alternatives outlined in Section 4.
- **Section 4, Long-List Alternatives Screening,** assesses the feasibility of BRT Alternatives that provide a direct service between the LIRR Main Line and the Nassau Coliseum site.
- **Section 5, Refined Long List Alternatives Screening,** further reviews the BRT Alternatives that advanced through the Long-List Screening. The screening results in the Alternatives that advance to the Short-List Screening.
- **Section 6, Physical Characteristics of Short-List Alternatives,** identifies the physical characteristics that would be needed to implement the Short-List Alternatives.
- **Section 7, Land Use and Development,** identifies existing and proposed development and redevelopment opportunities within key communities and at significant activity centers affected by one or more of the Short-List Alternatives.
- **Section 8, Operations,** presents a draft preliminary operating plan for the Short-List Alternatives. All Alternatives are proposed as a BRT service.
- **Section 9, Capital Cost,** presents draft preliminary capital cost estimates for the Short-List Alternatives.

3 Nassau Hub Study AA/EIS, Alternatives Analysis Report, Section 2 - Problem Statement, Purpose and Need, Goals and Objectives

- **Section 10, Ridership,** outlines the ridership forecast approach and summarizes ridership and modeling results for the Short-List Alternatives.

- **Section 11, Operating and Maintenance Cost,** provides an overview of the development and structure of operating and maintenance (O&M) costs and summarizes draft preliminary order-of-magnitude O&M cost estimates for the Short-List Alternatives.

- **Section 12, Environmental Screening,** identifies environmental issues that would preclude the implementation of the Short-List Alternatives.

- **Section 13, Public and Agency Involvement,** identifies the procedures undertaken to engage pertinent agencies, municipalities, stakeholder representatives, and the general public throughout the AA process.

- **Section 14, Short List Alternatives - Screening Results and Locally Preferred Alternative,** identifies and evaluates the BRT Alternatives that advanced to the Short-List Screening, summarizes the results, and identifies an LPA.

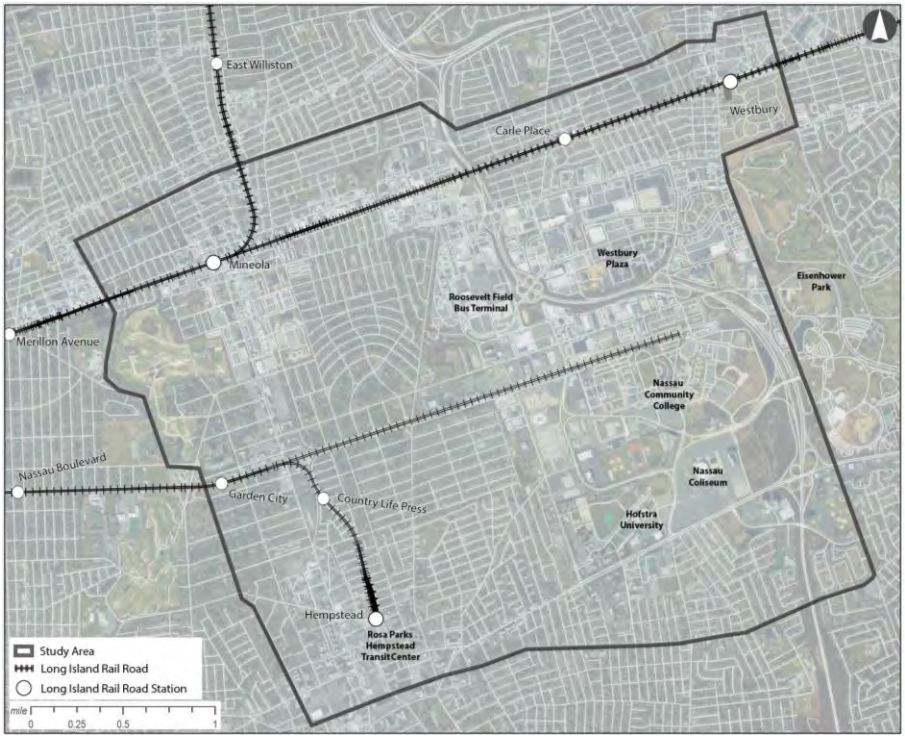
1.1 PURPOSE

The purpose of the AA Update Report is to identify a preferred BRT service Alternative that extends from the IOS, addresses congestion and creates enhanced connectivity between major destinations in the Nassau Hub area and the LIRR, and increases service to environmental justice (EJ) communities. The Study Area, which includes the Nassau Coliseum site, is home to multiple commercial, downtown, and institutional activity centers in the communities of Uniondale, Westbury, Carle Place, Mineola, Garden City, and Hempstead. New transit-oriented and commercial development, expansion of LIRR train service along the Main Line such as the Third Track Project, and a shift in attitude towards public transportation, have all provided an opportunity to expand and refine the findings from the 2014 AA and extend the reach of the IOS.

1.2 ALTERNATIVES ANALYSIS UPDATE STUDY AREA

The Study Area occupies approximately 10.3 square miles (SQ MI) in the heart of Nassau County, and is bounded by Jackson Avenue and Harvard Avenue to the north, Eisenhower Park to the east, New York State Route 102 (Front Street) to the south, and Cathedral Avenue-Rockaway Avenue to the west (see Figure 1-1).

Figure 1-1: Alternatives Analysis Update Study Area (Left) and Study Area Location on Long Island (Right)



Source: WSP, 2022

2 Existing Conditions

The following section describes existing demographic and socioeconomic conditions, which were compiled using data from 2010 through 2019, prior to the COVID-19 pandemic. The pandemic has brought about a significant change to travel patterns and transit use. The way people work has evolved in response to changing schedules for many office workers as remote work from home or other locations and more flexible hours are becoming the reality for a large portion of the workforce. While these shifts have yielded changes in ridership levels and travel demand patterns over previous years, it is too soon to say to what extent these changes will be permanent. Additionally, the U.S. Census Bureau's American Community Survey (ACS) 5-Year Estimate for 2016 to 2020 was delayed. Therefore, ACS data for 2020 and onward is not included in this analysis. In some instances, data from other sources was used to support the existing conditions analysis to further identify trends.

The purpose of analyzing existing conditions is to review recent land use, socioeconomic, and transportation trends over the last several years to inform development of the BRT service proposed in the AA Update. These patterns are representative of where residential and commercial developments are growing (or receding), as well as where opportunities exist to improve transit services between key employment, residential, and transit hub destinations. Understanding how people travel is useful in highlighting the Study Area's reliance on automotive travel—as well as external factors such as traffic—and where public transit can and should be improved. This is also useful in projecting potential ridership on future transit systems. All of the variables explored in this section help identify key trends in the Study Area that influence decisions made when developing the proposed BRT service.

2.1 HISTORIC DEVELOPMENT PATTERNS

Nassau County, previously part of Queens County, was first settled in the early 1600s by colonists from Connecticut. At the center of Nassau County was an area known as the Hempstead Plains, one of the few natural prairies east of the Allegheny Mountains. Remnants of the prairie remain in the Hempstead Plains Preserve and parts of Eisenhower Park. In the early years, settlers established agricultural and fishing communities. One of the oldest commercial centers is the Village of Hempstead in the southwest corner of the Nassau Hub area. Other colonial-era settlements include the Villages of Mineola and Westbury. The agricultural towns grew slowly through the early 1700s. By the late 1800s, Long Island supplied the Greater NYC area with farm products and was known as a resort area for wealthy New Yorkers. Also, by this time, the basic road network that serves the area was in place. This included the "hub-and-spoke" road network that is centered in the Village of Hempstead, with Old Country Road to the north and Hempstead Turnpike to the south.

In 1834, the LIRR Company was chartered to create a faster connection between NYC and Boston via ferry connections at Greenport. In the mid-1800s, the LIRR had to change its emphasis to local service and constructed branches off its main line to connect to existing shoreline villages to increase ridership because a quicker route to Boston was developed through Connecticut. By the late 1860s,

other railroad companies built their own routes to fill voids within the system, many of which were later sold or leased to the LIRR. In 1905, the first segments of the LIRR system were switched from steam-powered trains to electric.[4] In 1965, the Metropolitan Commuter Transportation Authority was created to purchase the LIRR and it became a public agency that was eventually incorporated into the Metropolitan Transportation Authority (MTA).[5] In 1968, the Pennsylvania and New York Central Railroads merged to form Penn Central, and in 1969, the New York and New Haven & Hartford Railroads were added to the merger.[6] Many of these original rail stations are at the heart of Nassau County's traditional downtowns, including the Village of Mineola, the Village of Westbury, the Village of Garden City, and the Village of Hempstead in the Study Area.

The most significant increase in Nassau County's population occurred after World War II when returning veterans moved to Long Island and started families. Development followed the parkways and highways, while downtowns formed around LIRR stations, and Long Island began its transformation as the paradigm of America's suburbs. This automobile-oriented development pattern predominated and led to Nassau County's status throughout the mid- to late-1900s as a bedroom suburb of NYC. Between 1950 and 1960, the population doubled, increasing from 672,000 to 1,300,700, reaching a peak of 1,428,838 in 1970. As suburban development and the reliance upon the automobile for transportation increased following World War II, the parkways, which had been designed for a different era, came under increasing pressure from commuter-related and other general increases in traffic.

Today, Nassau County's roadway network faces similar pressure as commuters continue to choose automobiles as their first choice for transportation.

2.2 LAND USE TRENDS

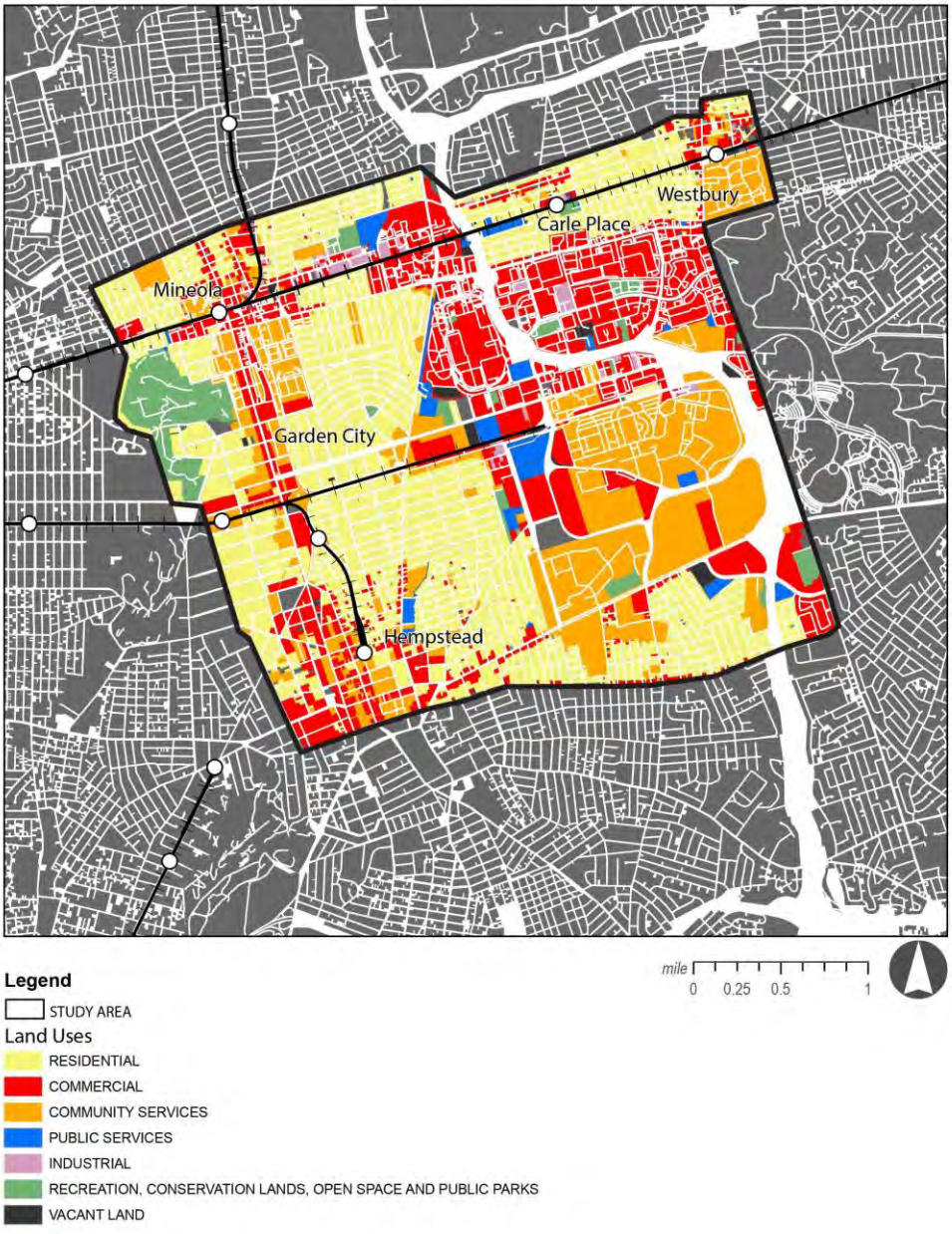
2.2.1 Land Use

Land use information was analyzed to better understand changes in development patterns within downtown areas and around transit hubs. This information helps to inform both future development opportunities and future transit services, which lead to increased connections between key employment and residential destinations.

The Study Area contains the largest concentration of commercial uses within Nassau County, including a regional mall, hotels, numerous office complexes, and a wide variety of shops, restaurants, and service establishments (see Figure 2-1). As shown in Table 2-1, approximately 20 percent of land in the Study Area is dedicated to commercial uses (e.g., Roosevelt Field Mall and land adjacent to Stewart Avenue to the east). Nineteen percent of the land within the Study Area is dedicated to community service (e.g., municipal buildings for Nassau County, the Villages of Mineola, Hempstead and Westbury, and Nassau Community College). About 32 percent of the total Study Area is dedicated to residential use, including both single-family homes and multi-family apartment buildings.

4 https://www.brooklynhistory.org/photos-of-the-week/electrification-of-the-long-island-railroad-in-brooklyn/
5 https://en.wikipedia.org/wiki/History_of_the_Long_Island_Rail_Road
6 https://www.american-rails.com/pc.html

Figure 2-1: Existing Land Use in the Study Area



Source: WSP, Nassau County Land Use Data, 2017

Table 2-1: Land Use Breakdown in the Study Area

Land Use	Description	Acreage	Percentage of Study Area
Residential	Areas used for housing	2,119	32%
Commercial	Areas used for offices, retail, services, and other commercial uses	1,327	20%
Community Services	Areas used for educational, health, cultural, and government services	1,258	19%
Recreation/ Parks	Areas used for recreational uses (parks, playgrounds, golf courses)	480	7%
Public Services	Areas used for electrical, water, and other utilities	125	2%
Industrial	Areas used for manufacturing	56	1%
Conservation	Areas used for nature preserves	45	1%
Vacant or Unknown	Areas of unused land	139	2%
Roadway Network	Roadway	1,043	16%
TOTAL		6,592	100%

Source: Nassau County Land Use and Zoning Data, 2017

2.2.1.1 Healthcare and Education

Nassau County is home to 11 junior colleges, colleges, and universities, with a combined total enrollment of over 80,000 students. Two institutions, Hofstra University and Nassau Community College, are located within the Study Area. Hofstra University has a total enrollment of approximately 10,000, while Nassau Community College has approximately 12,600 full and part-time students and 15,000 continuing and professional education students.[7] [8]

Academic institutions often collaborate with major medical facilities. This cooperation is exemplified by the North Shore-Long Island Jewish Hospital (beyond the Study Area limits), which opened a medical school and dormitories on the Hofstra University campus. In addition, Adelphi University, with a total enrollment of approximately 8,000 students, is in the Village of Garden City, just west of the Study Area.[9] This academic institution is the fourth largest nursing school in the nation and offers clinical service support for the Nassau University Medical Center. The New York University Langone Hospital–Long Island Research Institute at 101 Mineola Boulevard serves as a new, three-year accelerated medical school. Additionally, Sloan Kettering Cancer Center, at 1101 Hempstead Turnpike, recently opened a facility at the Nassau Coliseum site and across the street from Hofstra University.[10]

2.2.1.2 Attractors/Generators Within the Study Area

Within the Study Area, there are 10 activity centers (Attractors/Generators) that have the greatest impact on transit usage. The Attractors/Generators in the AA Update are based on both information previously evaluated and recent research to identify new ridership Generators, such as transit-oriented developments (Figure 2-2). Of the 10 defined activity centers defined by this AA Update, seven were designated as "Essential Attractors/Generators" that are crucial locations to be served

7 https://www.hofstra.edu/about/about_glance.html
8 https://www.nassaucountyny.gov/DocumentCenter/View/2677/2013-2014-NCC-Propsoed-Budget?bidId=
9 Adelphi University. Quick Facts. https://about.adelphi.edu/overview/quick-facts/fact-sheet/ (April 8, 2019)
10 https://www.newsday.com/business/hempstead-town-oks-plan-for-cancer-center-at-coliseum-site-q60079

by the new transit improvements. These seven Essential Attractors/Generators are anticipated to drive ridership based on their importance within the community:[11]

1) **Downtown Village of Mineola and Mineola Intermodal Center**: This activity center includes a major healthcare employer, connection to the LIRR Main Line, and the Mineola Intermodal Center that connects to NICE Bus service.
2) **Downtown Village of Westbury and Westbury LIRR Station**: This activity center is part of New York State's Downtown Revitalization Initiative, which seeks to revitalize downtowns through rezoning and redevelopment.
3) **Downtown Village of Hempstead and Rosa Parks-Hempstead Transit Center**: This activity center includes the Nassau County District Court, retail and commercial businesses, and the Rosa Parks-Hempstead Transit Center, which connects NICE Bus and the LIRR Hempstead branch.
4) **Nassau Community College**: This activity center is located at Mitchel Field and is the largest single-campus community college in the State University of New York system. It is both a major educational and employment hub.
5) **Nassau Coliseum and the Future Development at the Site**: This activity center is a major sports and entertainment facility with approximately 13,900 to 16,000 seats.[12] This activity center is also the location for proposed additional development.
6) **Hofstra University**: This activity center is a private university on a 240-acre campus. It is a major educational and employment hub near the Nassau Coliseum site.
7) **Roosevelt Field Mall and Roosevelt Field Bus Terminal**: This activity center is a retail and employment hub and a major bus depot that serves as a transfer point for NICE Bus service. The mall is the second largest indoor mall in the state of New York.

The following three activity centers were deemed Important Attractors/Generators that should be served by the new transit improvements, if possible:

1) **Nassau County Government Complex**: This activity center includes the Nassau County Clerk's office, Nassau County District Attorney's office, Nassau County Supreme Court, Nassau County Probation Department, and Nassau County Department of Health.
2) **Westbury Plaza**: This activity center is a major big-box store location, including Best Buy, Walmart, and Costco, and is adjacent to the Gallery at Westbury Plaza.
3) **Museum Row**: This activity center is a cultural hub and includes the Cradle of Aviation Museum, the Long Island Children's Museum, the Nassau County Firefighters Museum, and Nunley's Carousel.

11 The Nassau Hub Study AA/EIS Long-List Alternatives Technical Memorandum, March 2011.
https://www.nassaucoliseum.com/about/about-us

Figure 2-2: Essential and Important Attractors/Generators

Source: WSP, 2022

2.2.2 Planned, Committed, and Constructed Developments

Over the past five years, the Study Area has experienced continuous construction of residential and commercial developments. It has become increasingly desirable to build residential units near transit hubs, a trend that is evident in the Villages of Mineola, Westbury, and Hempstead.

In Mineola, the Allure at 140 Old Country Road, One Third Avenue at 250 Old Country Road, and Morgan Parc at 199 Second Avenue were developed within walking distance of the Village of Mineola LIRR train station.[13] Another new transit-oriented development still in development includes the BLD Mineola located between Third Street and Mineola Boulevard, and Station Road.[14] As part of the LIRR Expansion Project between Floral Park and Hicksville, two new parking garages between Main Street and Willis Avenue and on First Street and Third Avenue were developed.[15,16,17]

13 https://www.newsday.com/business/springhill-suites-hotel-planned-in-carle-place-o95779
14 https://bldnow.com/bld-projects/mineola-multi-family-residential-development/
15 http://www.amodernli.com/project/mineola-2nd-street-parking/
16 http://www.amodernli.com/project/mineola-harrison-avenue-parking-structure/
17 https://www.newsday.com/long-island/nassau/minola-parking-garages-1.18392179

In 2019, the Village of Westbury rezoned their downtown for additional transit-oriented development (TOD) opportunities as part of a revitalization initiative.[18,19,20] The rezoning will encourage mixed-use development, increase lot coverage ratios, widen sidewalks, increase connectivity to the LIRR, and increase open space. In conjunction with ongoing improvements around the Village of Westbury's LIRR station, the MTA has begun the process of redeveloping the southern parking lot into TOD. [21,22,23]

More recently, infill residential developments have been increasing throughout the Study Area. Two developments are currently under construction, the Florent at 555 Stewart Avenue, and The Selby at 659 Merrick Avenue. As more TODs are approved within the County, opportunities to increase public transit usage will emerge. As the public transit network improves and expands its service options, it is likely that additional infill will occur, creating a synergy between development and transit.

2.2.2.1 Nassau Veterans Memorial Coliseum Site

Since 1998, there have been numerous proposals to redevelop the land surrounding the Nassau Coliseum. The most recently developed proposal by RXR Realty and BSE Global sought to redevelop the 72-acre site with additional uses to complement the Nassau Coliseum.[24] However, the COVID-19 pandemic has resulted in changes to the initial development plans. As such, the County, in coordination with the current leaseholder, are exploring new opportunities for the site. As of early 2023, Nassau County and the Las Vegas Sands Casino are in discussion to redevelop the site but no plan has been made available to the public.

2.3 SOCIOECONOMIC CONDITIONS AND TRENDS

2.3.1 Population

Based on data from the 2019 ACS 5-Year Estimate, the population of the Study Area is estimated at 82,500, which represents approximately 6.1 percent of Nassau County's total population. Table 2-2, below, breaks down the Study Area population by age cohort. Within the Study Area, the population peaks between ages 25 and 44, approximately 26 percent of the total population. Approximately 16 percent of the population is over 65 and 25 percent of the population is 19 and under.

18 https://www.villageofwestbury.org/vertical/sites/%7B9CC594E0-0361-4F4F-A372-F1B738810B0F%7D/uploads/DRI_Update_Public_Information_Meeting__4-15-19.pdf
19 https://www.villageofwestbury.org/vertical/sites/%7B9CC594E0-0361-4F4F-A372-F1B738810B0F%7D/uploads/Village_of_Westbury_DGEIS_June_2019.pdf
20 https://www.villageofwestbury.org/index.asp?SEC=105F4AD4-A178-46C8-A61C-87A0B800E2B4
21 https://new.mta.info/mta-seeking-proposals-transit-oriented-development-lirr-westbury
22 http://www.amodernli.com/project/westbury-north-parking-structure/
23 http://www.amodernli.com/project/westbury-south-parking-and-lirr-lot-development/
24 https://www.newsday.com/long-island/nassau/hub-northwell-move-1.23938597

Table 2-2: Study Area Population by Age Group

Age Range	2019 Population	2019 Population Percentage
Under 5	5,591	7%
5 – 9	5,046	6%
10 – 14	3,951	5%
15 – 19	6,167	7%
20 – 24	7,231	9%
25 – 34	10,998	13%
35 – 44	10,828	13%
45 – 54	9,708	12%
55 – 59	5,306	6%
60 – 64	4,489	5%
65 – 74	7,061	9%
75 – 84	3,789	5%
85 and over	2,281	3%

Source: 2019 American Community Survey 5-Year Estimate

Between 2010 and 2019, Nassau County realized an increase of approximately 27,500 residents. Since the County is a mature suburban community, NYMTC projections anticipate that the County will gain residents gradually through 2045 (see Table 2-3).[25] Factors contributing to this gradual but slow population growth include projected increases in the County's elderly population, as well as an out-migration of young adults between the ages of 20 and 34.

The United States Census Bureau's Nassau County population estimates for 2020 exceed the NYMTC 2045 population estimates identified in Table 2-3, indicating that population growth is occurring at a faster rate than anticipated **Error! Reference source not found.**. The 2020 population estimate for Nassau County was 1,395,777, around 20,000 higher than the NYMTC projection.

Growth can increase transportation challenges within the County and the region. While the NYMTC projections estimated that slow growth would occur, it is clear from the most recently available data that growth is outpacing expectations. Population growth amongst individuals who drive would increase traffic volumes throughout the County. For populations that are too young to drive or individuals who have chosen to no longer drive, existing public transportation options could be inadequate, limiting their ability to travel within the County.

25 NYMTC. Plan 2045 NYMTC Regional Transportation Plan. Chapter 2, Table 21, p. 2-8. June 2017

Table 2-3: Projected Population in Nassau County (in 000s) (2010 – 2045)

Area Name	2010	2015	2017	2020	2025	2030	2035	2040	2045
Nassau County	1,340	1,345	1,355	1,356	1,379	1,423	1,475	1,530	1,579

Source: NYMTC PLAN 2045

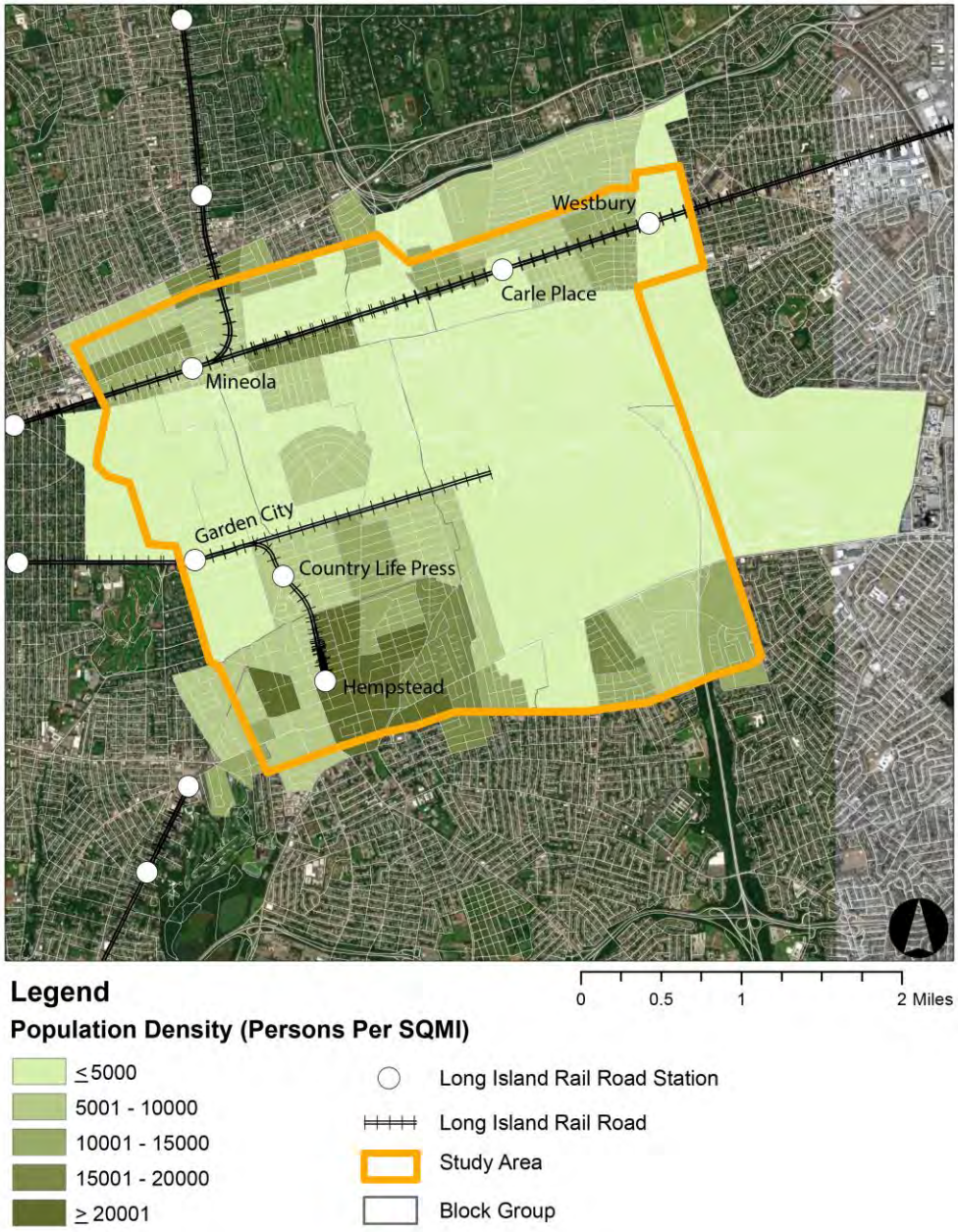
2.3.2 Population Density

Nassau County is more densely populated than other nearby suburban counties in New York State, such as Suffolk, Westchester, and Rockland Counties. In 2019, the Study Area had a population density of approximately 6,000 people per square mile (SQ MI), though the population density varies across the Study Area (see Figure 2-3). There are low-density communities (i.e., less than 5,000 to 10,000 persons per SQ MI), such as the Village of Garden City, and moderate density communities (i.e., 10,000 to 20,000 persons per SQ MI) within the Hamlets of Carle Place, East Meadow, and Uniondale.[26] Higher densities (i.e., greater than 12,000 persons per SQ MI) are found in small areas within the older downtowns of the Village of Mineola, in particular around the LIRR train station and around the downtown area of the Village of Hempstead. Block groups, surrounding the Village of Mineola LIRR station are more densely populated. This can be attributed to the increase of higher-density housing surrounding the station. Several blocks within the downtown of the Village of Hempstead, which contain multi-story apartment complexes and mixed-use buildings, have led to population densities exceeding 20,000 persons per SQ MI. In the near future, population densities are likely to increase with the conclusion of additional residential TOD construction within the downtowns of the Villages of Mineola, Westbury, and Hempstead.

Population density is generally consistent with housing unit density in the Study Area, which contains approximately 30,500 dwelling units (see Figure 2-4). On average, there are 3.5 housing units per acre. The highest densities are over 28 units per acre and are located primarily within the downtown core of the Village of Hempstead. The Village of Garden City, which generally comprises suburban neighborhoods of less than five units per acre, is the least densely populated portion of the Study Area.

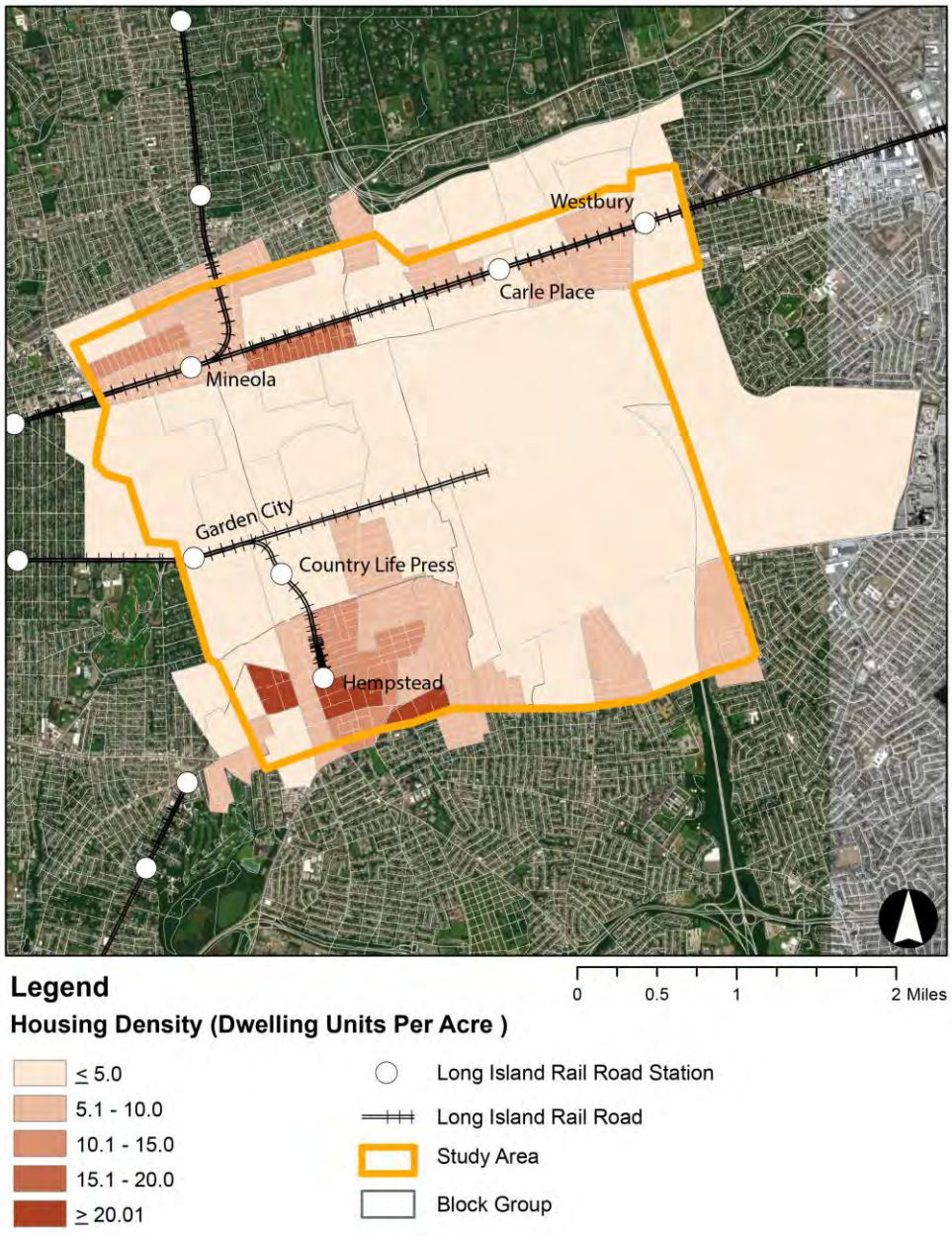
26 Density levels were defined in the 2014 AA.

Figure 2-3: 2019 American Community Survey 5-Year Estimate Population Density Map (Persons per square mile by Block Group)



Source: WSP, 2022

Figure 2-4: 2019 American Community Survey 5-Year Estimate Housing Density Map (Dwelling Units per Acre by Block Group)



Source: WSP, 2022

2.3.3 Employment

Employment data illustrates where jobs are concentrated, which is a useful consideration in planning for transportation improvements. In the Study Area, there are approximately 103,250 jobs (2019) an increase of approximately 1 percent over the 2010 jobs estimate (96,895). [27]

As shown in Table 2-1 in Section 2.2.1, commercial uses, which include offices, retail, and other services, comprise approximately 20 percent of the land use within the Study Area. Major office complexes in the Study Area include RXR Plaza, the Omni at 333 Earle Ovington Boulevard, and office buildings located at 50, 55, and 60 Charles Lindbergh Boulevard. Additionally, the County Government Complex in the Village of Mineola and the office complex along Franklin Avenue in the Village of Garden City are significant office concentrations. Roosevelt Field Mall and Westbury Plaza also represent major retail activity centers. Nassau Community College and Hofstra University are also a major employer.

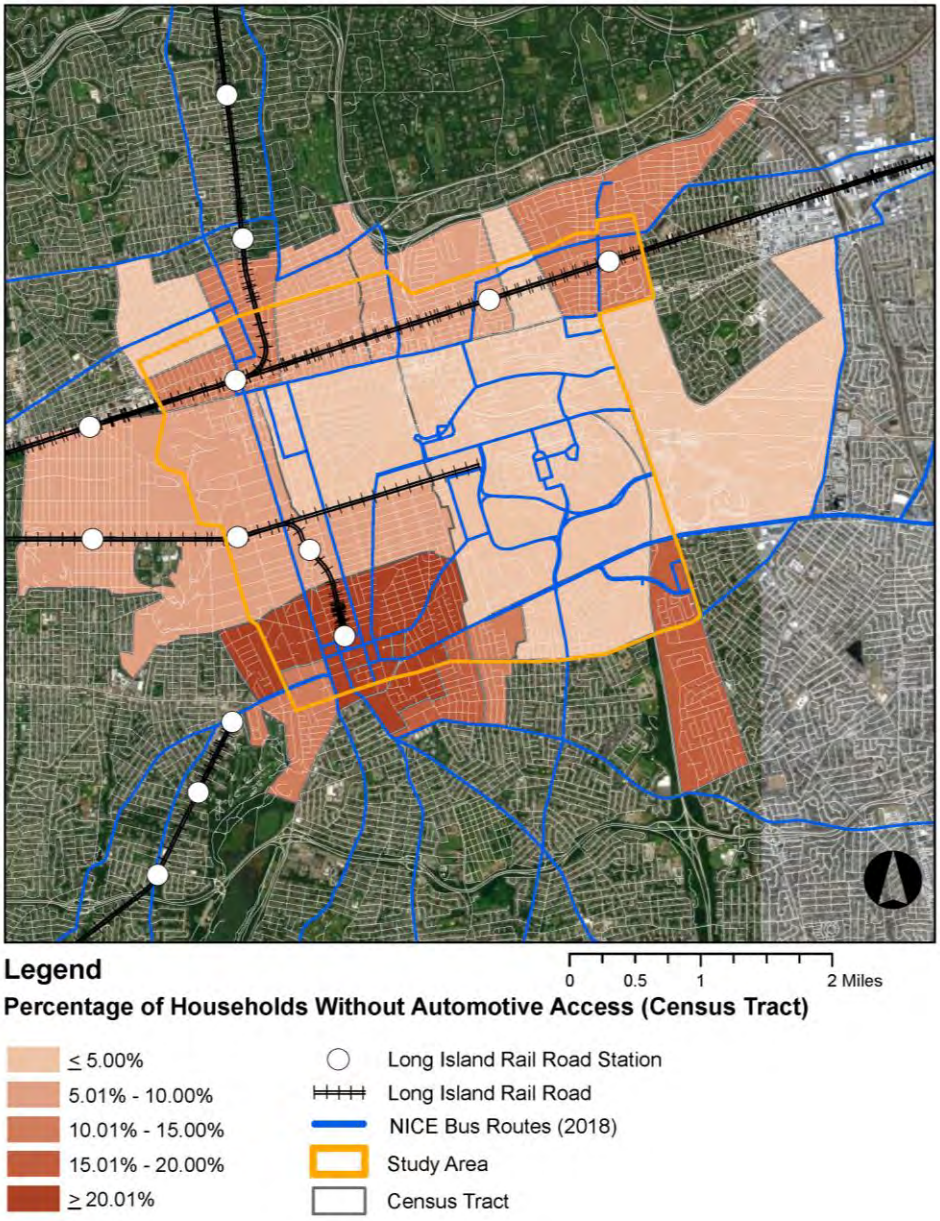
Based on the County-wide forecasts from the NYMTC *Plan 2045*, overall employment in the Study Area is anticipated to increase by more than 9,600 jobs (7.3 percent) between 2020 and 2045.[28] Historically, the healthcare, restaurant, and construction sectors have driven Long Island's employment growth. Healthcare made up 54 percent of the increase in jobs since 1998, with one third of healthcare jobs in the high-wage hospital subsector. Four of Long Island's 10 largest employers are hospitals, including Northwell Health, which employs nearly 70,000 people.[29]

2.3.4 Households Without a Personal Vehicle

Understanding the proportion of the population that has access to vehicles is useful in identifying areas currently underserved by public transit. The Study Area contains significantly more households without access to vehicles as compared to Nassau County. Based on the 2019 ACS 5-Year Estimate, 13 percent of households in the Study Area do not own vehicles, while just 7 percent of households in Nassau County do not own vehicles. As seen in Figure 2-5, households without vehicles are concentrated in the Villages of Hempstead, Westbury, and Mineola.

27 Longitudinal Employer-Household Dynamics 2019 (https://onthemap.ces.census.gov/)
28 NYMTC. Plan 2045 NYMTC Regional Transportation Plan. Chapter 2, Table 2.2, p. 2-10. June 2017
29 The Port Authority of NY & NJ, Monthly Economic Indicators, Summer in the Suburbs, Part I: Long Island's Economic Indicators, July 2019.

Figure 2-5: 2019 American Community Survey 5-Year Estimate- Percentage of Households Without a Vehicle (by Census Tract)



Source: WSP, 2022

2.4 TRANSPORTATION NETWORK

2.4.1 Roadway Network

The Study Area contains a network of roadways comprising state, county, and local roads. Meadowbrook State Parkway is the primary north-south travel route that provides connections to other regional roadways, such as I-495/Long Island Expressway (indirectly), the Northern State Parkway, and the Southern State Parkway (see Figure 2-6). All three are limited-access, grade-separated highways consisting of three traffic lanes in each travel direction, separated by a median. Trucks and buses are not allowed on the Meadowbrook State Parkway through the Study Area.

The primary east-west travel routes in the Study Area are Old Country Road (under Nassau County jurisdiction) and Hempstead Turnpike (under New York State Department of Transportation [NYSDOT] jurisdiction).

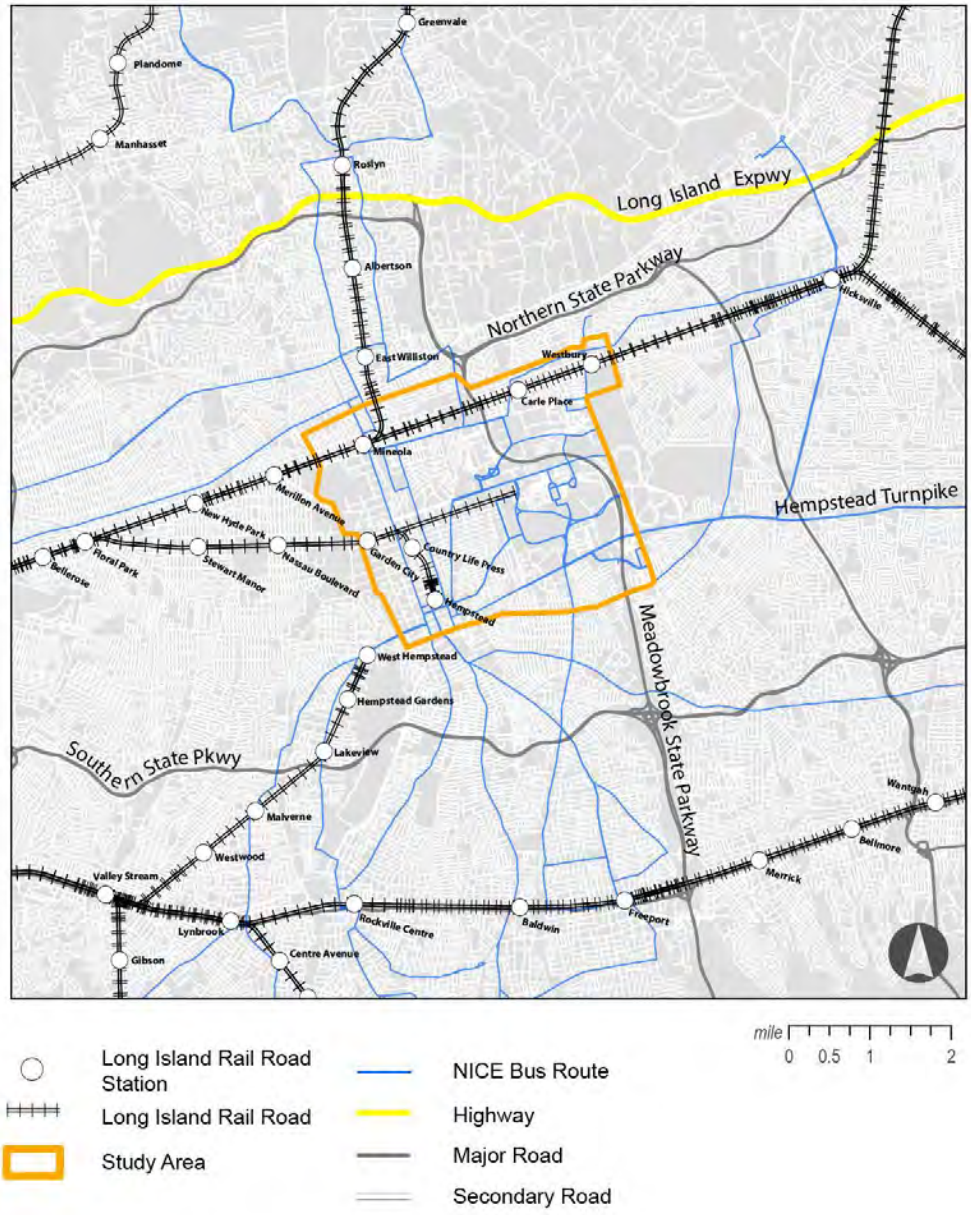
Old Country Road contains a varying number of travel lanes, attributable both to available right-of-way (ROW) and adjacent land uses, which generate substantial traffic demands that require a wider cross-section. Some sections have four travel lanes with or without on-street parking, while other sections have six to eight lanes with no parking. Old Country Road contains numerous curb cuts to allow access to adjacent land uses, while major intersections are controlled by traffic signals. The roadway typically has a speed limit of 40 miles per hour (mph) throughout, except for 30 mph limits posted in the Hamlet of Carle Place and the Village of Mineola. Transit service on Old Country Road is provided by NICE Bus routes N15, N22, N22x, and N24.

Hempstead Turnpike (New York State Route 24) is a principal arterial with a wide median along much of its length in the Study Area (until it enters the Village of Hempstead), and generally has three travel lanes in each direction, as well as left- and right-turn lanes at major intersections. West of Oak Street (in the Hamlet of Uniondale) and approaching the Village of Hempstead downtown, Hempstead Turnpike's cross-section narrows to two lanes in each direction. Hempstead Turnpike also has numerous curb cuts to allow access to adjacent land uses; major intersections are controlled by traffic signals. Hempstead Turnpike has a speed limit of 40 mph throughout the Study Area, except in the Village of Hempstead where the speed limit is 30 mph. Transit service on the Hempstead Turnpike is provided by NICE Bus routes N70, N71, and N72.

Other significant east-west roads, such as Stewart Avenue, also serve many of the area's major commercial and institutional developments and pass through primarily residential sections of the Village of Garden City. Transit service on Stewart Avenue is provided by NICE Bus routes N15, N16, N27, and N35.

The Study Area is also crossed by several other roads that provide access to major development areas or internal circulation within or between major activity centers. These include Zeckendorf Boulevard, Merchants Concourse, Ellison Avenue, Charles Lindbergh Boulevard, Earle Ovington Boulevard, Endo Boulevard, Quentin Roosevelt Boulevard, Oak Street, Merrick Avenue, and Commercial Avenue. Many of the Study Area intersections were improved to include through lanes or auxiliary lanes.

Figure 2-6: Transit and Roadway Network in and Around the Study Area



Source: WSP, 2019

2.4.2 Planned or Committed Roadway Improvements

The Transportation Improvement Program (TIP) covering Nassau and Suffolk Counties lists federally funded projects with money allocated through the next several fiscal years. The current TIP, adopted on September 5, 2019, covers Federal Fiscal Years 2020-2024.[30] A review of the current TIP lists several signal improvement projects in the Study Area that will enhance roadway capacity and efficiency. These include installing variable messaging signs and updating traffic signals throughout Nassau County; roadway, pedestrians, and streetscape improvements on Old Country Road; and designing a segment of the LI Motor Parkway Mixed Use Trail on Old Country Road at Salisbury Park Drive South. The TIP also includes standard maintenance and operations projects to be implemented within the Study Area.

2.4.3 Transit Network

2.4.3.1 Transit Centers

The Study Area is home to three transit centers: the Mineola Intermodal Center, the Rosa Parks-Hempstead Transit Center, and the Roosevelt Field Bus Terminal.

The Mineola Intermodal Center is centrally located in Downtown Mineola. The station is primarily served by LIRR trains to/from NYC, as well as trains along the Oyster Bay, Huntington/Port Jefferson, and Ronkonkoma Branches. A variety of medical, commercial, and governmental activities are within walking distance of the Mineola Intermodal Center, and NICE Bus provides several routes for local bus trips, including the N22, N23, N24, and N40/41.

The Rosa Parks-Hempstead Transit Center is adjacent to the terminus of the Hempstead Branch of the LIRR. The Transit Center is in the northern center of Hempstead Village. When the County consolidated private bus operations in 1973, the Rosa Parks-Hempstead Transit Center was envisioned as the center of a hub-and-spoke arrangement, with extensive transfer activity between NICE Bus routes, including N6, N15, N16, N27, N31/32, N35, N40/41, N48/49, N54/55, N70/71/72, and the Mercy Medical Shuttle. Today, the terminus provides connections between the LIRR and NICE Bus, as well as intercity bus operators Greyhound Lines, and Trailways of New York.

The Roosevelt Field Mall Bus Terminal serves as the main bus station for Roosevelt Field Mall and is served by NICE Bus only. The terminal is served by the N15, N16, N22, N24, N27, N35, and N43.

2.4.3.2 Metropolitan Transportation Authority – Long Island Rail Road

The LIRR is a heavy-rail commuter system that in 2019 had a total ridership of 91.1 million.[31] Four LIRR branches (Huntington/Port Jefferson, Oyster Bay, Ronkonkoma, and Hempstead) provide daily service to the northern and western edges of the Study Area. See Table 2-4 for total number of trains running east and westbound on LIRR. Only the Oyster Bay Branch offers LIRR north-south connectivity. A fifth branch, West Hempstead, terminates within a half mile of the Study Area's

30https://www.nymtc.org/Portals/0/Pdf/TIP/FFY%202020-2024%20TIP/Adopted%202020-2024%20TIP/Adopted%20NYMTC%20FFY%202020-2024%20TIP%20With%20Resolutions%20Amending%20Adopted%20TIP.pdf?ver=KAcYAYwnivCshPbv9UsgzA%3d%3d
31 https://new.mta.info/document/78921

perimeter. The West Hempstead branch primarily operates Monday through Friday with very limited weekend service (multiple transfers may be required).

The most recently available ridership estimate by route is from 2018. Between 2017 and 2018, annual ridership increased by approximately 1 percent (see Table 2-5). The Hempstead branch had the highest increase in ridership of all the lines within the Study Area with a 2 percent increase. The Greenport line had the highest increase of all LIRR lines with a 9 percent increase in ridership.

Table 2-4: 2019 Weekday LIRR Service Levels

Long Island Rail Road Line	West Bound Trains	East Bound Trains
Babylon Branch	84	79
Far Rockaway Branch	57	64
Hempstead Branch	**32**	**31**
Long Beach Branch	53	52
Montauk Branch	24	24
Oyster Bay Branch	**18**	**17**
Port Jefferson Branch	**97**	**97**
Port Washington Branch	53	50
Ronkonkoma Branch	**40**	**37**
West Hempstead	27	35

Note: Bold text indicates LIRR service that serves the Study Area

Source: LIRR 2019 Regular Branch Timetables. http://web.mta.info/lirr/Timetable/

Table 2-5: Annual Ridership by Branch in 2018

Long Island Rail Road Line	2018 Annual Ridership	2017 Annual Ridership	Percent Change
Babylon Branch	18,306,985	18,085,955	1.2%
City Zone	7,239,713	7,171,230	0.9%
Far Rockaway Branch	6,402,693	6,245,366	2.5%
Greenport	74,819	68,121	9.0%
Hempstead Branch	**4,329,862**	**4,251,182**	**1.8%**
Long Beach Branch	4,849,085	4,898,829	-1.0%
Montauk Branch	2,424,499	2,348,119	3.2%
Oyster Bay Branch	**1,929,263**	**1,924,288**	**0.3%**
Port Jefferson Branch	**19,114,377**	**19,086,565**	**0.1%**
Port Washington Branch	14,242,594	14,084,690	1.1%
Ronkonkoma Branch	**9,766,249**	**9,935,414**	**-1.7%**
West Hempstead	1,092,420	1,059,082	3.1%
Total	***89,772,559***	***89,158,841***	***0.7%***

Note: Bold text indicates LIRR service that serves the Study Area; ridership data is based on ticket sales; Port Jefferson Branch includes ridership from Huntington Branch

Source: LIRR 2018 Annual Ridership Report[32]

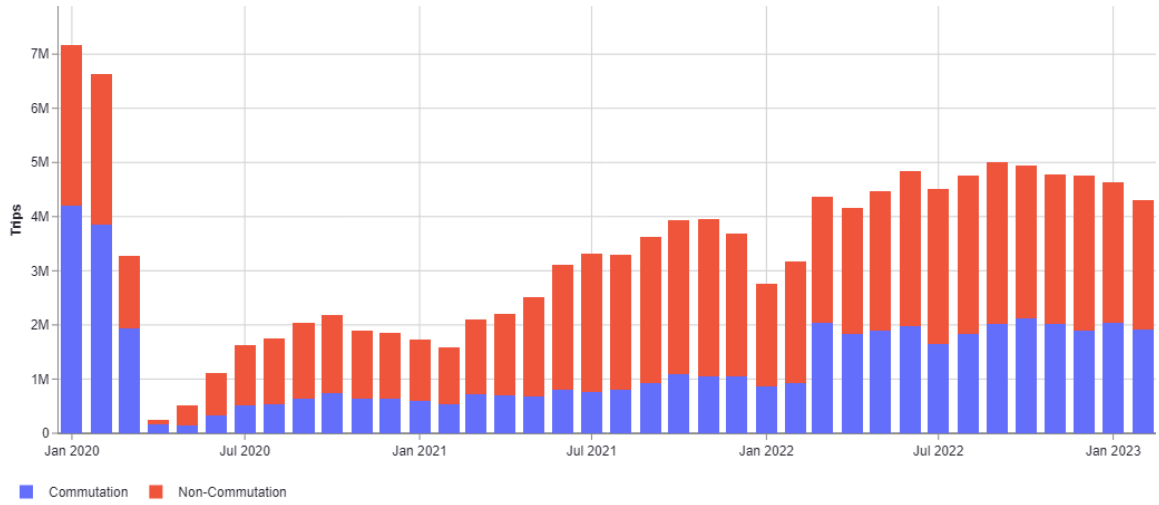
32 http://web.mta.info/mta/news/books/docs/LIRR-2018-Annual-Ridership-Report.pdf

East-west LIRR service is oriented to accommodate large volumes of commuters traveling to and from Manhattan, Brooklyn, and Queens, predominantly in the peak travel direction (i.e., AM – westbound, PM – eastbound). The major anchors of the LIRR's east-west orientation are Pennsylvania Station in Manhattan, Jamaica, and Hunterspoint Avenue in Queens, Hicksville in Nassau County, Atlantic Terminal in Brooklyn, and Huntington/Port Jefferson and Ronkonkoma in Suffolk County.

Access to the Study Area via the LIRR is provided via six stations, all of which are located along the western and northern perimeters. There is no direct rail service to the southern or eastern sections, or to many of the major destinations located within the Study Area. Within the Study Area, Mineola Station on the Mainline has the highest frequency of service, connects with other LIRR lines, has the greatest number of parking spaces, and has the shortest travel times to Manhattan due to scheduled express services. Current westbound LIRR travel time between Mineola and Manhattan ranges between 32 and 44 minutes, and travel time between Westbury and Manhattan ranges between 40 and 55 minutes. Eastbound trips between Mineola and Manhattan range between 35 and 42 minutes, and eastbound trips between Westbury and Manhattan range between 40 and 55 minutes. On the other branches, where express services are generally not operated, travel time from Pennsylvania Station to Hempstead and West Hempstead ranges from 46 to 60 minutes and between 47 and 56 minutes, respectively.

The COVID-19 pandemic in early 2020 caused a significant decrease in ridership as shown in Figure 2-7. As businesses, schools, and other institutions have reopened, ridership on the LIRR has been slowly increasing to approximately 70 percent of pre-pandemic levels. The MTA notes that the introduction of special fares, including a 10 percent discounted monthly ticket and the new 20-trip ticket, along with more people returning to offices contributed to the rise in work-related trips (commutation ridership). Additionally, non-work trips (non-commutation ridership) increased in January 2023, outpacing growth in work-related trips ridership.

Figure 2-7: Monthly Trips on Long Island Rail Road from January 2020 to February 2023[33]



Source: MTA Performance Metrics, 2023

2.4.3.3 MTA's LIRR East Side Access

MTA's East Side Access provides LIRR service to the east side of Manhattan, complementing existing service to both Pennsylvania Station on the west side of Manhattan, Atlantic Terminal in central Brooklyn, and Hunterspoint Avenue in western Queens.[34] The project consists of eight dedicated LIRR tracks in Grand Central Terminal. The new terminal, named Grand Central Madison, opened in January 2023. Year-to-date, Grand Central Madison's average daily ridership was 4,865 customers (5,308 customers on an average weekday and 3,535 customers on an average weekend).[35]

2.4.3.4 MTA's LIRR Expansion Project

MTA's LIRR is nearing the completion of the LIRR Expansion Project which will help reduce train congestion, delays, and provide more efficient peak-hour service.[36] The project includes the addition of a third track along the Main Line, known as the Third Track Project, which could help increase service for reverse commuters to jobs on Long Island. The addition of 9.8 miles of third track between Floral Park and Hicksville will enable the LIRR to substantially increase service frequency at Mineola and Westbury, which is anticipated to result in a commensurate increase in LIRR ridership at Mineola for both the peak and reverse-peak directions. The Second Track component of the Project was completed in late 2022, with some residual work ongoing through summer 2023.

2.4.3.5 Garden City – Mitchel Field Secondary

Within the Study Area there is a lightly used LIRR freight branch known as the Garden City-Mitchel Field Secondary. The branch is approximately 2.2 miles long and lies directly in the center of the

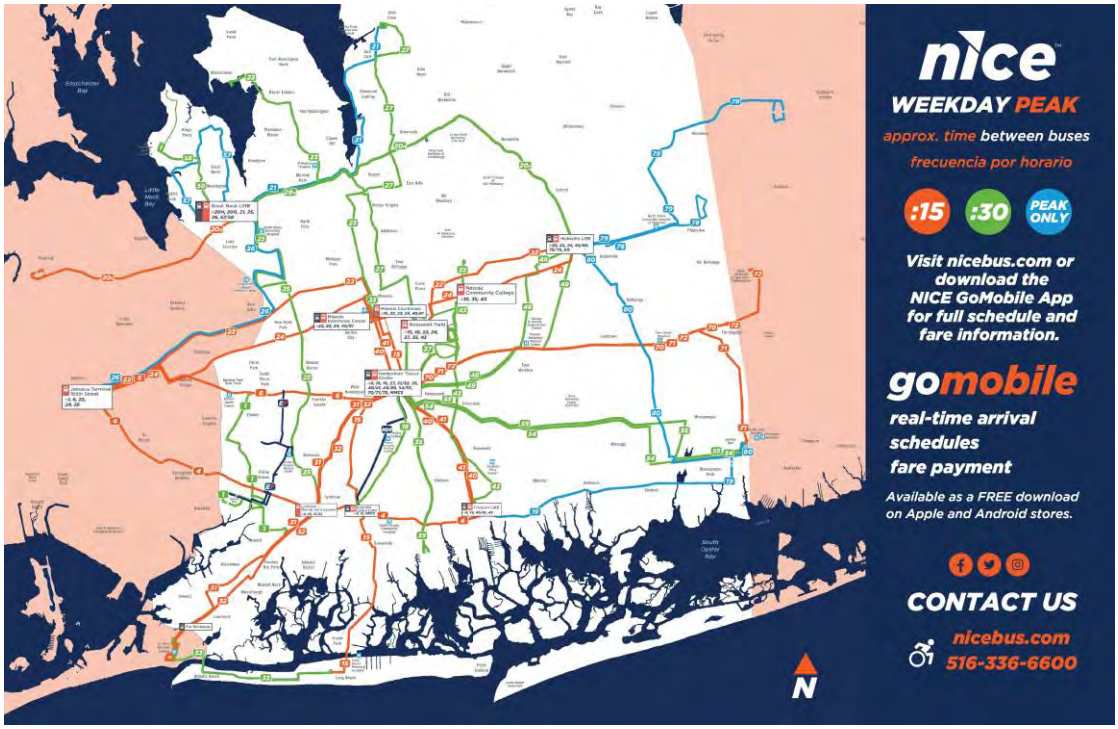
33 https://metrics.mta.info/
34 http://web.mta.info/capital/esa_alt.html
35 https://new.mta.info/document/105771
36 http://www.amodernli.com/project/thirdtrack/

Study Area.[37] Service on the line was transferred over to internal MTA and LIRR rail purposes in 2002 with an exception for the Ringling Brothers Barnum & Bailey Circus, which used the line to park its circus train during performances at the Nassau Coliseum. In 2017, the circus ceased performing. Since then, the line has been used for the storage of materials during the Third Track Project's construction.

2.4.3.6 Nassau Inter-County Express Bus

The NICE Bus transit network operates local bus service within Nassau County, as shown in Figure 2-8.[38] Since 2012, the system has been operated by Transdev under a lease and operating agreement with Nassau County. As of August 2022, the NICE Bus Network operated 37 routes and two shuttle services, with 21 buses serving the Study Area. Currently, bus routes include 6/6x, 15, 16, 22/22x, 23, 24, 27, 31/32, 35, 40/41, 48/49, 54/55, 70/71/72. NICE Bus also serves Nassau Community College with express service from the Hempstead Transit Center to campus via the N16Xpress due to student and faculty demand. NICE also serves both Hofstra University and Nassau Community College with the N16, and N43, both of which have 30-minute headways. Additionally, Hofstra University provides a direct shuttle service between its campus, the Village of Mineola LIRR station, and the Village of Hempstead LIRR station, which is not operated by NICE.

Figure 2-8: NICE Bus Routes as of June 2020



Source: NICE Bus, 2020 [39]

37 https://www.stb.gov/Decisions/readingroom.nsf/603de3fe8389457185257497001cb44d/0b736207efd3a05885256c1e004a77aa?OpenDocument
38 NICE Bus replaced MTA LI Bus as the county bus operator January 1, 2012.
39 https://www.nicebus.com/getattachment/Tools/Maps-and-Schedules/PRINT_WEB-System-Map.pdf.aspx?lang=en-US

NICE Bus experienced service cuts in 2017, which has been a contributing factor in the service's ridership decline.[40] Average bus trip length increased since 2012 from 4.9 miles to 5.8 miles in 2021, which may be related to the reduction in overall service.[41] The most recently available station boarding and alighting data for NICE Bus is from 2016 to 2018. The N6 had the highest average weekday boardings out of all routes, connecting Hempstead within the Study Area to Jamaica, Queens, primarily along Hempstead Turnpike. The available route level boardings are shown in Table 2-6 and accompanied by NICE Bus's 2018 routes (Figure 2-9).

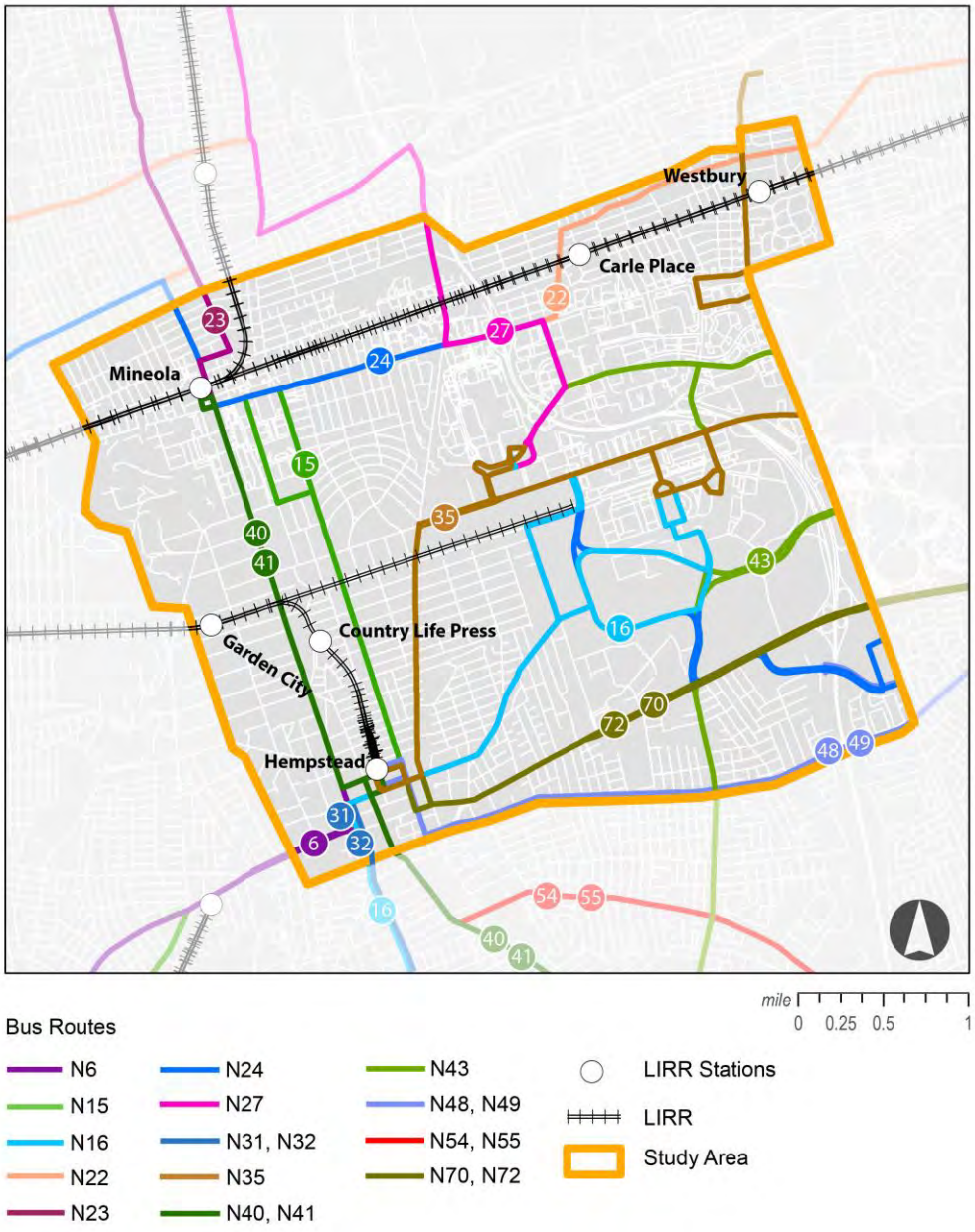
The current scheduled transit travel time between the LIRR's Mineola Station and the Nassau Coliseum site is 40 to 50 minutes on the bus, requiring a transfer.[42] This same 4-mile trip takes 10 to 18 minutes by car. Current transit travel time between LIRR's Westbury Station and the Nassau Coliseum site is 30 to 40 minutes, requiring a transfer, while vehicular travel time is 8 to 14 minutes.

The decline in NICE Bus ridership and increase in passenger miles traveled occurred despite an increase in employment and commute trips to the Study Area over the same period. These two factors indicate that people may be taking longer trips on NICE Bus to get to employers located in the Study Area or choosing to drive for a quicker connection because of the disconnect between services or roadway congestion.

Since the COVID-19 pandemic, ridership has rebounded on NICE Bus service. Based on the Federal Transit Administration's (FTA) Transit Agency profile, NICE Bus provided 14,263,561 annual unlinked trips in 2020, approximately 9.5 million less trips than in 2019 (23,791,024).[43] In 2021, NICE Bus provided 15,230,994 annual unlinked trips, an increase of approximately 1 million trips from 2020, indicating the beginning of a ridership rebound.

40 http://www.liherald.com/stories/lack-of-county-funding-drives-nice-bus-to-cut-routes,91394
41 https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/ntd/transit-agency-profiles/130056/2017-transit-profiles-top-50-summary.pdf
42 Data based on NICE data and travel time comparison in Google Maps.
43 https://www.transit.dot.gov/ntd/transit-agency-profiles/county-nassau

Figure 2-9: NICE Bus Routes in Study Area as of 2018



Source: WSP & NICE Bus, 2018

Table 2-6: Nassau Inter-County Express Bus Average Weekday Trips (Study Area routes highlighted in gray, 2016 and 2018)

Route	2016	2018	Change	% Change
N1	1,947	1,560	-387	-20%
N4	10,797	10,187	-610	-6%
N6	15,466	12,807	-2,659	-17%
N15	4,892	4,830	-62	-1%
N16	2,358	2,403	45	2%
N19	674	354	-320	-47%
N20	7,403	5,933	-1,470	-20%
N21	897	600	-297	-33%
N22	6,943	6,124	-819	-12%
N23	1,840	1,493	-347	-19%
N24	5,383	4,882	-501	-9%
N25	3,488	3,023	-465	-13%
N26	369	472	103	28%
N27	1,671	1,214	-457	-27%
N31	2,345	2,155	-190	-8%
N32	2,930	2,705	-225	-8%
N33	811	706	-105	-13%
N35	3,297	2,996	-301	-9%
N40/41	7,045	5,867	-1,178	-17%
N43	2,193	2,079	-114	-5%
N48/49	2,373	2,183	-190	-8%
N54/55	1,878	1,584	-294	-16%
N57	260	282	22	8%
N58	1,157	1,080	-77	-7%
N70/71/72	4,386	3,922	-464	-11%
N78/79	712	362	-350	-49%
N80	245	151	-94	-38%
Total of Study Area Routes	**65,000**	**57,244**	**-7,756**	**-12%**
Total	**93,760**	**81,954**	**-11,806**	**-13%**

Source: NICE Bus, 2018

2.5 TRAVEL PATTERNS

The Study Area encompasses a range of activity centers, including residential, office, government services (i.e., courts and administration), retail, manufacturing, cultural, educational, and recreational uses. As such, the Study Area generates extensive travel demand on the existing transportation system, especially on its roadways.

2.5.1 Travel Patterns to the Study Area by Direction

The U.S Census Bureau's 2019 Longitudinal Employer-Household Dynamics dataset shows an estimate of total commute-to-work trips in the Study Area.[44] While these travel patterns have been affected by the COVID-19 pandemic, the latest data available from the U.S. Census Bureau predates the pandemic. Within the Study Area, there are 103,254 jobs (Table 2-7). Approximately 55 percent of workers living in the Study Area travel less than 10 miles from their homes to reach their jobs. The greatest number of trips made into the Study Area for work were from east of the Study Area, totaling 23,608 or 23 percent of trips. The lowest number of trips made to work in the Study Area were from the north, totaling 6,421 or 6.1 percent of trips. Between 2015 and 2019, the total amount of commuting trips into the Study Area dropped by about 1 percent. The only commute direction to grow between 2015 and 2019 were commuters traveling to the Study Area from the northwest.

During the COVID-19 pandemic, typical travel patterns within Nassau County were upended due to the increase in employees working from home, which reduced traffic related to journey-to-work trips. However, as businesses, schools, and other institutions have reopened for in-person activities, traffic has increased and returned to nearly pre-pandemic levels.[45] While employees may continue to work from home, non-work trips may rise, creating traffic peaks outside typical AM and PM travel times and on non-freeway roadways for leisure trips.

44 Longitudinal Employer-Household Dynamics 2015, 2019 (onthemap.ces.census.gov/)
45 https://www.newsday.com/long-island/transportation/traffic-expressway-lie-c39425

Table 2-7: Commute to Work within Study Area

Where Workers Live Relative to the Study Area	Total Number of Workers Traveling to the Study Area (2015)	Total Number of Workers Traveling to the Study Area (2019)
North	6,425	6,219
Northeast	10,041	9,983
East	23,617	23,608
Southeast	11,001	10,599
South	9,793	9,503
Southwest	12,613	12,336
West	21,330	20,651
Northwest	9,907	10,355
TOTAL	104,727	103,254

Source: U.S. Census Bureau's Longitudinal Employer-Household Dynamics 2015, 2019

2.5.2 Commute to Work

The U.S. Census Bureau 2015-2019 ACS 5-Year Estimate was analyzed to determine the number of people who commute to work and how they travel with pre-COVID 19 data. This information is helpful for route planning and projecting ridership for public transit. As shown in Table 2-8, 52,855 residents in the Study Area above the age of 16 are in the workforce, of which 62 percent drive alone to work, 9 percent carpool, 18 percent take public transportation, 1 percent take a taxi or bike, 5 percent walk, and 3 percent work from home.

Census tracts in the Village of Hempstead had the highest number of public transit users, while tracts in the Village of Mineola had the highest number of residents who commute to work alone in their car, truck, or van. Tracts in North Uniondale had the highest number of individuals who walk to work, many of whom live on or close to the Nassau Community College and Hofstra University campuses.

Table 2-8: Commute to Work by Travel Mode (2019) by Census Tracts

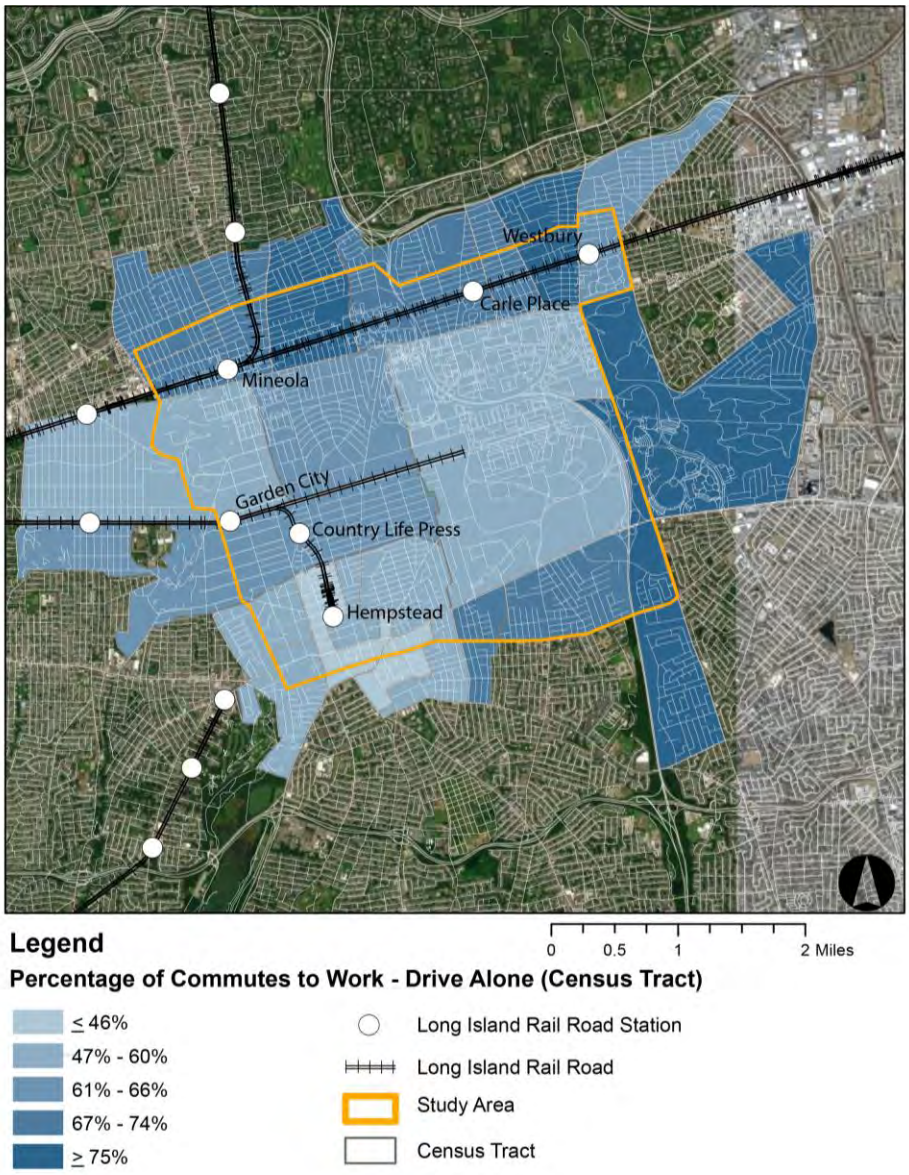
Location	Census Tract	Total	Alone in Car/Truck/Van	Carpool in Car/Truck/Van	Public Transit	Walk	Taxi or Bike	Work at Home
Carle Place	3038	2716	1838	347	401	94	9	27
North Uniondale	4073.01	2772	1552	155	273	540	39	213
East Meadow	4079	2337	1925	161	165	0	0	86
Garden City	4066	2021	1294	100	503	12	0	108
	4064	3051	1823	196	727	121	68	116
	4065.01	3443	273	73	871	43	0	183
Hempstead	4068.02	2503	1491	491	412	55	0	54
	4072.04	1210	829	78	245	18	3	37
	4067.02	1692	983	164	499	26	0	26
	4067.01	1524	918	279	270	12	0	45
	4069	3469	1887	485	847	112	65	73
	4068.01	2569	1191	317	807	157	39	58
	4072.01	2513	958	426	681	338	68	42
	4072.03	1623	943	192	268	130	46	44
Mineola	3035	2542	1855	151	389	74	7	66
	3037	4009	3039	215	582	11	107	55
	3036	4542	3186	151	742	370	17	66
Uniondale	4073.02	2263	1575	273	317	42	0	56
Westbury	3040.02	2534	1945	155	226	13	79	116
	3040.01	1249	920	73	171	26	7	52
	3041	2273	1403	348	299	82	56	85
	Total	**52,855**	**31,828**	**4,830**	**9,695**	**2,276**	**610**	**1608**
	Percentage Breakdown	**100%**	63%	9%	19%	4%	1%	3%

Source: U.S. Census Bureau, 2015-2019 American Community Survey 5-Year Estimate

Note: Census Tract 4077 is not included in the estimate because there are no residential uses within the parts of the Census Tract that reside in Study Area

As shown in Figure 2-10, northwestern East Meadow, in the southwest corner of the Study Area, has the highest percentage of residents (approximately 83.6 percent) that commute to work alone by car, truck, or van. The census tract with the smallest percentage of people who commute to work alone in a vehicle was located very close to the Village of Hempstead LIRR station, which likely indicates that a larger share of this tract's residents choose to use the LIRR for their commutes.

Figure 2-10: 2019 American Community Survey 5-Year Estimate Percentage of Total Commuters Who Commute to Work Alone by Car, Truck, or Van



Source: WSP, 2022

2.6 TRANSPORTATION LIMITATIONS AND CHALLENGES

2.6.1 Land Use Patterns

While the Study Area is the County's commercial, government, institutional, and entertainment center, the multiple destinations and activity nodes within the Study Area are themselves dispersed and poorly connected. The major activity centers in the Study Area tend to be isolated by large parking lots and multi-lane arterial roadways that function as physical barriers. Due to these conditions, the current transportation system does not efficiently link land uses within the Study Area. If no transportation improvements are implemented to correct this deficiency, this will constrain future development and limit increases in economic activity. In particular, there is no existing transit service that efficiently connects the Village of Mineola, the Village of Westbury, the Nassau Coliseum site, Museum Row, or the commercial strip on Hempstead Turnpike.

2.6.2 Roadway Congestion

One of the most prevalent transportation issues in Nassau County and the Study Area is persistent and recurring traffic congestion on major roadways. The private automobile is the dominant mode of transportation into and around the Study Area, serving as the travel mode for the majority of Study Area trips. Non-work trips (shopping, entertainment, and recreational) are more likely to be automobile-oriented than commuting trips, which are more likely to be made via transit.

According to NYMTC projections adopted for the *Congestion Management Process Report,* vehicle-miles traveled (VMT) in Nassau County are expected to increase at an average annual rate of 0.53 percent, resulting in a 16.1 percent overall increase in VMT from 2020 to 2050. NYMTC projects that the County's population will grow approximately 12.2 percent, lower than the County's projected increase in VMT. As shown in Table 2-9, the VMT growth in Nassau County is expected to outpace that of the region.

Table 2-9: Projected Vehicle Miles Traveled Growth

Area	Scenario Years Vehicle Miles Traveled (VMT) 2020	2050	Average Daily VMT Growth Rate
Nassau County	26,684,035	30,977,655	16.1%
NYMTC Region	156,631,484	176,396,167	12.6%

Source: NYMTC Average Annual VMT Growth Rate Forecast between 2020 and 2050
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=gfVbMzvLLqXENvn1jNkOhg%3d%3d

In addition to the expected growth in VMT, other congestion measures tracked by NYMTC are projected to worsen by 2050. Table 2-10 and Table 2-11 show increases in both person hours-delay and vehicle hours-delay, along with growing demand relative to roadway capacity. Average travel speed on Urban Restricted Access roadways is expected to decrease by 5 mph by 2050.

Table 2-10: Nassau County Congestion Performance Measures – Base Year 2020

Facility Type	Lane Miles of Congestion	Average Travel Speed	Vehicle Hours-Delay	Person Hours-Delay	Vehicle Miles Traveled
Urban Restricted Access	1,667.6	36.60	110,764	193,837	11,203,723
Urban Unrestricted Access	840.4	28.20	77,562	135,73	15,480,312

Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=gfVbMzvLLqXENvn1jNkOhg%3d%3d

Table 2-11: Nassau County Congestion Performance Measures – Forecast Year 2050

Facility Type	Lane Miles of Congestion	Average Travel Speed	Vehicle Hours-Delay	Person Hours-Delay	Vehicle Miles Traveled
Urban Restricted Access	2,234.9	31.60	179,776	314,608	12,637,950
Urban Unrestricted Access	1,332.3	27.80	107,602	188,304	18,339,705

Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=gfVbMzvLLqXENvn1jNkOhg%3d%3d

Table 2-12, Table 2-13, and Table 2-14, display the existing and projected changes of congestion performance measures within Nassau County, including the average Demand to Capacity (D/C) ratio for a particular road facility and the percent of travel that occurs in various conditions (somewhat congested and very congested). According to NYMTC, the existing D/C ratio for Urban Restricted Access roads is 0.39, around 7 percent of travel occurs under somewhat congested, and 6 percent under very congested conditions. The existing D/C ratio for Urban Unrestricted Access roads is 0.51, around 2 percent of travel occurs under somewhat congested, and 2 percent of travel occurs under very congested conditions.

Table 2-12: Nassau County Congestion Performance Measures – Existing Conditions (2020)

Facility Type	Demand/Capacity (D/C) Ratio	Percent of Travel Under Somewhat Congested Conditions (0.8<=D/C<=1)	Percent of Travel Under Very Congested Conditions (D/C>1)
Urban Restricted Access	0.39	7%	6%
Urban Unrestricted Access	0.51	2%	2%

Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=gfVbMzvLLqXENvn1jNkOhg%3d%3d

In the 2050 forecast year, the existing D/C ratio for Urban Restricted Access roads is 0.42, around 9 percent of travel occurs under somewhat congested, and 8 percent of travel occurs under very

congested conditions. The projected D/C ratio for Urban Unrestricted Access roads is 0.57, around 3 percent of travel occurs under somewhat congested, and 3 percent of travel occurs under very congested conditions.

Table 2-13: Nassau County Congestion Performance Measures – Forecast Year (2050)

Facility Type	Demand/Capacity (D/C) Ratio	Percent of Travel Under Somewhat Congested Conditions (0.8<=D/C<=1)	Percent of Travel Under Very Congested Conditions (D/C>1)
Urban Restricted Access	0.42	9%	8%
Urban Unrestricted Access	0.57	3%	3%

Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=qfVbMzvLLqXENvn1jNkOhq%3d%3d

By 2050, the D/C ratio is expected to increase by 7.7 percent on Urban Restricted Access roads and 11.7 percent on Urban Unrestricted Access roads. Urban Restricted Access roads are expected to have an increase in travel under somewhat congested conditions by 28.6 percent and an increase in travel under very congested conditions by 33.3 percent. Urban Unrestricted Access roads are expected to have an increase in travel under somewhat congested conditions by 50 percent and an increase in travel under very congested conditions by 50 percent.

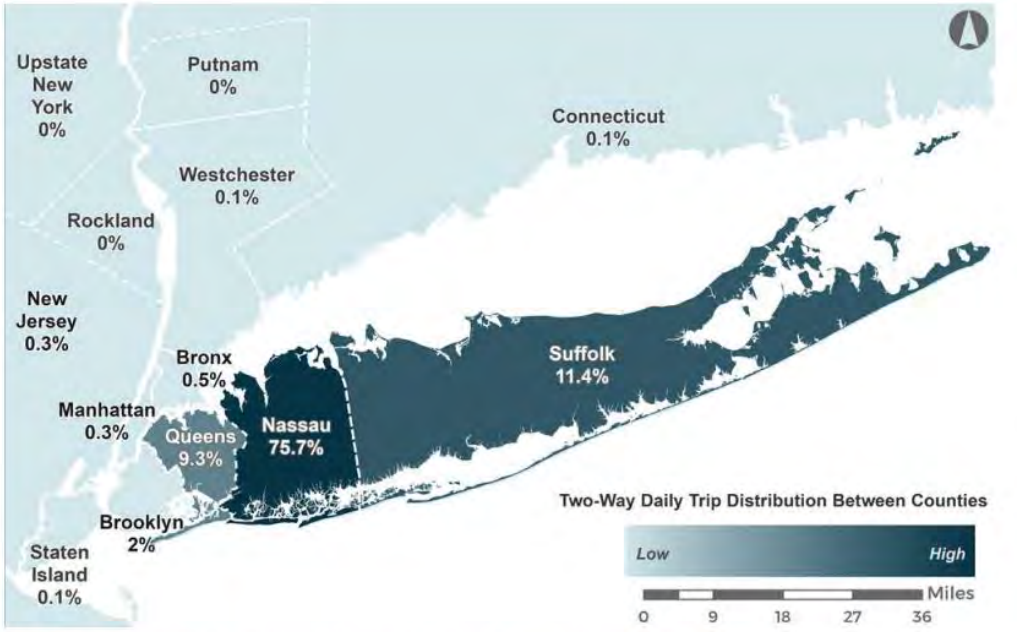
Table 2-14: Nassau County Congestion Performance Measures – Projected Change from 2020 to 2050

Facility Type	Increase in Demand/Capacity (D/C) Ratio	Increase in Percent of Travel Under Somewhat Congested Conditions (0.8<=D/C<=1)	Increase in Percent of Travel Under Very Congested Conditions (D/C>1)
Urban Restricted Access	7.7%	28.6%	33.3%
Urban Unrestricted Access	11.7%	50%	50%

Source: WSP, Using NYMTC Data
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=qfVbMzvLLqXENvn1jNkOhq%3d%3d

While specific data inside the Study Area was not available, Figure 2-11Figure 2-12, and Figure 2-13 illustrate the general trends of daily trips between Nassau County and other counties, and which key corridors will experience heavy congestion. Approximately 75.7 percent of daily trips are within Nassau County by 2050 and the Study Area is expected to see several congested corridors in both the AM and PM.

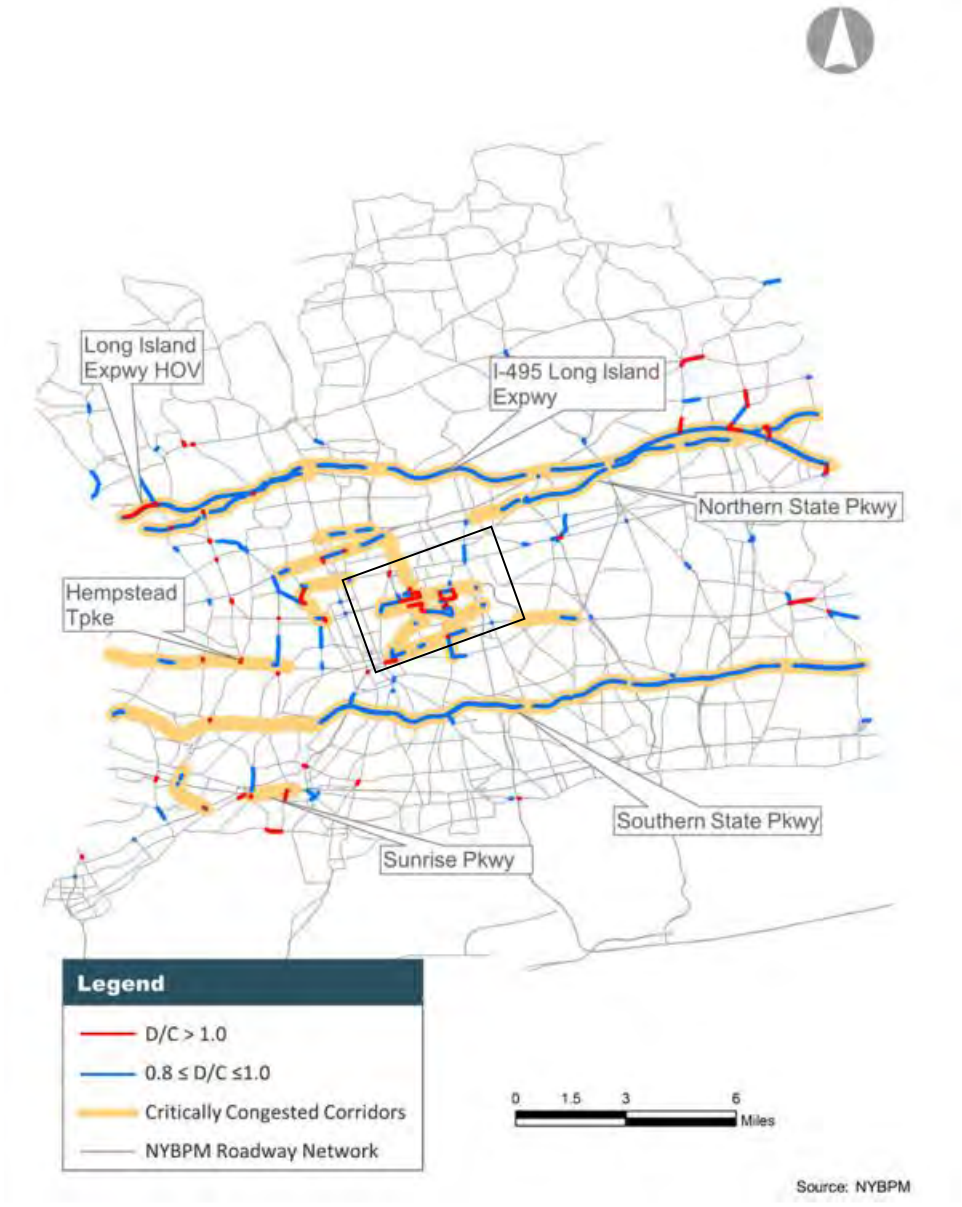
Figure 2-11: Daily Trips between Nassau and Other Counties for the Forecast Year



Note: The two-way daily trip tabulations include all classes of highway trips (auto plus truck).

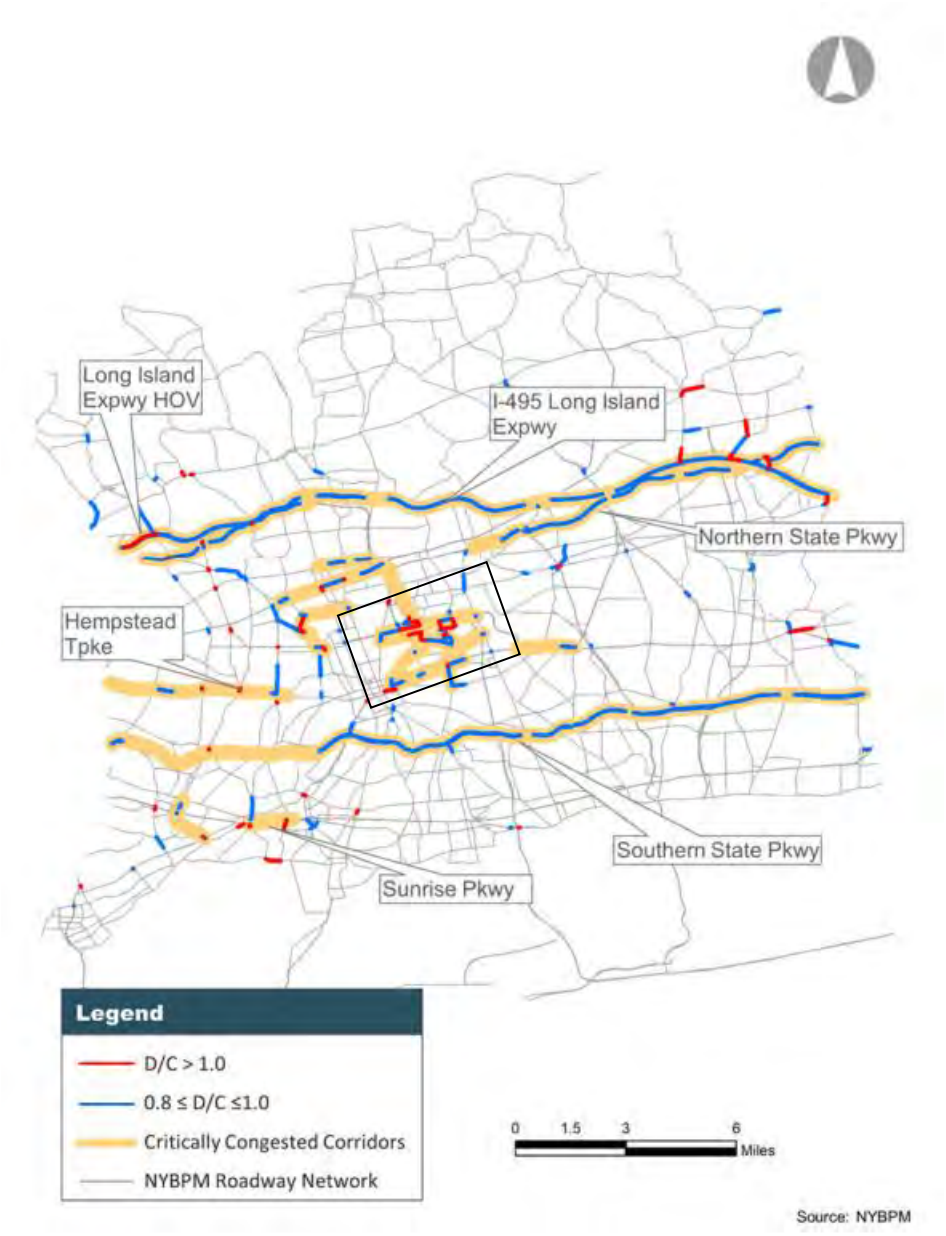
Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=gfVbMzvLLqXENvn1jNkOhg%3d%3d

Figure 2-12: Forecast Year Congested Corridors (AM Peak Period), Nassau County



Source: NYMTC Congestion Management Performance Measures
https://www.nymtc.org/Portals/0/Pdf/CMP%20Status%20Report/2021%20CMP/NYMTC_CMP_Adopted_Report.pdf?ver=qfVbMzvLLqXENvn1jNkOhq%3d%3d

Figure 2-13: Forecast Year Congested Corridors (PM Peak Period), Nassau County



Source: NYMTC Congestion Management Performance Measures; graphic created by NYMTC
https://www.nymtc.org/Required-Planning-Products/Congestion-Management-Process/Updated-Performance-Measures-Metrics

2.6.3 Transit Network Limitations

The existing LIRR and NICE Bus networks face several challenges in attracting new transit riders and adequately accommodating Study Area-bound and intra-Study Area travel for those who have no other travel options. These challenges are described below.

LIRR Rail Network

- LIRR service is oriented east-west for travel to and from Nassau County and NYC.
- Train stations are located on the periphery of the Study Area, beyond the typical half-mile walking distance to and from many of the Study Area's activity centers.
- Current reverse-peak rail service tends to be slower and infrequent, with AM and PM peak-period gaps. The addition of the Third Track Project, completed in late 2022, provides the opportunity for enhanced reverse-peak rail service. However, no new bus service has been developed to provide a direct last mile connection to destinations in the Study Area, such as the Coliseum site.

NICE Bus Network

- Bus distributor routes serving Study Area destinations from LIRR train stations are infrequent, have limited service hours, and may not always be schedule-coordinated.
- Of the 21 routes that serve the Study Area, only 11 offer frequent service (defined as frequencies of 15 minutes) during the AM and PM peak periods.
- Intra-Study Area bus service is fragmented and infrequent, which can be confusing for potential riders.
- There are no priority bus treatments (e.g., exclusive bus lanes, signal priority, and bus bulbs) in the Study Area; bus service is often delayed and irregular due to existing general traffic congestion.
- Many parts of the north shore and the southeast quadrant of Nassau County lack direct transit connections to the Study Area.

3 Purpose and Need, Goals and Objectives

3.1 PROBLEM STATEMENT

On any given day the Study Area experiences widespread transportation issues that contribute to both economic and environmental challenges. As previously discussed, inadequate transportation services and widespread suburban sprawl have led to an ever-increasing automobile dependency within both the local community and Nassau County at large.[46] This automobile dependency has led to congested roadways during peak hours and an increase in commuting time to jobs, schools, and other activities. It is forecast that congestion will only get worse as population and employment continue to grow on Long Island. These transportation problems not only affect daily commuters but also limit the County's ability to capitalize on economic development opportunities and preserve the high-quality suburban lifestyle that residents and business have come to expect. New housing and business developments may increase the reliance on automotive travel if the area is not adequately served by efficient public transportation options.

The following four overarching problems have been identified as issues the County experiences:[47]

- Traffic congestion is pervasive and recurrent on roadways throughout Nassau County, making it difficult to travel to, from, and within the Nassau Hub area.
    - In NYMTC's *Plan 2045*, Nassau County is expected to realize an 11.1 percent decrease in average speed by 2045 due to increased traffic and congestion.[48]
    - NYMTC projects VMT in the County to increase 12 percent from 2020 to 2045.[49]
    - In addition to the expected growth in VMT, other congestion measures tracked by NYMTC are projected to worsen by 2045. Arterial road lane miles of congestion are projected to increase by 84 percent and local road lane miles of congestion are projected to increase by 68 percent. Vehicle hours-delay and person hours-delay are both projected to increase by 41 percent across the County.[50]
- Transit does not provide competitive service to, from, and within the Study Area.
    - Existing NICE Bus service between key destinations is infrequent, time-consuming, and unreliable, and sometimes requires transferring between two buses or walking. The current scheduled transit travel time between the LIRR's Mineola Station and the Nassau Coliseum site is 40 to 50 minutes by bus, requiring a transfer. This same 4-mile trip takes 10 to 18 minutes by car. Current transit travel time between LIRR's Westbury Station and the Coliseum Site is 30 to 40 minutes, requiring a transfer, while vehicular travel time is 8 to 14 minutes.[51]

46 Nassau Hub Study AA/EIS, Alternatives Analysis Report, Section 2 - Problem Statement, Purpose and Need, Goals and Objectives
47 The four overarching problems listed are consistent with the four overarching problems found in the Purpose and Need, Goals and Objectives section of the 2014 AA/EIS.
48 NYMTC PLAN 2045
49 NYMTC Average Annual VMT Growth Rate Forecast between 2020 and 2045 (R series)
50 NYMTC Congestion Management Performance Measures
51 Data based on NICE data and travel time comparison in Google Maps.

    - No transit route, based on NICE Bus service maps, directly connects the Nassau Coliseum site with the LIRR Main Line. Only two routes, the N16 and N43, serve the Nassau Coliseum site, with both routes connecting to Roosevelt Field and the N16 connecting to the Village of Hempstead.
    - From 2012 to 2018, NICE Bus experienced a ridership decline of 17 percent for average weekday boardings, from 99,000 average weekday boardings to 82,000.[52]
    - The combination of bus service cuts and increased traffic congestion make providing reliable public transit service more difficult.
    - LIRR is not positioned to provide widespread intra-county north and south connections between key destinations nor distribution service because the fixed rail service serves east-west travel.
- Land use patterns within the Study Area are disjointed and dispersed and have led to a reliance on automotive travel.
    - Existing land use patterns discourage transit usage. Key destinations have access to large amounts of surface parking, discouraging the use of rail or bus to connect. The Nassau Hub area has an estimated 26 million square feet of parking.[53]
    - On average, there are 3.5 dwelling units per acre in the Nassau Hub area, well below the 12 to 25 dwelling units per acre recommended for BRT corridors.[54]
- The lack of transit choices limits the County's ability to positively affect environmental quality and sustainability, leading to a decline in livability.
    - Increased traffic congestion (noted above) will continue to result in delays, traffic accidents, and degradation of quality of life.

In 2020, the COVID-19 pandemic altered typical travel patterns, resulting in travel demands that are not easily captured using widely available recent data such as the U.S. Census Bureau's American Community Survey. A recent 2021 survey conducted by Nassau County for the Shared Mobility Management Plan identified how travel patterns of County residents have changed since the pandemic and whether or not residents anticipate that those changes will continue post-pandemic:

- Before the COVID-19 pandemic, approximately 80 percent of survey respondents worked at an office or attended school only in person. After the COVID-19 pandemic, only 58 percent of survey respondents said they would in person for work or school.

- Before the COVID-19 pandemic, only 7 percent of survey respondents worked or attended school remotely while 7 percent had a hybrid in-person/remote schedule. After the COVID-19 pandemic, approximately 12 percent of respondents said they would continue to work or attend school remotely, while 26 percent of respondents said they would have a hybrid in-person/remote schedule.

52 Data provided by NICE Bus.
53 Nassau Hub Study AA/EIS, Alternatives Analysis Report, Section 3 – Existing Conditions
54 Santasieri, Colette. Planning for Transit-Supportive Development: A Practitioner's Guide. Federal Transit Authority (FTA), Report No. 0056. June 2014

While this data is limited to just County residents, it provides some insight into how existing and new transit services need to adjust to changing demands in the near and long term.

3.2 PURPOSE AND NEED

The purpose of the AA Update is to identify an Alternative within the Nassau Hub Study Area that extends from the IOS, addresses congestion on County roadways, provides more efficient connections between major destinations, and supports new condensed development patterns, such as potential future development at the Nassau Coliseum site and an enhanced north-south entrance. New housing and business developments within the Nassau Hub area, enhancement of LIRR train service along its Main Line, and the shift in attitude toward alternative modes of transportation provide new connectivity opportunities that were not anticipated in the 2014 AA. The Alternatives developed and evaluated as part of this AA intend to achieve the following purposes:

- Improve public transit service to, from, and within the congested Nassau Hub area by providing increased transit capacity, more reliable and less time-intensive service, and convenient access to and from major Nassau County employment and activity centers, such as the Nassau Coliseum site, for residents, employees, and visitors.

- Enhance regional connectivity to and from the Nassau Hub area by expanding and connecting local transit services with the LIRR in Nassau County, and improve intermodal transit hubs where rail, bus, automobile, bicycle, and pedestrian links connect.

- Increase transit ridership by expanding transit services and facilities in an area with an ever-increasing travel demand that can no longer be met by existing or proposed roadway facilities.

- Mitigate congestion through the provision of attractive, efficient transit options.

- Support transportation solutions that will be instrumental in improving the economic vitality and continuing redevelopment in the Nassau Hub area.

- Improve mobility for residents, employees, and visitors to employment, educational, recreational, medical, healthcare, research and retail centers.

- Improve regional air quality by reducing or slowing the growth in automobile emissions.

- Support local and regional land use plans and facilitate municipalities' efforts to direct redevelopment opportunities in condensed development patterns.

Improved transit in the Nassau Hub area is consistent with the goals and objectives defined in prior studies of transportation in the Nassau Hub area. This AA Update also responds to needs identified by NYMTC in *Plan 2045: Maintaining the Vision for a Sustainable Region,* adopted June 2017, and its update Report *Moving Forward*.

The following are the needs identified for the Study Area that will be addressed by implementing a BRT service proposed in the AA Update:

- **Support transit-oriented economic development opportunities and land use plans.** Nassau County and many of the Nassau Hub area's municipalities have identified land use and development goals that support greater transit services. Nassau County's Master Plan and its study on "Cultivating Opportunities for Sustainable Development" call for more sustainable development.[55] The Village of Mineola has seen continuous development over the past five years. This includes the Allure apartment complex at 140 Old Country Road, the 1 Third Avenue apartment complex located to the west of the Mineola LIRR station, the Morgan Parc apartment complex located at 199 Second Street, and New York University Langone Hospital–Long Island Research Institute at 101 Mineola Boulevard.[56] New transit service will not only support land use plans but also make future developments more viable and ultimately make all new proposed developments more successful.

- **Expand transportation system capacity.** There is a need to expand capacity in the transportation network to accommodate existing demand and projected growth in VMT.

- **Increase travel choices.** Travel options to and from Nassau County are limited to cars, LIRR service from east and west, and limited NICE Bus service from Jamaica, Queens, and Elmont, Nassau County, via Hempstead Turnpike. Within the Nassau Hub area, travel is limited to cars and local bus service that operates within the congested traffic network. Additional travel options will improve the ability to pursue more transit-friendly economic development opportunities and distribution of transit riders, particularly to and from the LIRR Main Line and within the area.

- **Provide more reliable travel times.** Congested traffic conditions create longer transit travel times, thereby reducing the reliability of the existing transit services. A reduction in traffic congestion by improving alternative travel modes to the automobile will improve travel time reliability for all modes.

- **Improve transit access and connectivity and prioritize equitable transit access.** There is a need for improved transit access and connectivity to the Nassau Hub area from the west and south, such as Hempstead, and for new services from the east and north, such as Westbury, in conjunction with prioritizing equity and accessibility of transportation services. The Nassau Hub area contains significantly more households without access to vehicles as compared to Nassau County. Approximately 13 percent of households in the Study Area do not own vehicles, while just 7 percent of households in Nassau County do not own vehicles. Households without vehicles are particularly concentrated in Hempstead and Westbury.[57]

- **Better integrate the expanded LIRR service into local and regional transit options.** The primary means of access between LIRR stations and activity centers in the Study Area is the

55https://www.nassaucountyny.gov/DocumentCenter/View/3324/FinalNCIRFSReport31414?bidId=; https://www.nassaucountyny.gov/2872/Master-Plan
56 http://hconews.com/2015/02/12/winthrop-university-hospital-opens-research-center/
57 Data from 2016 US Census American Community Survey

automobile. A frequent, reliable distribution system to deliver LIRR customers to destinations that are beyond walking distance does not exist. Connectivity and accessibility would be greatly enhanced if transit service was enhanced between activity centers and LIRR stations.

- **Provide improved off-peak and reverse-peak trip-making options.** The high concentration of medical, retail, and event/recreation-related facilities in the Study Area results in a need to provide high levels of off-peak and reverse-peak transit service.

- **Improve operational efficiency.** Increasingly scarce operating resources require more efficient transit services.

- **Improve environmental quality.** More efficient growth and sustainable development patterns are necessary to reduce impacts to the local and global environment.

3.3 GOALS AND OBJECTIVES

The following Goals and Objectives were defined based on the problems and needs within the Study Area (Figure 3-1) and the Project's Purpose and Need. The Goals and Objectives identified in this section were used to develop the evaluation criteria and evaluation measures used to screen the Alternatives and select an LPA.

Figure 3-1: Nassau Hub Transit Study-Study Area

Goal 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.

Objectives:

- Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible.

- Develop a public transportation Alternative that has the best potential to attract a maximum number of riders, including non-transit dependent riders (i.e., choice riders) and transit dependent riders.

- Increase public transportation options as a means of access to, from, and within the Study Area.

- Develop a transit Alternative that encourages use of alternate modes of transportation (walking, bicycling, carpooling, and other travel demand management methods) over travel by automobile to access the transit system.

- Identify a transit Alternative that is capable of growing and adapting to changes in service demand.

Goal 2: Develop transit improvements that will enhance mobility and support transportation equity to, from and within the Study Area in a cost-effective, innovative manner.

Objectives:

- Provide improved transit access for choice and non-choice riders to, from, and within the Study Area and serve vulnerable and underserved populations including disadvantaged communities and EJ communities.

- Maximize benefits and new opportunities presented by LIRR service enhancements (i.e., Main Line Third Track and Eastside Access).

- Develop an Alternative that will have a capital cost that is consistent with anticipated financial resources and O&M costs that can be funded with federal, state, and/or local resources.

- Develop an Alternative that provides travel time savings compared to existing options.

- Reduce travel time and costs associated with congestion.

- Develop an Alternative that is capable of being funded for construction through traditional or Alternative funding/financing mechanisms.

- Explore Alternatives that can be phased incrementally and are consistent with available funding.

- Develop an Alternative that is conducive to implementation through Alternative project delivery structures.

- Develop transit infrastructure that can be reasonably adapted to changes in technology.

Goal 3: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.

Objectives:

- Use transit to better serve existing and planned activity centers and connect to existing and planned development opportunities.

- Support the Nassau Coliseum site as directly as possible from the LIRR Main Line.

- Develop a seamless, convenient and integrated regional transportation system that connects to existing and planned activity centers and connects to existing and planned development opportunities.

- Use transit to support concentration of growth in designated areas, including transit-oriented developments.

- Locate transit to enhance the economic competitiveness of the Study Area, creating new job opportunities and supporting existing business.

- Develop a transit Alternative that can be supported by local land use plans and development policies.

Goal 4: Develop transit improvements that enhance quality of life and promote sustainability.

Objectives:

- Coordinate transit infrastructure and services with land use to promote sustainability, livability, and enhance quality of life.

- Use transit as part of a regional approach to address congestion-related air quality concerns and regional air quality conformity; mitigate greenhouse gas (GHG) emissions; and mitigate overall energy consumption for trip making.

- Encourage uses at street level that will support a lively streetscape at a pedestrian scale with diverse activity in the vicinity of station areas.

- Incorporate alternative fuels and energy sources into the transit Alternative, as appropriate.

Goal 5: Develop transit improvements that are resilient and address physical, social, economic, and technological challenges.

Objectives:

- Develop adaptive transit infrastructure that can maintain or restart operations under various conditions.

Accounting for the identified Purpose and Need and the Project's Goals and Objectives, BRT routing Alternatives to connect the IOS to the LIRR Main Line were developed and evaluated in a three-tiered screening process.

4 Long-List Alternatives Screening

This section presents the initial screening of the Long-List Alternatives for a BRT service between the LIRR Main Line, the Nassau Coliseum site, and the IOS. The analysis results in a Refined Long-List of Alternatives that meet the Project's Purpose and Need, and Goals and Objectives.

The Long List screening of the Main Line Connection Alternatives assessed BRT services that will connect the IOS to either the Village of Mineola or the Village of Westbury LIRR Main Line station, or both, and to other activity centers within the Study Area. This Long List screening assesses both BRT Alternatives that connect to the Village of Mineola and Alternatives that connect to the Village of Westbury.

4.1 LONG LIST ALTERNATIVES

A Long-List of Alternatives that potentially address the Project's Purpose and Need and associated Goals and Objectives were initially identified and conceptually defined. Each Long-List Alternative was designed to serve as a direct connection between Nassau Coliseum site, the LIRR Main Line, the IOS, and other major activity centers in the Study Area, as well as address the following considerations:

- Existing transportation network and services
- Support of transportation equity
- Existing and future travel patterns
- Capacity of existing transportation infrastructure and operating conditions
- Existing land use patterns
- Future land use patterns and proposed major developments
- Linkages between existing Attractors and Generators (as defined in Section 2.2.1.2) and proposed activity centers
- Proposed transportation options previously studied.

4.1.1 Alignment Alternatives: Mineola

All potential Alternatives are conceptual and related infrastructure and operational details were not developed as part of this initial screening process. It was determined that specific routing to the Mineola LIRR station across Old Country Road would be developed at a later stage of the Alternatives screening due to ongoing work for LIRR's Third Track Project and redevelopment around the Mineola Station. In the interim, each Mineola Alternative ended at Old Country Road. Figure

4-1 and Figure 4-2 through Figure 4-6 show the potential Alternatives and their connections to the IOS, which is depicted with a black dashed line. All Alternatives travel north-south to connect the Nassau Coliseum site to the Village of Mineola's LIRR Main Line station.

Figure 4-1: Mineola Alternatives

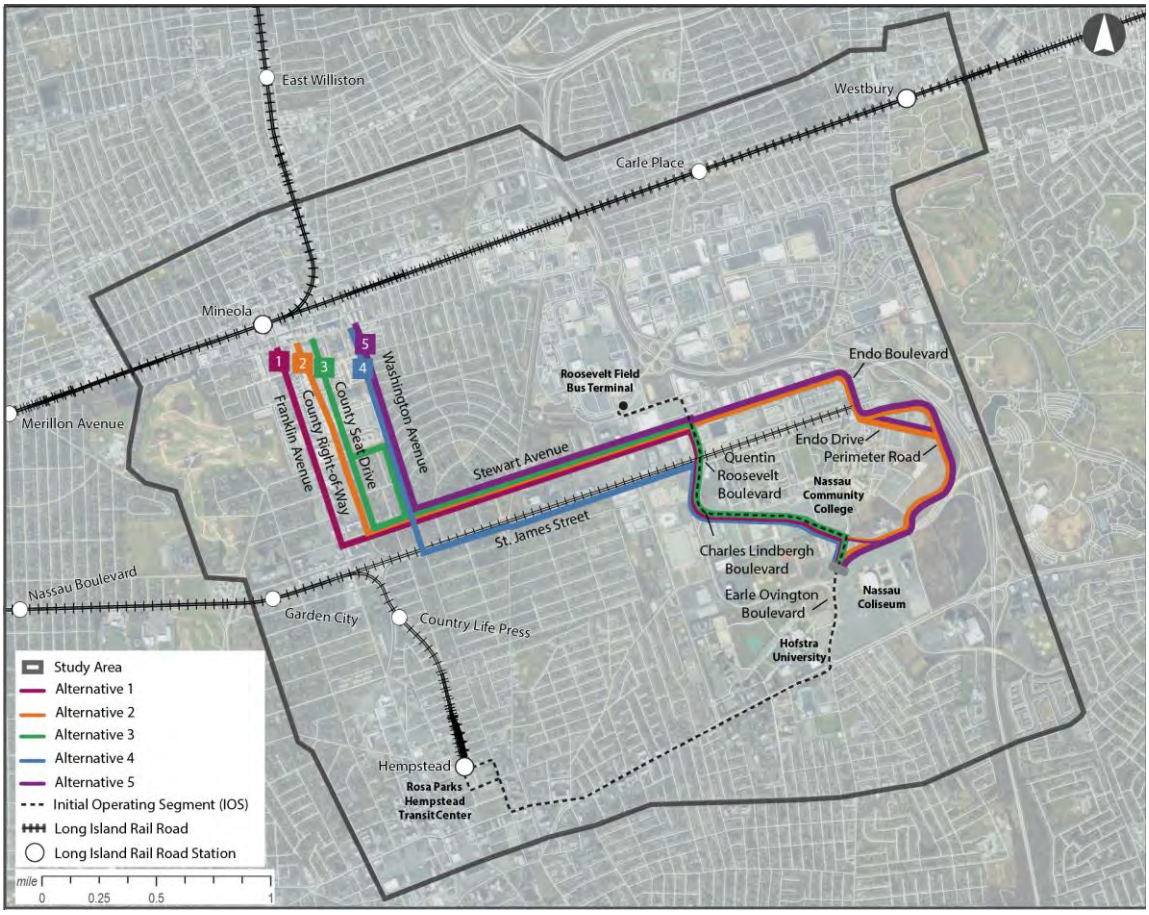
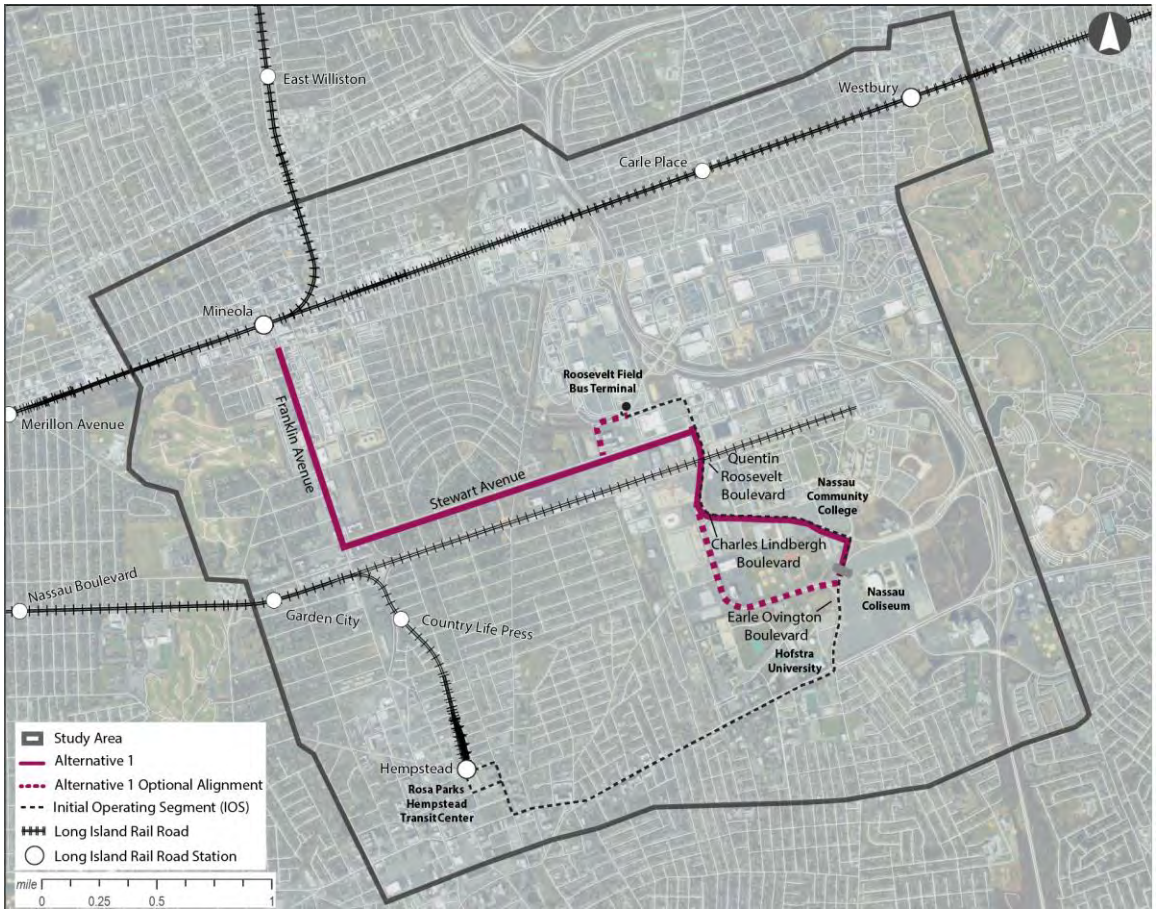
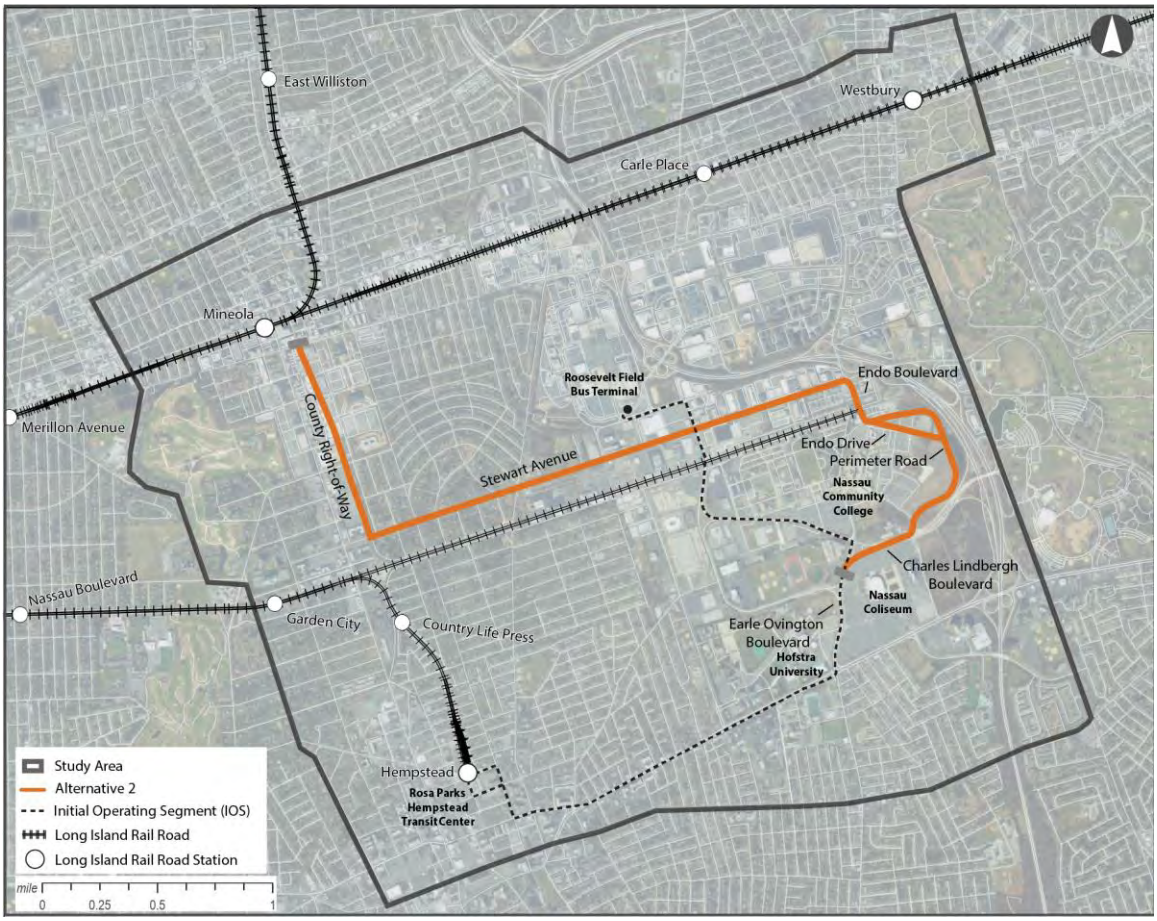


Figure 4-2: Mineola Alternative 1



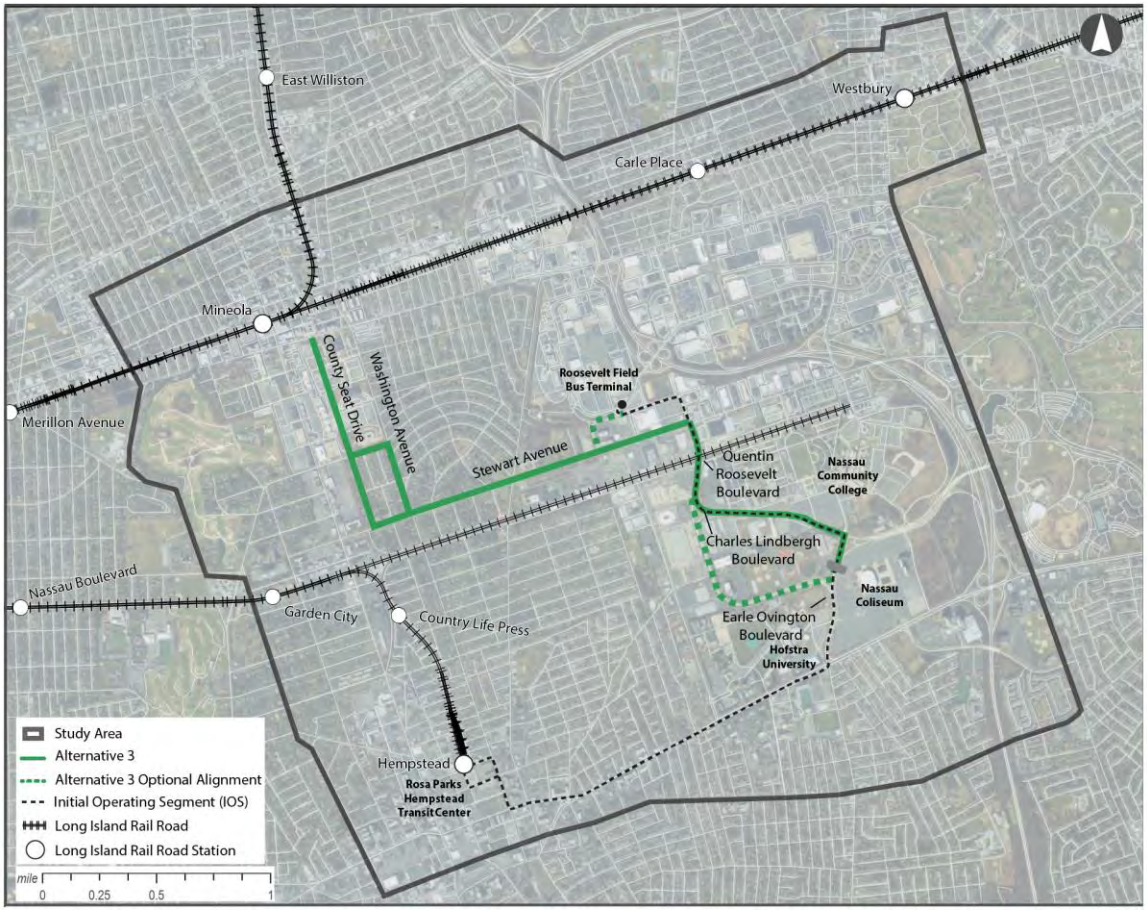
Alternative 1 runs along Franklin Avenue to Stewart Avenue. The alignment then connects to the IOS at Quentin Roosevelt Boulevard. The Alternative connects the Mineola LIRR station, Nassau County Government Complexes, Museum Row, Nassau Community College, Nassau Coliseum, and Hofstra University. Additionally, this Alternative has the option to connect to Roosevelt Field Mall and Bus Terminal, as well as the option to run south on Charles Lindbergh Boulevard to connect to the IOS.

Figure 4-3: Mineola Alternative 2



Alternative 2 runs along the County ROW to Stewart Avenue. The County ROW is a former LIRR rail alignment that parallels Franklin Avenue. The alignment takes Stewart Avenue to Endo Boulevard and connects to Perimeter Road, then Charles Lindbergh Boulevard. The alignment then connects to the IOS at Earle Ovington Boulevard. The Alternative connects the Mineola LIRR station, Nassau County Government Complexes, Nassau Community College, Nassau Coliseum, and Hofstra University.

Figure 4-4: Mineola Alternative 3

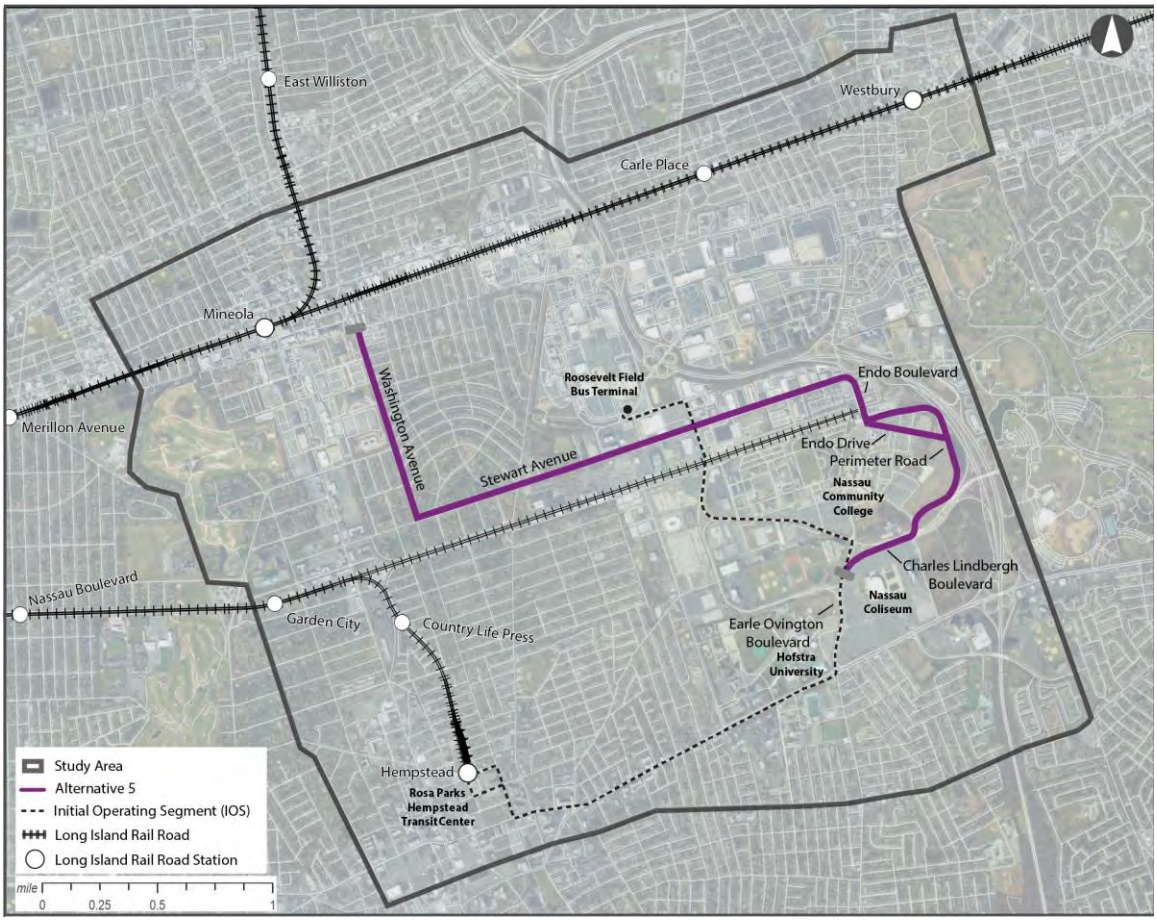


Alternative 3 runs along County Seat Drive to Stewart Avenue. The alignment then connects to the IOS at Quentin Roosevelt Boulevard. The Alternative connects the Mineola LIRR station, Nassau County Government Complexes, Museum Row, Nassau Community College, Nassau Coliseum, and Hofstra University. Additionally, this Alternative has the option to connect to Roosevelt Field Mall and Bus Terminal, as well as the option to run south on Charles Lindbergh Boulevard to connect to the IOS.

Figure 4-5: Mineola Alternative 4

Alternative 4 runs along Washington Avenue to St. James Street/Commercial Avenue. The alignment then connects to the IOS at Quentin Roosevelt Boulevard. The Alternative connects the Mineola LIRR station, Nassau County Government Complexes, Museum Row, Nassau Community College, Nassau Coliseum, and Hofstra University. Additionally, this Alternative has the option to run south on Charles Lindbergh Boulevard to connect to the IOS.

Figure 4-6: Mineola Alternative 5



Alternative 5 runs along Washington Avenue to Stewart Avenue. The alignment takes Stewart Avenue to Endo Boulevard and then connects to Perimeter Road. The alignment then connects to the IOS at Earle Ovington Boulevard. The Alternative connects the Mineola LIRR station, Nassau County Government Complexes, Nassau Community College, Nassau Coliseum, and Hofstra University.

4.1.2 Alignment Alternatives: Westbury

All potential Alternatives are conceptual and related infrastructure and operational details were not considered as part of this screening process. Figure 4-7, as well as Figure 4-8 through Figure 4-15, show the potential Alternatives and their connections to the IOS. The IOS is depicted in a black dashed line. All Alternatives travel north-south to connect the Nassau Coliseum site to the Westbury LIRR Main Line station.

Figure 4-7: Westbury Alternatives

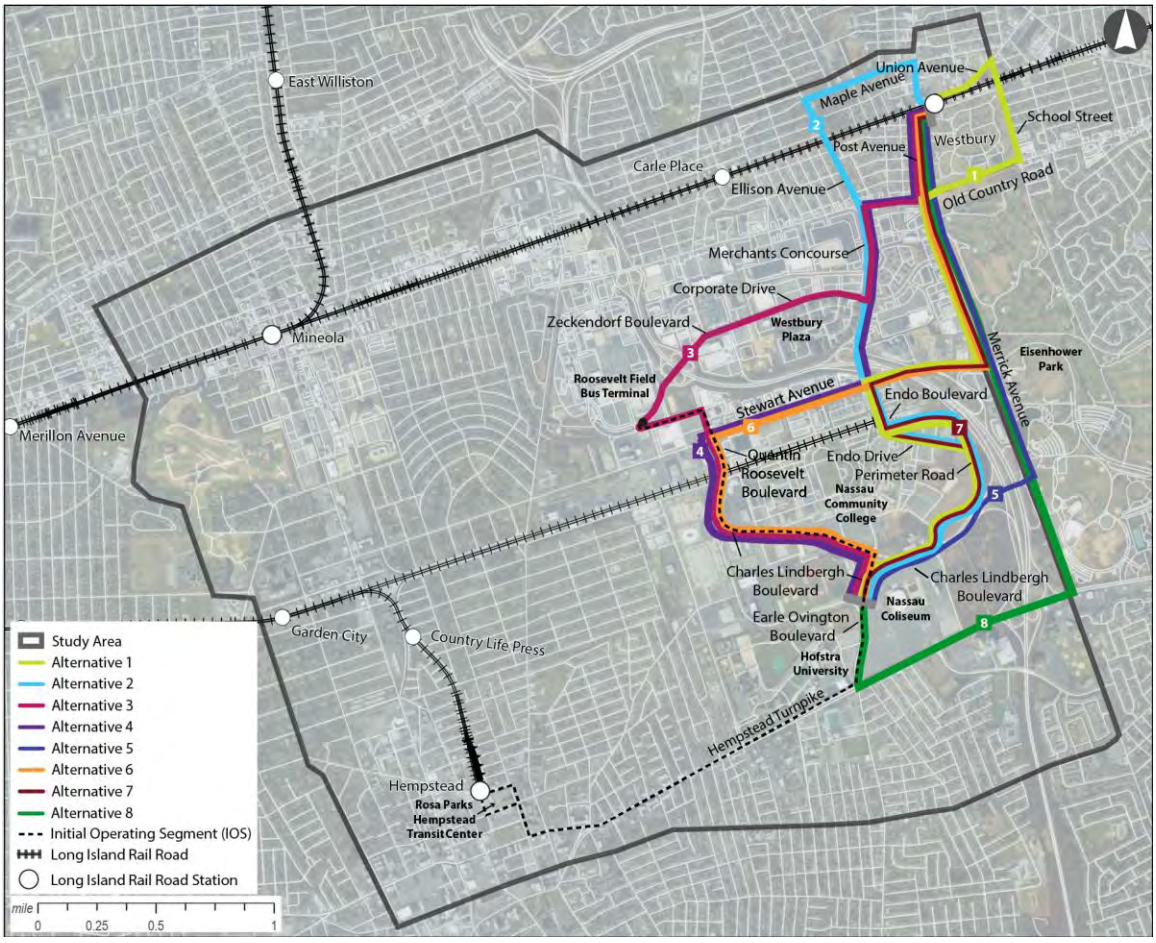
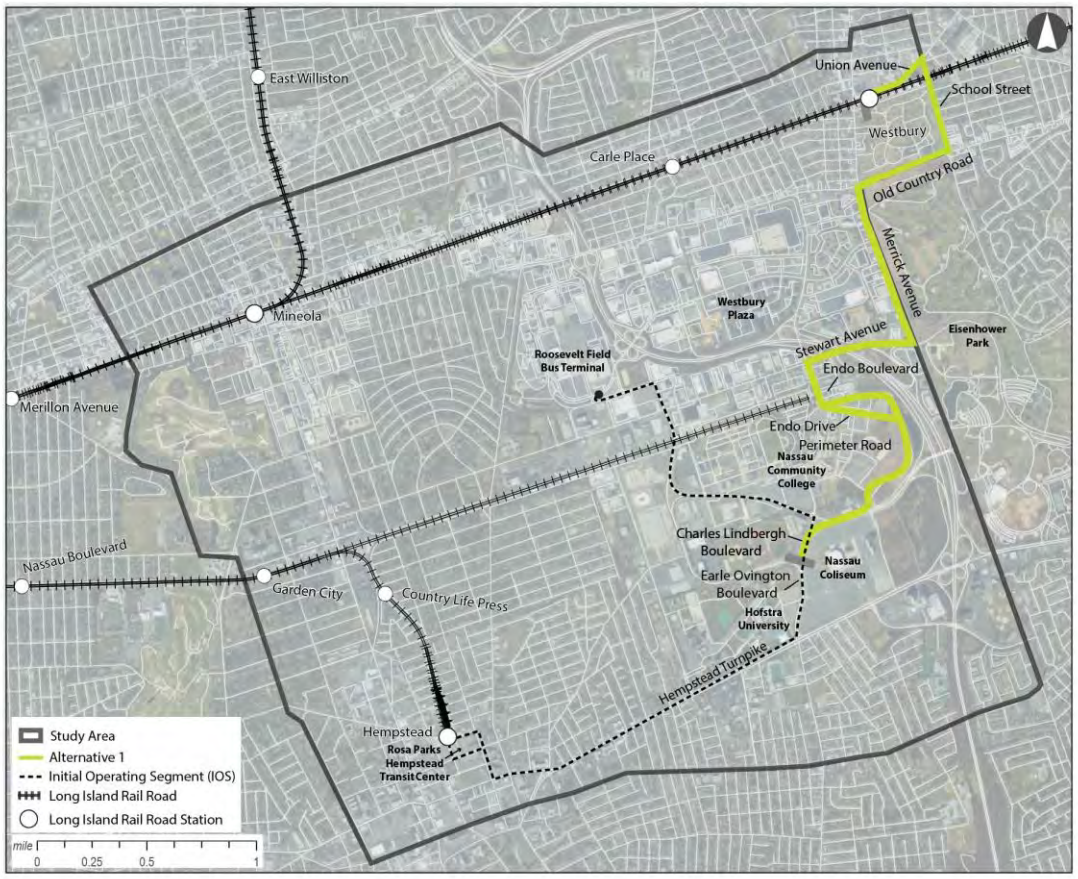
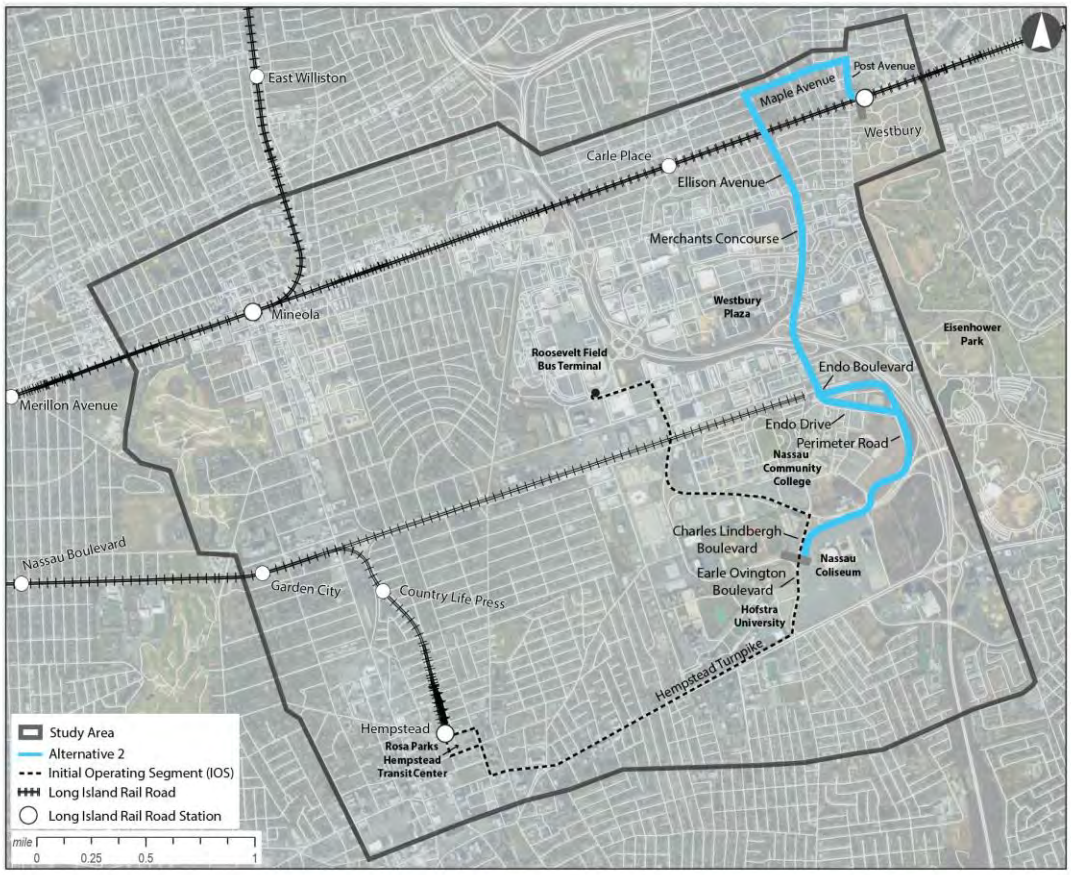


Figure 4-8: Westbury Alternative 1



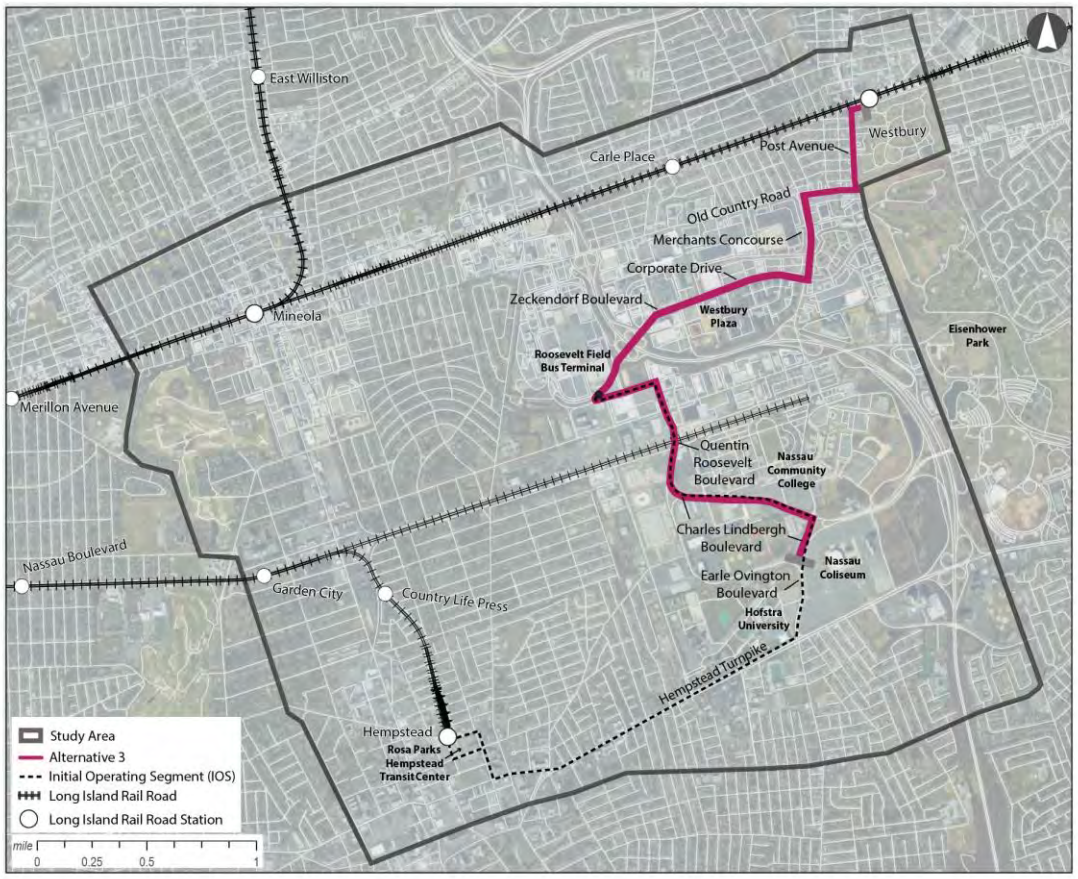
Alternative 1 runs along Union Avenue and turns right onto School Street. The alignment then turns right onto Old Country Road and makes a left turn onto Merrick Avenue. The alignment then turns right onto Stewart Avenue, left onto Endo Boulevard, left onto Perimeter Road, and then connects into Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College, Eisenhower Park, and the Westbury LIRR station.

Figure 4-9: Westbury Alternative 2



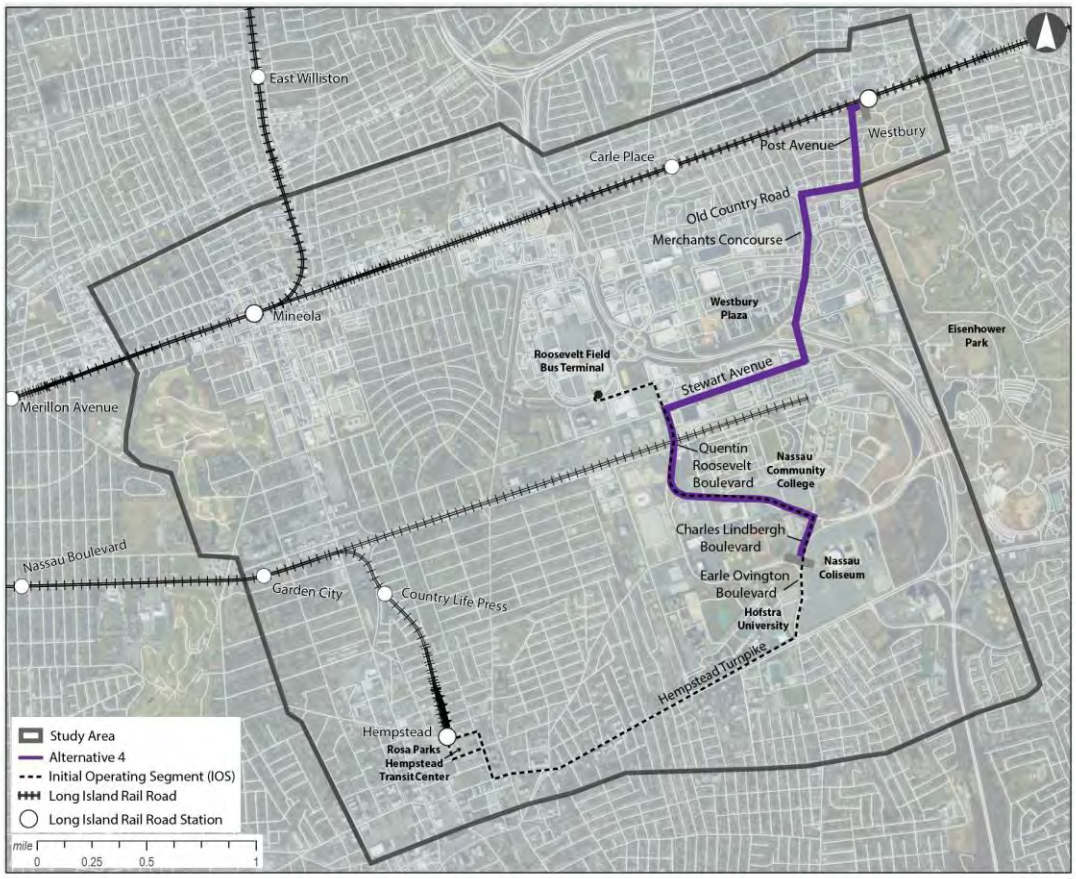
Alternative 2 runs along Post Avenue and turns left onto Maple Avenue. The alignment then takes a left onto Ellison Avenue-Merchants Concourse-Endo Boulevard. The Alternative then makes a left turn onto Perimeter Road, which connects into Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College, Westbury Plaza, and the Westbury LIRR station.

Figure 4-10: Westbury Alternative 3



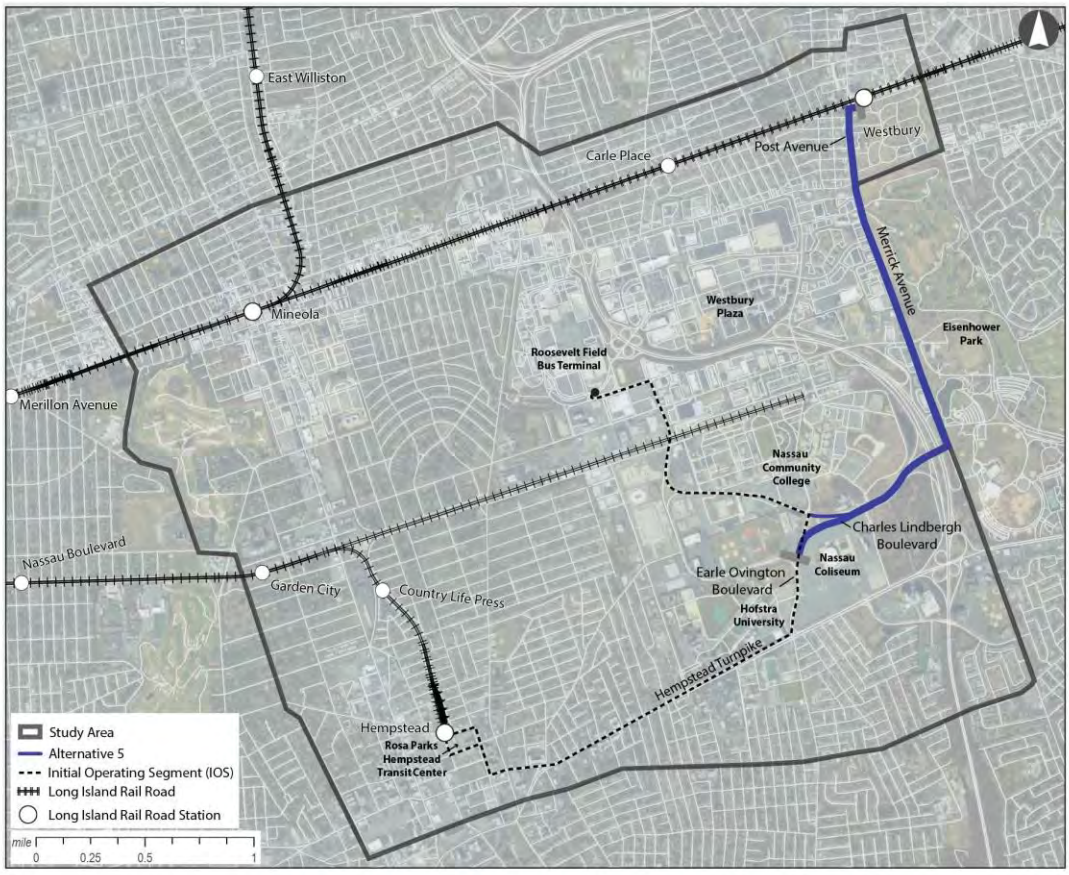
Alternative 3 runs along Post Avenue and makes a right turn onto Old Country Road. The alignment then makes a left turn onto Merchants Avenue and a right turn onto Corporate Drive-Zeckendorf Boulevard. The alignment then takes a left turn onto Ring Road South-South Street and continues onto Quentin Roosevelt Boulevard and Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College, Museum Row, Roosevelt Field Mall, Westbury Plaza, and the Westbury LIRR station.

Figure 4-11: Westbury Alternative 4



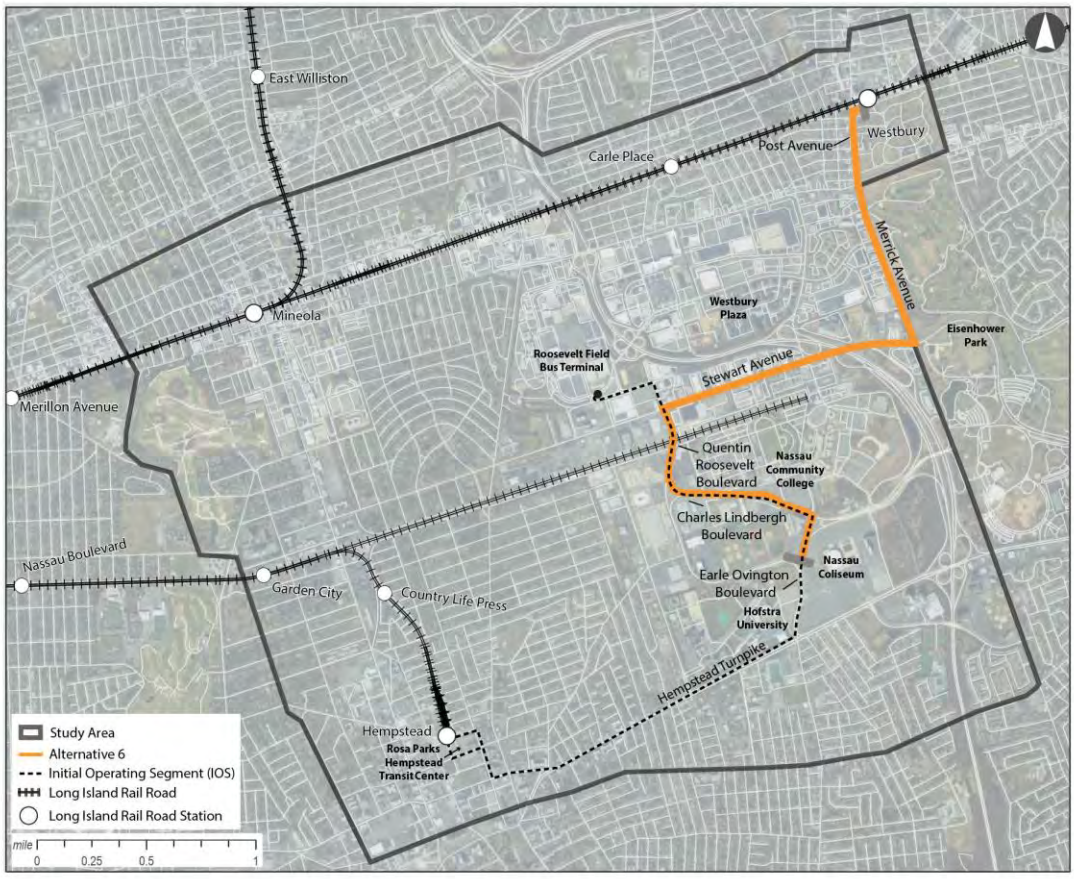
Alternative 4 runs along Post Avenue and makes a right turn onto Old Country Road. The alignment then makes a left turn onto Merchants Concourse and a right turn onto Stewart Avenue. The alignment then makes a left turn onto Quentin Roosevelt Boulevard and connects into Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College and Museum Row, Westbury Plaza, and the Westbury LIRR station.

Figure 4-12: Westbury Alternative 5



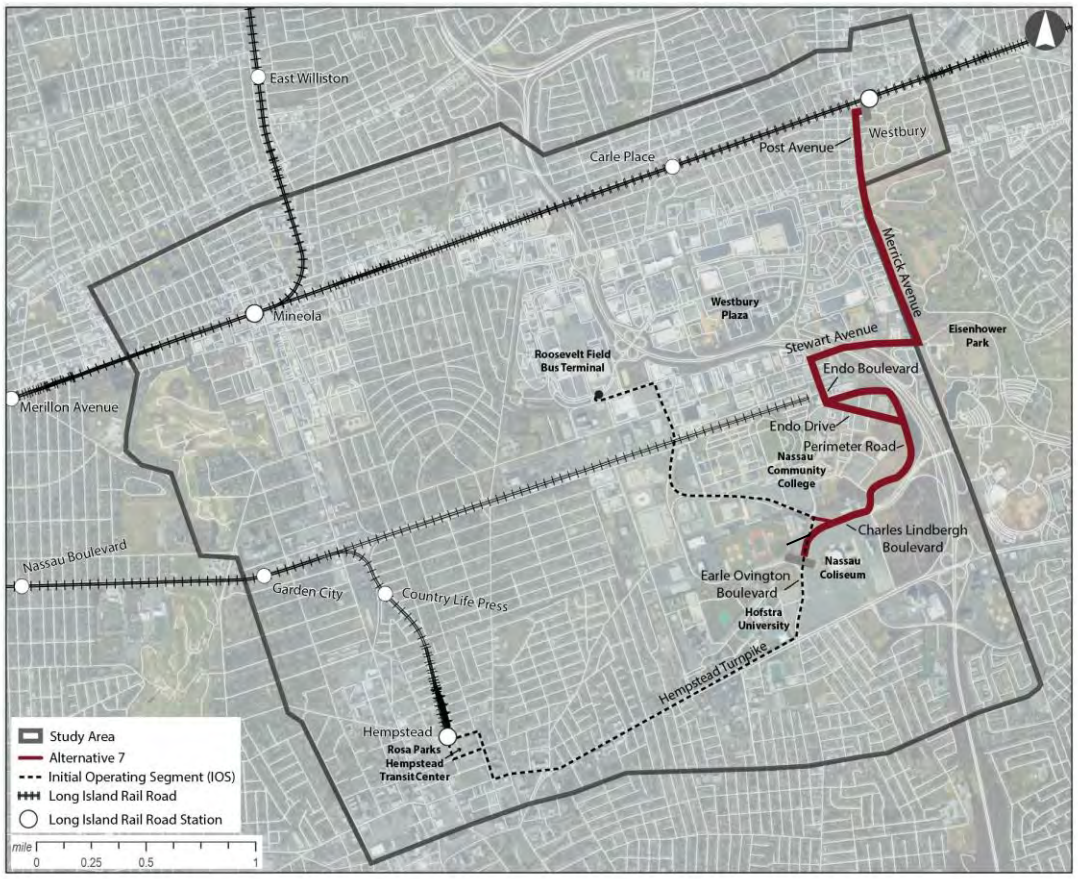
Alternative 5 runs along Post Avenue and onto Merrick Avenue. The alignment then makes a right turn onto Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Eisenhower Park, and the Westbury LIRR station.

Figure 4-13: Westbury Alternative 6



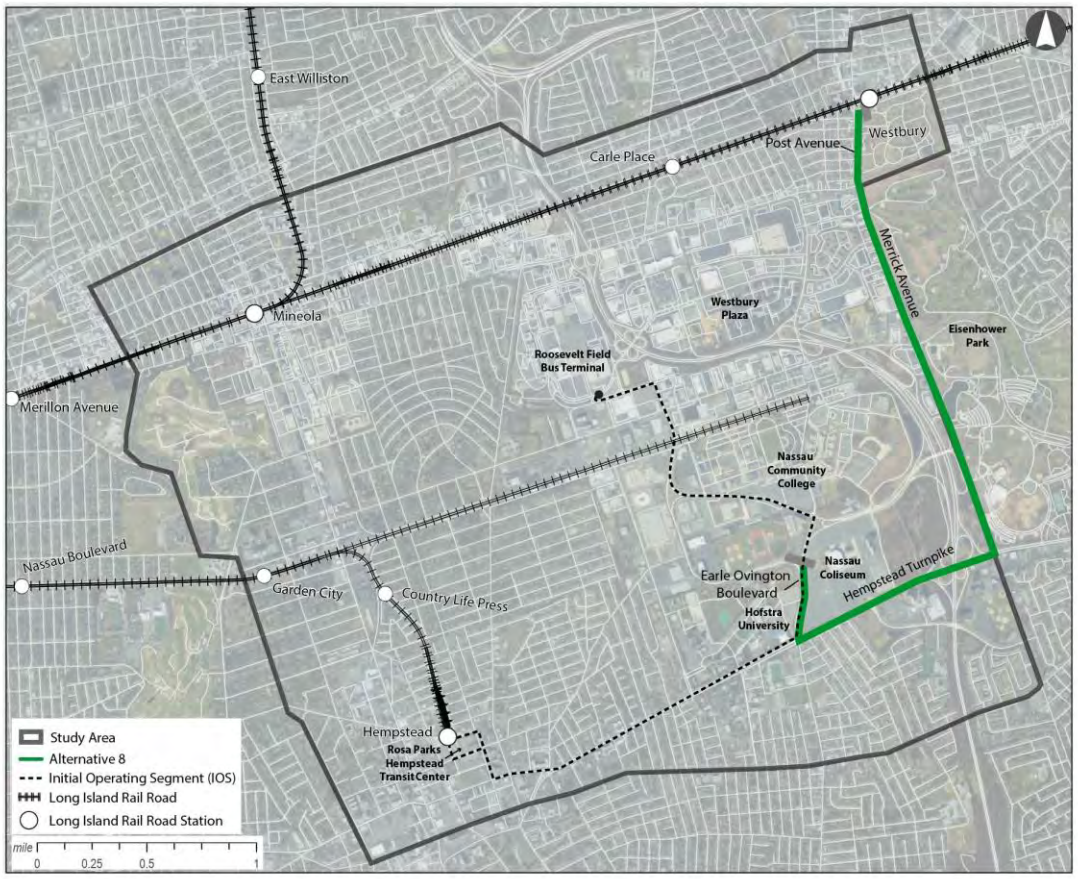
Alternative 6 runs along Post Avenue and onto Merrick Avenue. The alignment then makes a right turn onto Stewart Avenue, and a left turn onto Quentin Roosevelt Boulevard, connecting onto Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College, Museum Row, Eisenhower Park, and the Westbury LIRR station.

Figure 4-14: Westbury Alternative 7



Alternative 7 runs along Post Avenue and onto Merrick Avenue. The alignment then makes a right turn onto Stewart Avenue and a left turn onto Endo Boulevard, which connects into Perimeter Road. The alignment then connects into Charles Lindbergh Boulevard. This Alternative connects the Nassau Coliseum, Nassau Community College, Eisenhower Park, and the Westbury LIRR station.

Figure 4-15: Westbury Alternative 8



Alternative 8 runs along Post Avenue and onto Merrick Avenue. The alignment then makes a right turn onto Hempstead Turnpike and a right turn onto Earle Ovington Boulevard. This Alternative connects the Nassau Coliseum, Eisenhower Park, and the Westbury LIRR station.

4.2 LONG LIST SCREENING PROCESS

4.2.1 Screening Process Overview

A three-tier screening evaluation process was established for the proposed Alternatives and alignments, which includes an initial screening, Refined Long-List Screening, and Short-List Screening.

- Initial screening to eliminate Alternatives that did not meet the established Goals and Objectives early in the evaluation process and refine the Long-List Alternatives to a Refined Long-List
- Refined Long-List Alternatives screening to broadly analyze the Refined Long-List Alternatives for their ability to address study goals and on that basis identify the Short-List Alternatives
- Short-List Alternatives screening to analyze the Short-List Alternatives in greater detail to ultimately lead to the selection of the LPA.

This section describes the initial screening, which identifies any Long-List Alternative deemed less feasible based on the Project Goals and Objectives and associated screening criteria. The screening highlighted the comparative strengths and weaknesses of potential Alternatives and identified one or more Alternative(s) for further evaluation in subsequent screening phases.

The initial screening evaluation was qualitative and considered the Long-List Alternatives in terms of their alignments and basic attributes. Each of the Long-List Alternatives was screened using the initial evaluation criteria listed in Table 4-1. Five goals, with corresponding objectives, evaluation criteria, and measures, were taken into consideration in this initial screening phase. A qualitative assessment was performed to identify flaws in each Alternative relative to each measure.

Table 4-1: Initial Screening Criteria

Objective	Evaluation Criteria	Evaluation Measures
Goal 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.		
Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible.	An Alternative must be capable of being implemented in a location where there is sufficient physical and operational capacity to accommodate the route alignment, and with minimal negative impact to adjacent land uses.	Does the Alternative's alignment contain physical, institutional, and/or operational restrictions that would permit its realistic implementation and operation?
Goal 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner		
Provide improved transit access for choice and non-choice riders to, from, and within the Study Area and serve vulnerable and underserved populations including environmental justice (EJ) communities.	An Alternative must serve mobility needs efficiently.	Does the Alternative's alignment provide improved access to both choice riders and non-choice riders, including non-choice riders from vulnerable and underserved populations?
Goal 3: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.		
Support the Nassau Coliseum and future development by providing a connection from the Nassau Coliseum site to the Long Island Rail Road (LIRR) Main Line.	In addition to any alignments that connect to other transportation facilities, an Alternative must also originate/end on the LIRR Main Line and serve the Nassau Coliseum site.	Does the Alternative's alignment provide a connection from the LIRR Main Line to the Nassau Coliseum site?
Use transit to better serve existing and planned activity centers and connect to existing and planned development opportunities.	An Alternative must serve LIRR stations, intermodal centers, and as many of the prioritized trip Attractors and Generators in the Study Area as feasible and be consistent with typical bus rapid transit levels of service.	Does the Alternative's alignment provide connections to most of the prioritized trip Attractors and Generators located within the Study Area?
Goal 4: Develop transit improvements that enhance quality of life and promote sustainability.		
Coordinate transit infrastructure and services with land use to promote sustainability, livability, and enhance quality of life.	An Alternative must have physical attributes that will conceptually enable integration with the community.	Does the Alternative's alignment include physical attributes that will conceptually permit integration within the community?
Goal 5: Develop transit improvements that are resilient and address physical, social, economic, and technological challenges.		
Develop adaptive transit infrastructure that can maintain or restart operations under various conditions.	An Alternative must be reasonably able to adapt to changing conditions and resource availability.	Does the design enable immediate reactivation of service after an event?

Note: Choice Riders are transit riders that have access to a car but choose to take public transportation.

Findings and results of the initial screening for all Alternatives are discussed in the following section.

4.2.2 Long List Initial Screening: Mineola

4.2.2.1 Goal 1 – Objective 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.

Evaluation Measure: Does the Alternative's alignment contain physical, institutional, or operational restrictions that would not permit its realistic implementation or operation?

A qualitative review and identification of potential physical, institutional, or operational challenges of Alternatives was conducted. Based on the analysis, two alignments were identified as less feasible due to institutional or physical restrictions that would not permit realistic implementation or operation. The majority of the Mineola Alternatives would travel through a mix of residential and commercial streets that have limited existing NICE Bus service. Stewart Avenue is a wide bi-directional street that provides east-west access for Garden City residents and is not served by NICE Bus. North-south streets are a mix of residential and commercial use and vary in size and directionality. Washington Avenue, County Seat Drive, and Franklin Avenue (north-south streets) are served by NICE Bus. Curb side parking is limited along the proposed Alternative routes.

Alternative 1 was determined to not satisfy the Goal and Objective due to existing roadway congestion on Franklin Avenue. The existing roadway is a commercial corridor that has expanded sidewalk infrastructure, mature trees, and curbside parking for easy access to business and restaurants. It is likely that adding additional bus service along the roadway would cause existing traffic to disperse onto nearby roads in residential neighborhoods and may cause public controversy from surrounding homeowners.

Alternative 4 was determined to not satisfy the Goal and Objective because the current roadway width on St. James Street would not support a BRT service. The roadway width would not allow for a dedicated bus lane. The current weight limit on the street is 4 tons (a typical 40-foot bus weighs well over 10 tons). While it is possible to receive an exemption to run an oversized vehicle along the roadway, it is likely that the Alternative would cause public controversy from homeowners along the street.

4.2.2.2 Goal 2 – Objective 1: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.

Evaluation Measure: Does the Alternative's alignment provide improved access to both choice riders and non-choice riders, including non-choice riders from vulnerable and underserved populations?

Analysis of how an Alternative's alignment would improve transit access for both choice and non-choice riders was used to determine whether or not an Alternative would enhance mobility and transportation equity in the Study Area. Choice riders are transit riders that have access to a car but choose to take public transportation. Non-choice riders are residents who rely on transit and other non-private vehicle modes as their only travel option because they do not have regular access to a car due to physical or socioeconomic factors. As stated in Section 2, based on the U.S. Census Bureau American Community Survey 2019 5-Year Estimate for Nassau County, about 13 percent of households within the Study Area do not have access to a personal vehicle, making these households non-choice riders of public transportation. In the census tract surrounding the Village of Mineola LIRR station, approximately10 percent of households do not have access to a vehicle. All Alternatives

would support improved transit access for both choice and non-choice riders through the expansion of service and resulting decreased travel time between existing and future key Attractors within the Study Area.

Making first/last mile connections between Nassau County's LIRR stations and existing and future housing, employment hubs, and key destinations is key to improving mobility and building transportation equity. Residents or employees of Nassau County may choose to drive to work, school, or social and recreational activities, rather than take public transportation, if a first/last mile connection cannot easily be made with a non-automotive mode. Research done as part of Nassau County's Shared Mobility Management Plan estimates approximately 40 percent of LIRR riders drive to a train station.[58] Additionally, approximately 68 percent of County residents drive alone to work.[59] Providing additional public transportation options, such as a high-frequency bus service, would make it easier for both choice and non-choice riders to make first/last mile connections from the LIRR or NICE Bus by expanding mobility options and providing faster transit service.

Nassau County is home to vulnerable and underserved populations that may rely more heavily on public transportation to travel to school, work, medical appointments, and social or recreational activities, even if their household has access to a car. In addition to non-choice riders who do not have access to a private vehicle, differently abled persons, persons with limited English proficiency, and persons younger than 18 and older than 65 may all rely more on public transportation. Within vulnerable and underserved populations are also minority and low-income populations, which together comprise EJ communities.[60] For the purposes of this analysis, EJ communities are identified as census tracts with minority and/or low-income populations above the U.S. Census Bureau American Community Survey 2019 5-Year Estimate for Nassau County. Overall, approximately 40 percent of the population of Nassau County identifies as a minority (identified as Hispanic/Latino, Black/African American, American Indian/Alaska Native/Asian, or some other race) and 5.6 percent of the population has an income below the poverty level.

Eight census tracts are within a half-mile buffer area surrounding the alignments that travel to the Mineola LIRR station. Four census tracts have been identified as potential EJ communities where the percentage of population is above the county average for populations identifying as a minority and/or living below the poverty level. See Table 4-2 and Figure 4-16 for further information about all census tracts that may be served by the proposed Alternatives to the Mineola LIRR station.

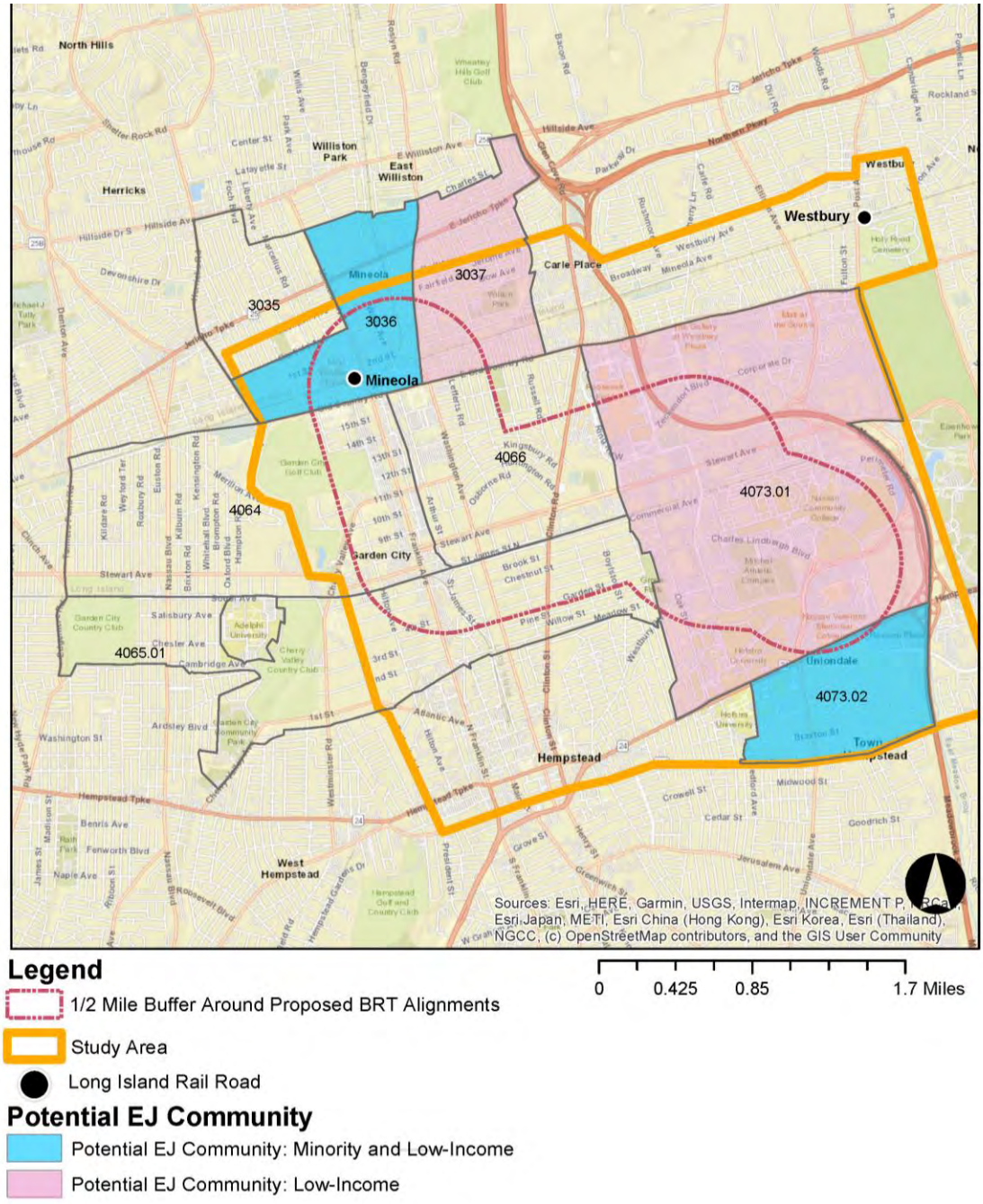
58 Long Island Rail Road 2013-2014 Origin Destination Survey.
59 U.S. Census Bureau American Community Survey 2019 5-Year Estimate
60 Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations," is the current U.S. environmental justice requirement, issued in 1994. EO 12898's purpose is to focus federal attention on the environmental and human health effects of federal actions on "minority and low income populations."

Table 4-2: Potential Environmental Justice Communities Mineola Alternatives

Census Tract	Population Identifying as a Minority	Population Living Below Poverty Level
Nassau County	*40.0%*	*5.6%*
3035	26.8%	1.7%
3036	**44.6%**	**8.1%**
3037	33.6%	**6.7%**
4064	**8.3%**	2.7%
4065.01	15.1%	1.4%
4066	13.4%	3.3%
4073.01	37.1%	**8.1%**
4073.02	**90.8%**	**18.0%**

Bold denotes census tracts that meet the potential EJ Community threshold.
Source: U.S. Census Bureau American Community Survey 2019 5-Year Estimate

Figure 4-16: Potential Environmental Justice Communities Mineola Alternatives



Source: U.S. Census Bureau American Community Survey 2019 5-Year Estimate

No Alternative was screened out based on this evaluation measure as all Alternatives would provide improved transit access for choice and non-choice riders, including those that are part of vulnerable and underserved populations or in potential EJ communities. Each of the Alternatives would provide faster, more reliable transit service that could act as a first/last mile connection to existing services offered by LIRR or NICE Bus. Additionally, all Alternatives connect to potential EJ communities outside of the Study Area and Nassau County via the LIRR, NICE, and other public transit services.

4.2.2.3 Goal 3 – Objective 1: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.

Evaluation Measure: Does the Alternative's alignment provide a connection from the LIRR Main Line to the Nassau Coliseum site?

All Alternative alignments were reviewed relative to their connection between the LIRR Main Line and the Nassau Coliseum site. Each alignment uses a similar direct connection between the two locations (traveling from the Mineola LIRR), and all Alternatives travel south and then east to connect into the IOS. Therefore, no Alternative was screened out under this evaluation measure.

4.2.2.4 Goal 3 – Objective 2: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.

Evaluation Measure: Does the Alternative's alignment provide connections to most of the prioritized trip Attractors and Generators located within the Study Area?

All Alternative alignments were reviewed relative to the location of the key destinations, as defined in section 2.2.1.2, to determine whether the alignment provided connection to them. All Alternative alignments would connect to most, if not all, Essential and Important Attractors/Generators identified in section 2.2.1.2 while prioritizing the connection between the LIRR Main Line and the Nassau Coliseum site. Therefore, no Alternative was screened out under this evaluation measure.

4.2.2.5 Goal 4 – Objective 1: Develop transit improvements that enhance quality of life and promote sustainability.

Evaluation Measure: Does the Alternative's alignment include physical attributes that will conceptually permit integration within the community?

A qualitative review of land use along the route of each Alternative was performed to determine if the character of uses (type, density, levels of activity) would be consistent with transit service. Portions of the Study Area where the primary land use is large-lot, single-family, low-density residential were not found to have the characteristics needed to support transit. A review of current zoning and master plans indicated that these conditions would continue in the future. However, many of the Alternatives are along the most direct route to the IOS and have existing bus service, which could connect into the new BRT system.

Alternative 4 was determined to not satisfy the Goal and Objective due to its likely incompatibility with the surrounding neighborhood. Specifically, the Alternative uses both Washington Avenue and St. James Street/Commercial Avenue, which are primarily low-density, single-family residential. Additionally, there may be public controversy from running BRT along St. James Street because of existing limits on vehicle weight.

4.2.2.6 Goal 5 – Objective 1: Develop transit improvements that are resilient and address physical, social, economic, and technological challenges.

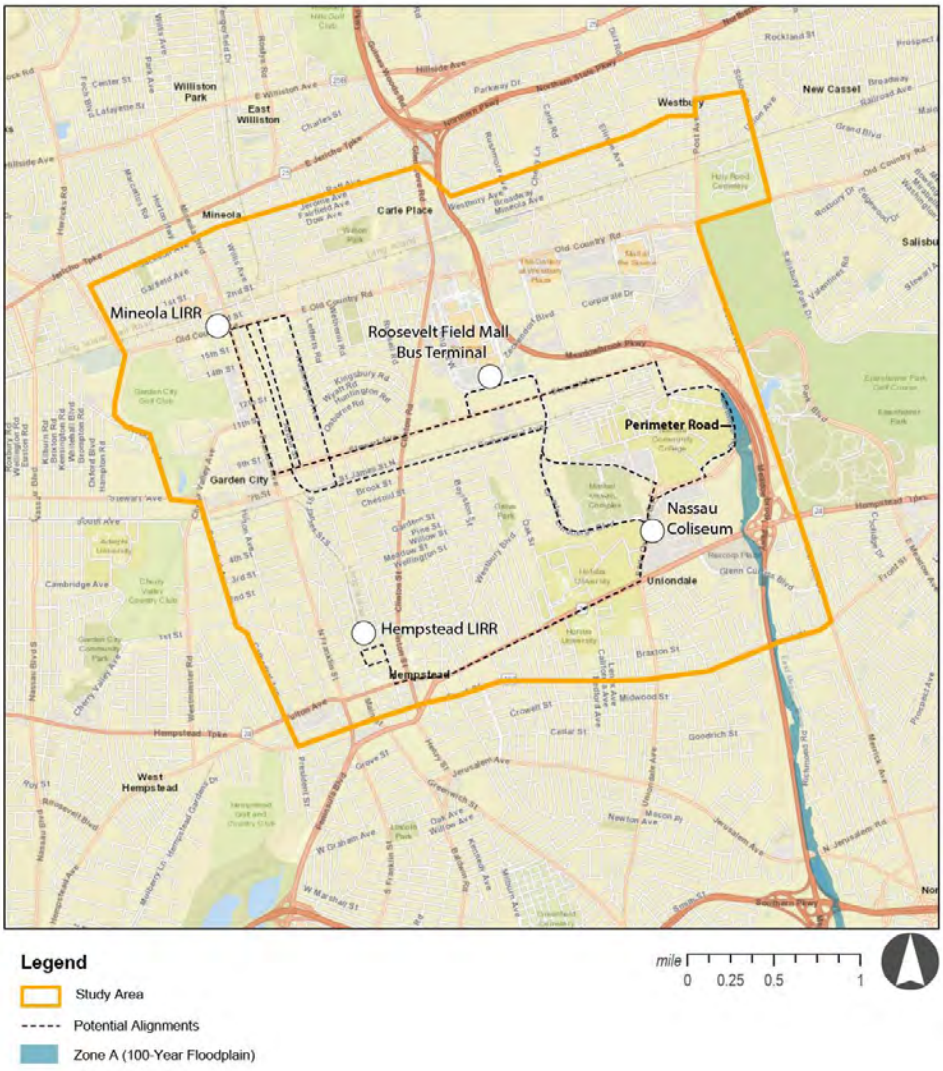
Evaluation Measure: Does the design enable immediate reactivation of service after an event?

A qualitative review within the Study Area was performed to determine if any alignment crosses an existing floodplain. Based on the findings, Alternative 2 and Alternative 5 run on Perimeter Road, which is on the periphery of an existing 100-year floodplain (Figure 4-17). However, the surrounding area is approximately 75 feet above sea level and would not be considered a low-lying area.[61]

All Alternatives would be implemented in a resilient manner, as BRT is an innately resilient service. The BRT service, on any of the proposed alignments, would be able to use other roadways in the event of a flood, thus maintaining service to key destinations. Therefore, no Alternative was screened out under this evaluation measure.

61 Nassau County Department of Public Works Topographic Map

Figure 4-17: Floodplain Map Mineola Alternative



Source: Federal Emergency Management Agency, WSP

4.2.3 Long List Initial Screening Results: Mineola

Table 4-3 summarizes the results of the initial screening of the Mineola Alternatives. Alternatives that did not meet the Goals and Objectives and were not carried forward are indicated by a pink X mark. Alternatives that met the Goals and Objectives and were carried forward are indicated by a green check mark.

Table 4-3: Alternatives Screening Results for Mineola

Alternative	Goal 1	Goal 2	Goal 3		Goal 4	Goal 5	Outcome
	Objective 1	Objective 1	Objective 1	Objective 2	Objective 1	Objective 1	
Alternative 1 (Franklin Ave.)	X	✓	✓	✓	✓	✓	**Not Advanced**
Alternative 2 (County ROW)	✓	✓	✓	✓	✓	✓	**Advanced**
Alternative 3 (County Seat Dr.)	✓	✓	✓	✓	✓	✓	**Advanced**
Alternative 4 (Washington Ave./ St. James St.)	X	✓	✓	✓	X	✓	**Not Advanced**
Alternative 5 (Washington Ave./ Stewart Ave.)	✓	✓	✓	✓	✓	✓	**Advanced**

4.2.4 Long List Initial Screening: Westbury

4.2.4.1 Goal 1 – Objective 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.

Evaluation Measure: Does the Alternative's alignment contain physical, institutional, or operational restrictions that would not permit its realistic implementation or operation?

A qualitative review and identification of potential physical, institutional, or operational flaws of the segments was conducted. The existing roadways used by the Westbury Alternatives are major commercial corridors that generally do not have curbside parking and could accommodate a dedicated BRT lane for travel. Except for Ellison Avenue, Maple Avenue, and Post Avenue, roadways typically have two lanes of through traffic on each side. Ellison Avenue, Maple Avenue, and Post Avenue are within residential areas and each have one through lane in both directions and curbside parking. Both Maple Avenue and Post Avenue have existing bus service and 30-mph speed limits. This indicates that a BRT could be implemented successfully.

Alternative 2 was determined to not satisfy the Goal and Objective due to institutional and physical restrictions that would not permit realistic implementation or operation. Ellison Avenue, which is used in Alternative 2, is a 40-foot wide residential street with curbside parking and no current bus service. The roadway is limited by both its width and its 20-mph speed limit. Operationally, it would be unlikely that a BRT service would operate successfully under these conditions. Therefore, Alternative 2 was screened out under this evaluation measure.

4.2.4.2 Goal 2 – Objective 1 Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner

Evaluation Measure: Does the Alternative's alignment provide improved access to both choice riders and non-choice riders, including non-choice riders from vulnerable and underserved populations?

Analysis of how an Alternative's alignment would improve transit access for both choice and non-choice riders was used to determine whether or not an Alternative would enhance mobility and transportation equity in the Study Area. Choice riders are transit riders that have access to a car but choose to take public transportation. Non-choice riders are residents who rely on transit and other non-private vehicle modes as their only travel option because they do not have regular access to a car due to physical or socioeconomic factors. As stated in Section 2, based on the U.S. Census Bureau American Community Survey 2019 5-Year Estimate for Nassau County, approximately 13 percent of households within the Study Area do not have access to a personal vehicle, making these households non-choice riders of public transportation. In the census tracts surrounding the Westbury LIRR station, between 10 and 14 percent of households do not have access to a personal vehicle. All Alternatives would support improved transit access for both choice and non-choice riders through the expansion of service and resulting in decreased travel time between existing and future key Attractors within the Study Area.

Making first/last mile connections between Nassau County's LIRR stations and existing and future housing, employment hubs, and key destinations is key to improving mobility and building transportation equity. Residents or employees of Nassau County may choose to drive to work, school, or social and recreational activities, rather than take public transportation, if a first/last mile

connection cannot easily be made with a non-automotive mode. Research done as part of Nassau County's Shared Mobility Management Plan estimates that approximately 40 percent of LIRR riders drive to a train station.[62] Additionally, approximately 68 percent of county residents drive alone to work.[63] Providing additional public transportation options, such as a high-frequency bus service, would make it easier for both choice and non-choice riders to make first/last mile connections from LIRR or NICE Bus by expanding mobility options and providing faster transit service.

Nassau County is home to vulnerable and underserved populations that may rely more heavily on public transportation to travel to school, work, medical appointments, and social or recreational activities, even if their household has access to a car. In addition to non-choice riders who do not have access to a private vehicle, differently abled persons, persons with limited English proficiency, and persons younger than 18 and older than 65 may all rely more on public transportation. Within vulnerable and underserved populations are also minority and low-income populations, which together comprise EJ communities.[64] For the purposes of this analysis, EJ communities are identified as census tracts with minority and/or low-income populations above the U.S. Census Bureau American Community Survey 2019 5-Year Estimates for Nassau County. Overall, approximately 40 percent of the population of Nassau County identifies as a minority (identified as Hispanic/Latino, Black/African American, American Indian/Alaska Native/Asian, or some other race) and 5.6 percent of the population has an income below the poverty level.

Twelve census tracts are within a half-mile buffer area surrounding the alignments that travel to the Westbury LIRR station. Nine census tracts have been identified as EJ communities where the percentage of population is above the county average for populations identifying as a minority and/or living below the poverty level. See Table 4-4 and

62 Long Island Rail Road 2013-2014 Origin Destination Survey.
63 U.S. Census Bureau American Community Survey 2019 5-Year Estimate
64 Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations," is the current US environmental justice requirement, issued in 1994. EO 12898's purpose is to focus federal attention on the environmental and human health effects of federal actions on "minority and low income populations.

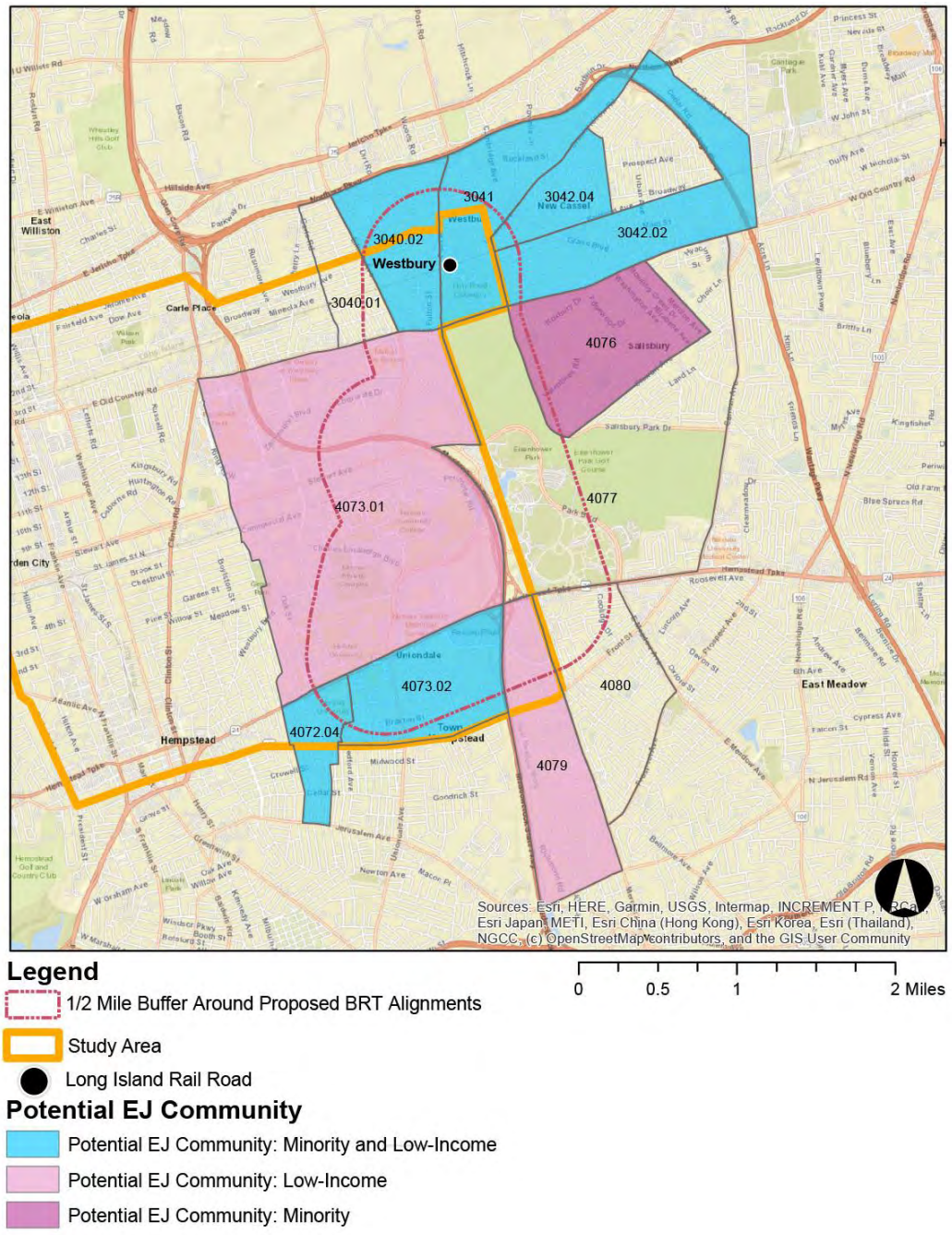
Figure 4-18 for further information about all census tracts that may be served by the proposed Alternatives to the Westbury LIRR station.

Table 4-4: Potential Environmental Justice Communities Westbury Alternatives

Census Tract	Population Identifying as a Minority	Population Living Below Poverty Level
Nassau County	*40.0%*	*5.6%*
3040.01	18.9%	3.6%
3040.02	**50.9%**	**9.3%**
3041	**87.4%**	**9.9%**
3042.02	**83.9%**	**10.1%**
3042.04	**95.4%**	**13.2%**
4072.04	**89.8%**	**9.5%**
4073.01	37.1%	**8.1%**
4073.02	**90.8%**	**18.0%**
4076	**40.3%**	1.6%
4077	34.3%	4.9%
4079	30.8%	**8.9%**
4080	32.6%	1.4%

Bold denotes census tracts that meet the potential EJ Community threshold.
Source: U.S. Census Bureau American Community Survey 2019 5-Year Estimate

Figure 4-18: Potential Environmental Justice Communities Westbury Alternatives



Source: U.S. Census Bureau American Community Survey 2019 5-Year Estimate

No Alternative was screened out based on this evaluation measure as all Alternatives would provide improved transit access for choice and non-choice riders, including those that are part of vulnerable and underserved populations or in potential EJ communities. Each of the Alternatives would provide

faster, more reliable transit service that could act as a first/last mile connection to existing services offered by the LIRR or NICE Bus. Additionally, all Alternatives connect to potential EJ communities outside of the Study Area and Nassau County via the LIRR, NICE, and other public transit services.

Turn Analysis

A turn analysis was conducted for the Westbury Alternatives to further analyze the differences of potential routes. Compared to all Alternatives, Alternatives 1, 3, and 4 have a combination of long routes, a high number of turns, which are circuitous resulting in longer travel times (Table 4-5). Generally, turns will add additional travel time even with transit signal priority installed at intersections. Alternative 1 is approximately 3.3 miles and has seven turns. Alternative 3 is approximately 3.7 miles and has six turns. Alternative 4 is approximately 3.6 miles and has six turns. These Alternatives would likely not improve travel time for choice and non-choice riders because their total distances and number of turns would increase the travel time as compared to other Alternatives with shorter distances and/or fewer turns. Therefore, Alignments 1, 3, and 4 were determined to not satisfy the Goal and Objective and were screened out under this evaluation measure.

Both Alternative 5 and 8 have the least amount of turns and both routes may have fewer impacts on travel time between the Westbury LIRR station and the Nassau Coliseum site.

Alternatives 2, 6, and 7 have a modest number of turns and may have fewer impacts on travel time.

Table 4-5: Westbury Alternatives Distance and Number of Turns

Alternative	Approximate Distance [miles]	Number of Turns
Alternative 1	3.3	7
Alternative 2	3.6	4
Alternative 3	3.7	6
Alternative 4	3.6	6
Alternative 5	2.6	1
Alternative 6	3.7	3
Alternative 7	3.3	4
Alternative 8	3.4	2

Note: Does not include turn out of Nassau Coliseum, into Nassau Community College/Museum Row, or into Westbury LIRR, and does not include turns between Endo Boulevard, Endo Drive, and Perimeter Road because Endo Drive is under Nassau Community College property.

4.2.4.3 Goal 3 – Objective 1: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.

Evaluation Measure: Does the Alternative's alignment provide a connection from the LIRR Main Line to the Nassau Coliseum site?

All Alternative alignments were reviewed relative to their connection between the LIRR Main Line and the Nassau Coliseum site. Each alignment uses a direct connection between the two locations (traveling from the Westbury LIRR), and all Alternatives travel south and then west to connect into the IOS. Therefore, no Alternative was screened out under this evaluation measure.

4.2.4.4 Goal 3 – Objective 2: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.

Evaluation Measure: Does the Alternative's alignment provide connections to most of the prioritized trip Attractors and Generators located within the Study Area?

All Alternative alignments were reviewed relative to the location of the key destinations, as defined in Section 2.2.1.2, to determine whether the alignment provided a connection to them. All Alternative alignments would connect to most, if not all, Essential and Important Attractors/Generators while prioritizing the connection between the LIRR Main Line and the Nassau Coliseum site. Therefore, no Alternative was screened out by this evaluation measure.

4.2.4.5 Goal 4 – Objective 1: Develop transit improvements that enhance quality of life and promote sustainability.

Evaluation Measure: Does the Alternative's alignment include physical attributes that will conceptually permit integration within the community?

A qualitative review of land use along the route of each Alternative was performed to determine if the character of uses (type, density, levels of activity) would be consistent with transit service. Portions of the Study Area where the primary land use is large-lot, single-family, low-density residential were not found to have the characteristics needed to support transit. A review of current zoning and master plans indicated that these conditions would continue in the future. However, many of the Alternatives are along a direct route to the IOS and have existing bus service, which could connect into the new BRT system.

Alternative 2 (Maple Ave/Ellison Ave) is the only Alternative that has an alignment within a low-density residential area and with no existing bus route. Therefore, Alternative 2 was determined to not satisfy the Goal and Objective and was screened out under this evaluation measure.

4.2.4.6 Goal 5– Objective 1: Develop transit improvements that are resilient and address physical, social, economic, and technological challenges.

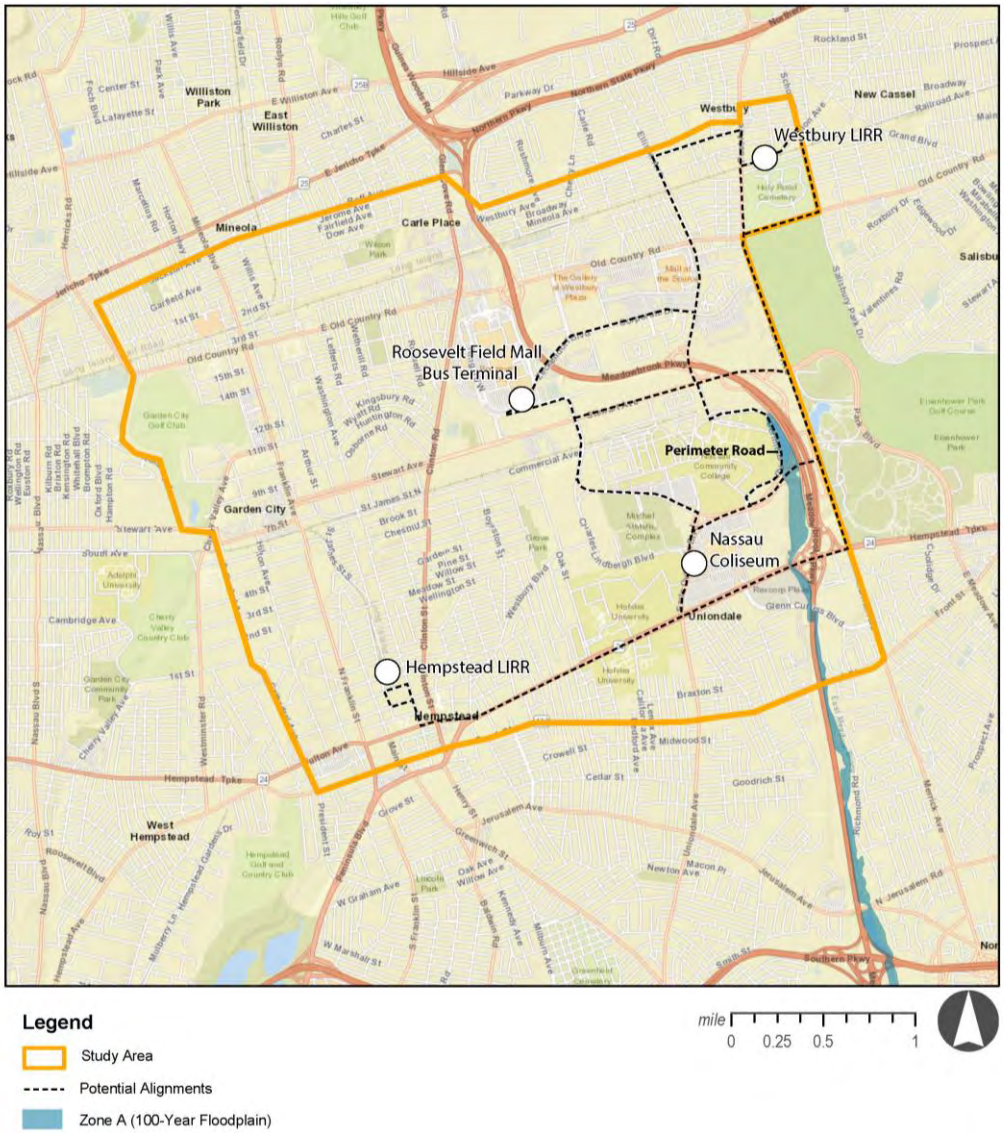
Evaluation Measure: Does the design enable immediate reactivation of service after an event?

A qualitative review of existing floodplains within the Study Area was performed to determine if any alignment crosses an existing floodplain. Based on the findings, Alternative 1, 2, and 7 run on Perimeter Road, which is on the periphery of an existing 100-year floodplain (Figure 4-19).

However, the surrounding area is approximately 75 feet above sea level and would not be considered a low-lying area.[65]

All Alternatives would be implemented in a resilient manner, as BRT is an innately resilient service. The BRT service, on any of the proposed alignments, would be able to use other roadways in the event of a flood, thus maintaining service to key destinations. Therefore, no Alternative was screened out under this evaluation measure.

Figure 4-19: Floodplain Map Westbury Alternative



Source: Federal Emergency Management Agency, WSP, 2021

65 Nassau County Department of Public Works Topographic Map

4.2.5 Long List Initial Screening Results: Westbury

Table 4-6 summarizes the results of the initial screening of Westbury Alternatives. Alternatives that did not meet the Goals and Objectives and were not carried forward are indicated by a pink X mark. Alternatives that meet the Goals and Objectives and are carried forward are indicated by a green check mark.

Table 4-6: Alternatives Screening Results for Westbury

Alternative	Goal 1	Goal 2	Goal 3		Goal 4	Goal 5	Outcome
	Objective 1	Objective 1	Objective 1	Objective 2	Objective 1	Objective 1	
Alternative 1 (Union Ave./School St.)	✓	X	✓	✓	✓	✓	**Not Advanced**
Alternative 2 (Maple Ave./Ellison Ave.)	X	✓	✓	✓	X	✓	**Not Advanced**
Alternative 3 (Merchants Concourse/ Corporate Dr.)	✓	X	✓	✓	✓	✓	**Not Advanced**
Alternative 4 (Merchants Concourse/ Stewart Ave.)	✓	X	✓	✓	✓	✓	**Not Advanced**
Alternative 5 (Merrick Ave./ Charles Lindbergh Blvd.	✓	✓	✓	✓	✓	✓	**Advanced**
Alternative 6 (Merrick Ave./ Stewart Ave.)	✓	✓	✓	✓	✓	✓	**Advanced**
Alternative 7 (Merrick Ave./ Perimeter Rd.	✓	✓	✓	✓	✓	✓	**Advanced**
Alternative 8 (Merrick Ave./ Hempstead Tpke.)	✓	✓	✓	✓	✓	✓	**Advanced**

4.3 LONG LIST SCREENING SUMMARY & NEXT STEPS

4.3.1 Mineola Alignments

Based upon the initial screening performed, Alternatives 1 and 4 did not meet the Goals and Objectives and are not recommended for advancement to the next phase of screening. Both alignments included roadways that would not permit implementation of a successful BRT service either due to roadway width or anticipated traffic congestion. Alternatives 2, 3, and 5 were advanced to the next level of evaluation as they sufficiently meet all criteria in the initial screening. Each of the remaining Alternatives provides a direct connection between the LIRR Main Line in the Village of Mineola and the Nassau Coliseum site while also serving additional Essential Attractors/Generators in the Study Area. Additionally, all optional alignments for the remaining Alternatives were considered in the next level of evaluation.

4.3.2 Westbury Alignments

Based upon the initial screening performed, Alternatives 1, 2, 3, and 4 did not meet the Goals and Objectives and were not recommended for advancement to the next phase of screening. Alternatives 1, 3, and 4 do not improve travel times, owing to their length and number of turns. Alternative 2 contains institutional and physical flaws (low speed limits and narrow street width) that would not permit the implementation of a successful BRT service along the proposed alignment. Alternatives 5, 6, 7, and 8 were advanced to the next level of evaluation as they sufficiently meet all criteria in the initial screening. Each of the remaining Alternatives provides a direct connection between the LIRR Main Line in the Village of Westbury and the Nassau Coliseum site. All, except for Alternative 8, also serve additional Essential Attractors/Generators within the Study Area.

5 Refined Long-List Alternatives Screening

This section presents the Refined Long List Screening. The analysis from this screening resulted in a Short List of Alternatives used to select an LPA. The Refined Long List Screening is the second tier of the three-tier screening evaluation process and builds off the previously developed Long List Screening (see Section 4). In the Long List Screening, three Mineola Alternatives (Alternatives 2, 3, and 5) and four Westbury Alternatives (Alternatives 5, 6, 7, and 8) were advanced as they best met the Goals and Objectives used for the screening process. See Section 4.2.3 and 4.2.5 of the Long-List Alternatives Screening for the results for both the Mineola Alternatives and Westbury Alternatives.

5.1 REFINED LONG LIST GOALS, OBJECTIVES, AND METRICS

The Refined Long List Screening assessed the proposed BRT services in a comparative screening evaluation that included the development of detailed evaluation metrics for each Alternative. These evaluation metrics included the following:

(1) Travel Time

(2) Encourages the use of Alternative Transportation Modes

(3) Political and Local Agency Support

(4) Attractors and Generators Served (as defined in Section 2.2.1.2)

(5) Connection To Existing and Future Transit Services

(6) Supportive Land Use

The purpose of the Refined Long List Screening was to broadly analyze the Refined Long List Alternatives to determine their ability to address this AA Update's goals. The evaluation metrics used in this analysis were both qualitative and quantitative and build upon the objectives, criteria, and metrics used in the Long List Screening (see Table 5-1). Goals 1, 2, and 3 and their corresponding objectives were chosen as appropriate measures because their associated evaluation criteria would refine the list of Alternatives. All Alternatives support Goals 4 and 5; therefore, these goals are not evaluated further in this tier of screening.

The Refined Long-List screening was divided into two phases. The first phase of the screening prioritizes Evaluation Metric 1, Travel Time, as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. The top two Alternatives that best met this Goal and Objective advanced to the second phase of screening. The second phase of the screening further analyzed the remaining Alternatives based on Evaluation Metrics 2, 3, 4, 5, and 6.

Table 5-1: Refined Long List Goals, Objectives, Evaluation Criteria, and Evaluation Metrics

Objective	Evaluation Criteria	Evaluation Metrics
Goal 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.		
Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible.	Does the Alternative's alignment contain physical, institutional, and/or operational restrictions that would permit its realistic implementation and operation?	(3) Political and local Agency Support – Does the bus rapid transit (BRT) system have support from key local decision makers?
Develop a transit Alternative that encourages use of Alternative transportation modes (walking, bicycling, carpooling, and other travel demand management methods) over travel by automobile to access the transit system.	Connect to shared mobility services provided throughout Nassau County.	(2) Encouragement of Alternative Transportation Modes – Has the BRT system been designed to connect to Future Shared Mobility Services?
Goal 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner		
Develop an Alternative that provides travel time savings compared to existing options.	Travel time should be minimized.	(1) Travel Time – Quantitative analysis of travel time of proposed service.
Goal 3: Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs.		
Use transit to better serve existing and planned activity centers and connect to existing and planned development opportunities.	An Alternative must serve Long Island Rail Road (LIRR) stations, intermodal centers, and as many of the prioritized trip Attractors and Generators in the Study Area as feasible but be consistent with typical BRT service.	(4) Attractors and Generators Served – Does the Alternative's alignment provide connections to most of the prioritized trip Attractors and Generators located within the Study Area?
	Connections to additional transit options need to be offered.	(5) Connection to Existing and Future Transit Services – Does the alignment provide connections to LIRR, and existing bus services, and the Nassau Hub Transit Initiative Initial Operating Segment?
Develop a transit Alternative that can be supported by local land use plans and development policies.	Extent to which an Alternative can be supported by existing and planned local land use policies should be maximized.	(6) Supportive Land Use – Will the alignment be supported by land use plans and policies such as transit-oriented developments and infill development?

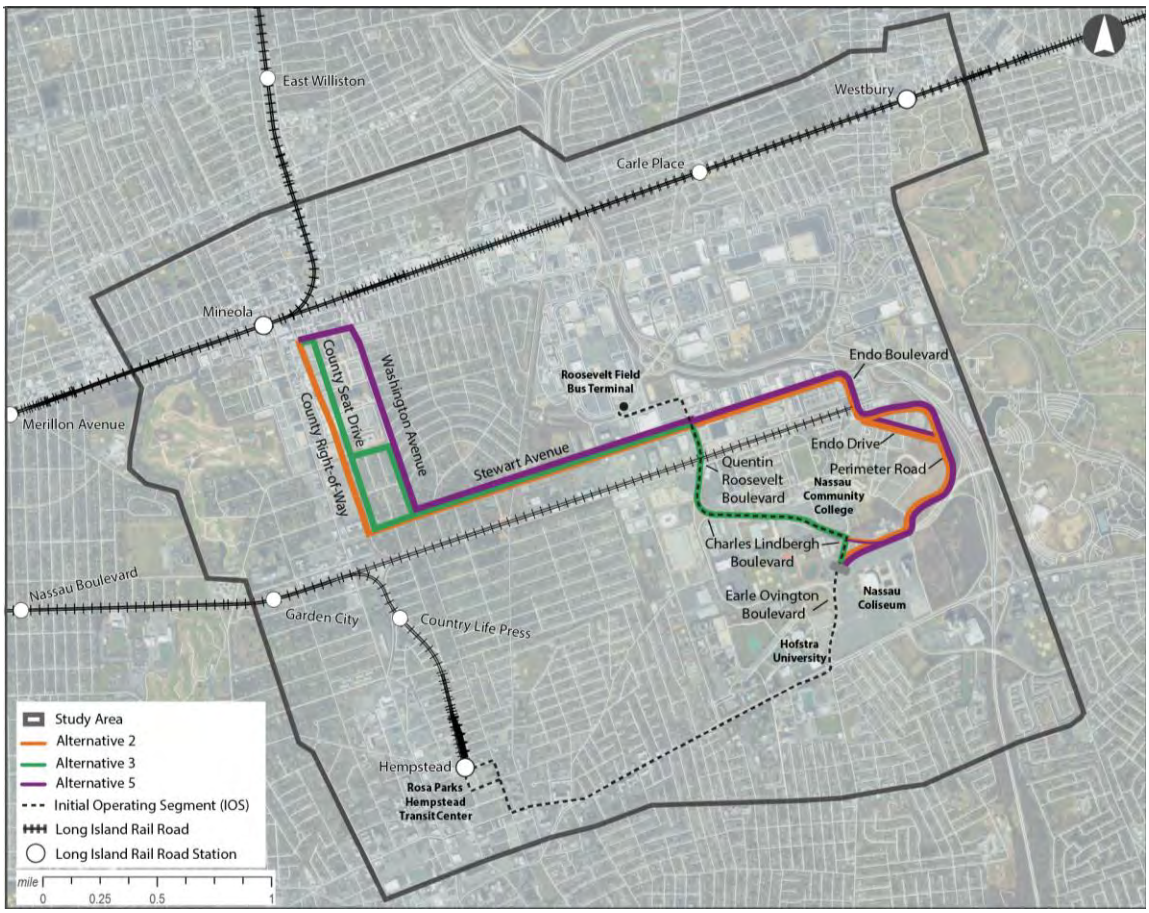
***Goal 4 (Develop transit improvements that enhance quality of life and promote sustainability) and Goal 5 (Develop transit improvements that are resilient and address physical, social, economic, and technological challenges) were not evaluated further in this screening because all Alternatives support them.**

Each of the Refined Long List Alternatives analyzed using these goals, objectives, evaluation criteria, and evaluation metrics are described in the following sections.

5.2 MINEOLA ALTERNATIVES

The following are the Refined Long List Alternatives for connecting the Village of Mineola's LIRR station and the Nassau Coliseum site, both located in the Town of Hempstead. At this time, no specific routing to access the termini at the Village of Mineola's LIRR station or the Nassau Coliseum site has been identified. Alignment termini locations are subject to change and may result in variations to the Refined Long List Alternatives. Additionally, proposed stop locations are subject to change. See Figure 5-1 for the overview map of the Refined Long-List Alternatives for the connection to the Village of Mineola.

Figure 5-1: Refined Long-List Mineola Alternatives



5.2.1 Refined Long List Mineola – Alternative 2

Alternative 2 (Figure 5-2) would travel south from Old Country Road onto the County ROW, which is located between Kellum Place and County Seat Drive. The entrance to the ROW is adjacent to the Nassau County Office Building on the western side. The County ROW is currently a parking lot for the adjacent Nassau County government offices, which include the Nassau County Clerk's Office, the Probation Department, and the Department of Health. The Alternative would travel south on the County ROW to 11th Street where the Alternative would continue south through a portion of the County ROW that is undeveloped, connecting into Stewart Avenue. The eastern side of this portion of the County ROW contains single-family homes, while the western side is a surface parking lot for the commercial uses along Franklin Avenue. The Alternative would then turn left onto Stewart Avenue, traveling east. The adjacent land uses between the County ROW exit on Stewart Avenue and Clinton Road are single-family homes. East of Clinton Road, the adjacent land uses are primarily commercial with a few single-family residential homes. The Alternative would continue east on Stewart Avenue to Endo Boulevard. Past Quentin Roosevelt Boulevard, Stewart Avenue is a mixture of both commercial and multi-family residential. At Endo Boulevard, the Alternative would turn right and travel south to the intersection of Endo Boulevard, Perimeter Road, and Endo Drive. The Alternative would then travel southeast on Endo Drive.[66] From Endo Drive, the alignment would travel south onto Perimeter Road, making a left to access Charles Lindbergh Boulevard. From Charles Lindbergh Boulevard, the alignment would travel west and then south, making a left onto Earle Ovington Boulevard to reach the termini at the Nassau Coliseum site.

Five intermediary stops are proposed for Alternative 2. The first stop is located at County ROW and South Drive, which will connect to the adjacent County offices. The second stop is located on Stewart Avenue between Clinton Road and Raymond Court. The stop will connect to the adjacent commercial uses. The third stop is located at Stewart Avenue and Quentin Roosevelt Boulevard. This stop will connect to adjacent commercial uses and the IOS. The fourth stop is located at Stewart Avenue and Endo Boulevard. This stop will connect to the adjacent multi-family infill and commercial uses. The fifth stop is located at the intersection of Endo Boulevard, Perimeter Road, and Endo Drive. This stop will connect to Nassau Community College.

Table 5-2 provides key characteristics of Alternative 2 relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

66 This reflects a slight adjustment of the alignment due to changes in street geometry at Perimeter Road.

Table 5-2: Mineola Alternative 2 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 10.7 – 20.7 minutes (15.7 minutes average) South Bound: 12 – 20 minutes (16 minutes average)
(4) Attractors and Generators Served	• Downtown Mineola/Mineola Long Island Rail Road (LIRR) station • Nassau County Government Complex • Nassau Community College • Nassau Coliseum • Hofstra University
(5) Connection To Existing and Future Transit Services	LIRR Mineola Station Nassau Inter-County Express (NICE) Bus Route 15 Stop: • Stewart Avenue/ Clinton Road NICE Bus Route 16 Stops: • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's • Post Office / Stewart • 845 Stewart Avenue • Selfridge Avenue / Stewart Avenue • Endo Bl / Stewart Avenue NICE Bus Route 22x Stop: • County Seat Dr / Old Country Road NICE Bus Route 22 Stop: • County Seat Dr / Old Country Road NICE Bus Route 24 Stop: • County Seat Dr / Old Country Road NICE Bus Route 27 Stops: • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's • Stewart Plaza NICE Bus Route 35 Stops: • Selfridge Avenue / Stewart Avenue • Post Office / Stewart Avenue • Stewart Plaza • Stewart Avenue / Clinton Road • Stewart Avenue / Endo Boulevard • 845 Stewart Avenue • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's NICE Bus Route 43 Stop: • Stewart Avenue / Endo Boulevard Alternative connects to the future Initial Operating Segment at Earle Ovington Boulevard and Charles Lindbergh Boulevard.

Evaluation Metrics	Outcome
(6) Supportive Land Use	• Morgan Parc (Mineola Village Green) is located at 199 Second Avenue. • One Third Avenue is located at 250 Old Country Road. • The Florent is located at 555 Stewart Avenue. • Proposed development BLD Mineola is located between 3rd St and Mineola Boulevard and 3rd St and Station Road. • The Avalon Garden City on Stewart Avenue and Endo Boulevard.

Figure 5-2: Mineola Alternative 2

5.2.2 Refined Long List Mineola – Alternative 3

For the purposes of the Refined Long-List Screening, Alternative 3 was analyzed as a stand-alone route terminating at the Nassau Coliseum site. Previous analysis identified this Alternative as an extension of the IOS or terminating at Roosevelt Field Mall.

Alternative 3 (Figure 5-3) would travel east on Old Country Road and make a right onto County Seat Drive. The Alternative would travel south on County Seat Drive which is adjacent to Nassau County government offices (for northbound service, Arthur Street would be used). The Alternative would then turn left at 11th Street and travel east to Washington Avenue. At Washington Avenue, the Alternative would turn right, traveling south to Stewart Avenue. Washington Avenue is primarily single-family homes. At Stewart Avenue, the Alternative would turn left, traveling east on Stewart Avenue. This portion of Stewart Avenue consists of single-family homes. East of Clinton Road, the adjacent land uses are primarily commercial with a few single-family residential. The Alternative would make a right at Quentin Roosevelt Boulevard, traveling on the IOS. This area is generally composed of commercial uses and public facilities such as museums and colleges. The Alternative would travel south and then east in the counter flow lane on Charles Lindbergh Boulevard to Earle Ovington Boulevard. At Earle Ovington Boulevard, the alignment would turn right and travel south to reach the termini at the Nassau Coliseum site.

Four intermediary stops are proposed for Alternative 3. The first stop is located at the intersection of County Seat Drive and South Drive. This stop connects to adjacent Nassau County government offices. The second stop is located at the intersection of Stewart Avenue and Quentin Roosevelt Boulevard and connects to the adjacent commercial uses. The third stop is located at Charles Lindbergh Boulevard and Railroad Avenue serving Museum Row and adjacent office parks. The fourth stop is located at Charles Lindbergh Boulevard near Library Road West, serving Nassau Community College.

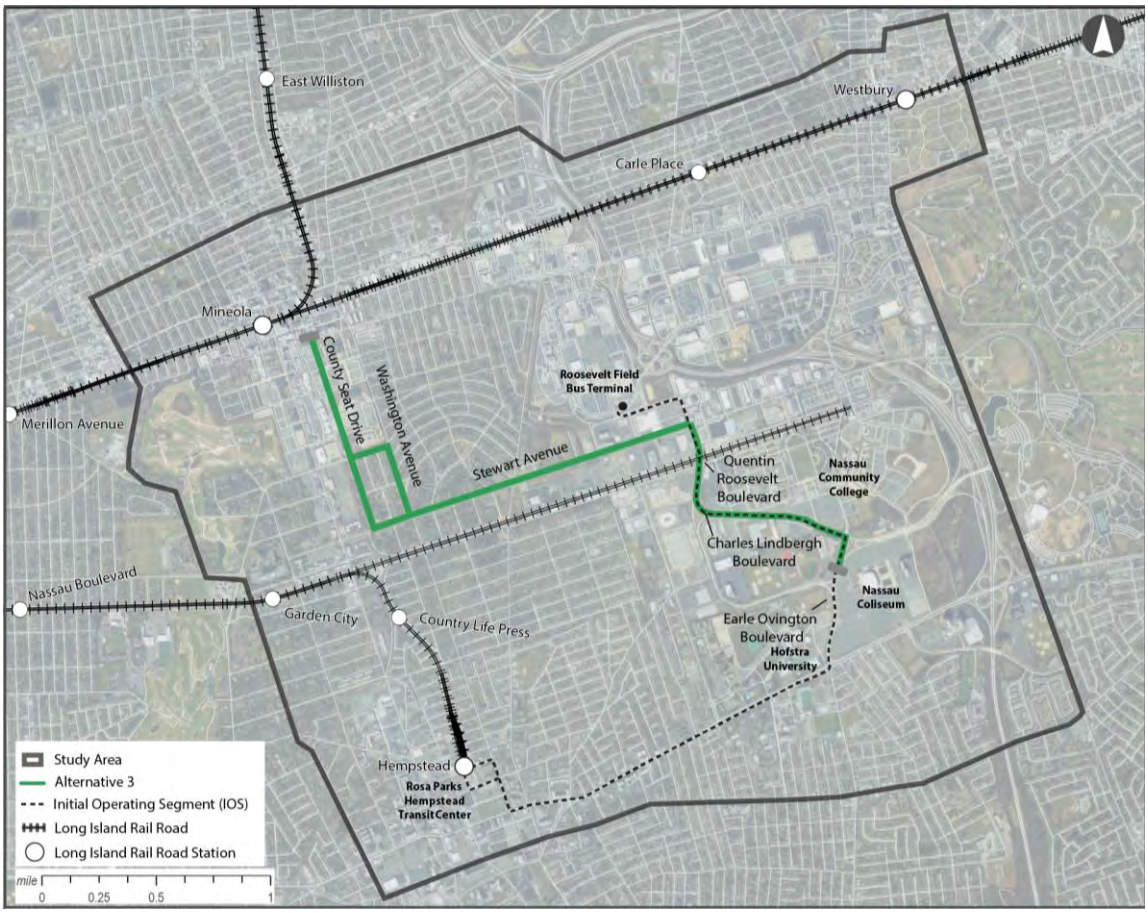
Table 5-3 provides key characteristics of Alternative 3 relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

Table 5-3: Mineola Alternative 3 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 8.7 – 17.3 minutes (13 minutes average) South Bound: 8.7 – 18 minutes (13.3 minutes average)
(4) Attractors and Generators Served	• Downtown Mineola/Mineola Long Island Rail Road (LIRR) station • Nassau County Government Complex • Nassau Community College • Nassau Coliseum • Hofstra University • Museum Row
(5) Connection To Existing and Future Transit Services	LIRR Mineola Station Nassau Inter-County Express (NICE) Bus Route 15 Stop: • Stewart Avenue / Clinton Road NICE Bus Route 16 Stop: • Mall Entrance / Stewart Avenue NICE Bus Route 22x Stop: • County Seat Dr / Old Country Road NICE Bus Route 22 Stop: • County Seat Dr / Old Country Road NICE Bus Route 24 Stop: • County Seat Dr / Old Country Road NICE Bus Route 27 Stops: • Stewart Avenue / Quentin Roosevelt Boulevard • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's • Stewart Plaza NICE Bus Route 35 Stops: • Stewart Plaza • Stewart Avenue / Clinton Road • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's Alternative connects to the future Initial Operating Segment at Quentin Roosevelt Boulevard.

Evaluation Metrics	Outcome
(6) Supportive Land Use	• Morgan Parc (Mineola Village Green) is located at 199 Second Avenue. • One Third Avenue is located at 250 Old Country Road. • The Florent is located at 555 Stewart Avenue. • Proposed development BLD Mineola is located between 3rd St and Mineola Boulevard and 3rd St and Station Road.

Figure 5-3 Mineola Alternative 3



5.2.3 Refined Long List Mineola – Alternative 5

Alternative 5 (Figure 5-4) would travel east on Old Country Road and make a right onto Washington Avenue. The Alternative would travel south on Washington Avenue to Stewart Avenue. The adjacent land uses on Washington Avenue are single-family homes. The Alternative would then turn left onto Stewart Avenue, traveling east on the roadway. The adjacent land uses on Stewart Avenue are single-family homes. East of Clinton Road, the adjacent land uses are primarily commercial with a few single-family residential homes. The Alternative would continue east on Stewart Avenue to Endo Boulevard where it would turn right. Past Quentin Roosevelt Boulevard, Stewart Avenue is a mixture of both commercial and multi-family residential. The Alternative would then travel southeast on Endo Drive.[67] From Endo Drive, the alignment would travel south onto Perimeter Road, making a left turn to access Charles Lindbergh Boulevard. From Charles Lindbergh Boulevard, the alignment would travel west and then south, making a left turn onto Earle Ovington Boulevard to reach the termini at the Nassau Coliseum site.

Five intermediary stops are proposed for Alternative 5. The first stop is located at Washington Avenue and South Drive, which will connect to the adjacent County offices. The second stop is located on Stewart Avenue between Clinton Road and Raymond Court. The stop will connect to the adjacent commercial uses. The third stop is located at Stewart Avenue and Quentin Roosevelt Boulevard. This stop will connect to adjacent commercial uses and the IOS. The fourth stop is located at Stewart Avenue and Endo Boulevard. The stop will connect to the adjacent multi-family infill and commercial uses. The fifth stop is located at the intersection of Endo Boulevard, Perimeter Road, and Endo Drive. This stop will connect to Nassau Community College.

Table 5-4 provides key characteristics of Alternative 5 relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

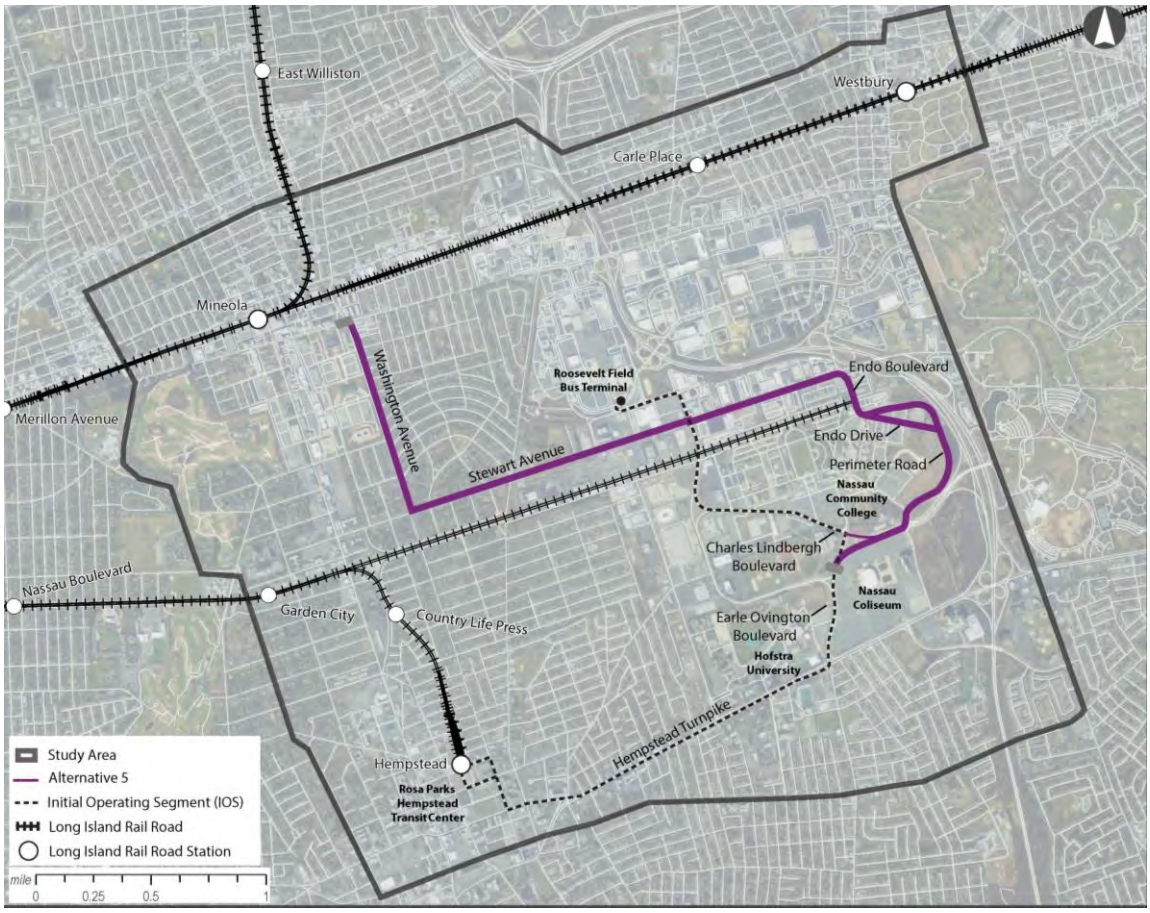
67 This reflects a slight adjustment of the alignment due to changes in street geometry at Perimeter Road.

Table 5-4: Mineola Alternative 5 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 10.7 – 22.3 minutes (16.5 minutes average) South Bound: 10.7 – 24 minutes (17.3 minutes average)
(4) Attractors and Generators Served	• Downtown Mineola/Mineola Long Island Rail Road (LIRR) station • Nassau County Government Complex • Nassau Community College • Nassau Coliseum • Hofstra University • LIRR Mineola Station
(5) Connection To Existing and Future Transit Services	Nassau Inter-County Express (NICE) Bus Route 15 Stops: • Stewart Avenue / Washington Avenue • Stewart Avenue / Clinton Road Nassau Inter-County Express (NICE) Bus Route 22x Stop: • County Seat Dr / Old Country Road NICE Bus Route 22 Stop: • County Seat Dr / Old Country Road NICE Bus Route 27 Stops: • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's • Stewart Plaza NICE Bus Route 35 Stops: • Selfridge Avenue / Stewart Avenue • Post Office / Stewart Avenue • Stewart Plaza • Stewart Avenue / Clinton Road • Stewart Avenue / Endo Boulevard • 845 Stewart Avenue • Mall Entrance / Stewart Avenue • Stewart Avenue / BJ's NICE Bus Route 43 Stop: • Stewart Avenue / Endo Boulevard Alternative connects to the future Initial Operating Segment at Earle Ovington Boulevard and Charles Lindbergh Boulevard.

Evaluation Metrics	Outcome
(6) Supportive Land Use	• Morgan Parc (Mineola Village Green) is located at 199 Second Avenue. • One Third Avenue is located at 250 Old Country Road. • The Florent is located at 555 Stewart Avenue. • Proposed development BLD Mineola is located between 3rd St and Mineola Boulevard and 3rd St and Station Road. • The Avalon Garden City on Stewart Avenue and Endo Boulevard.

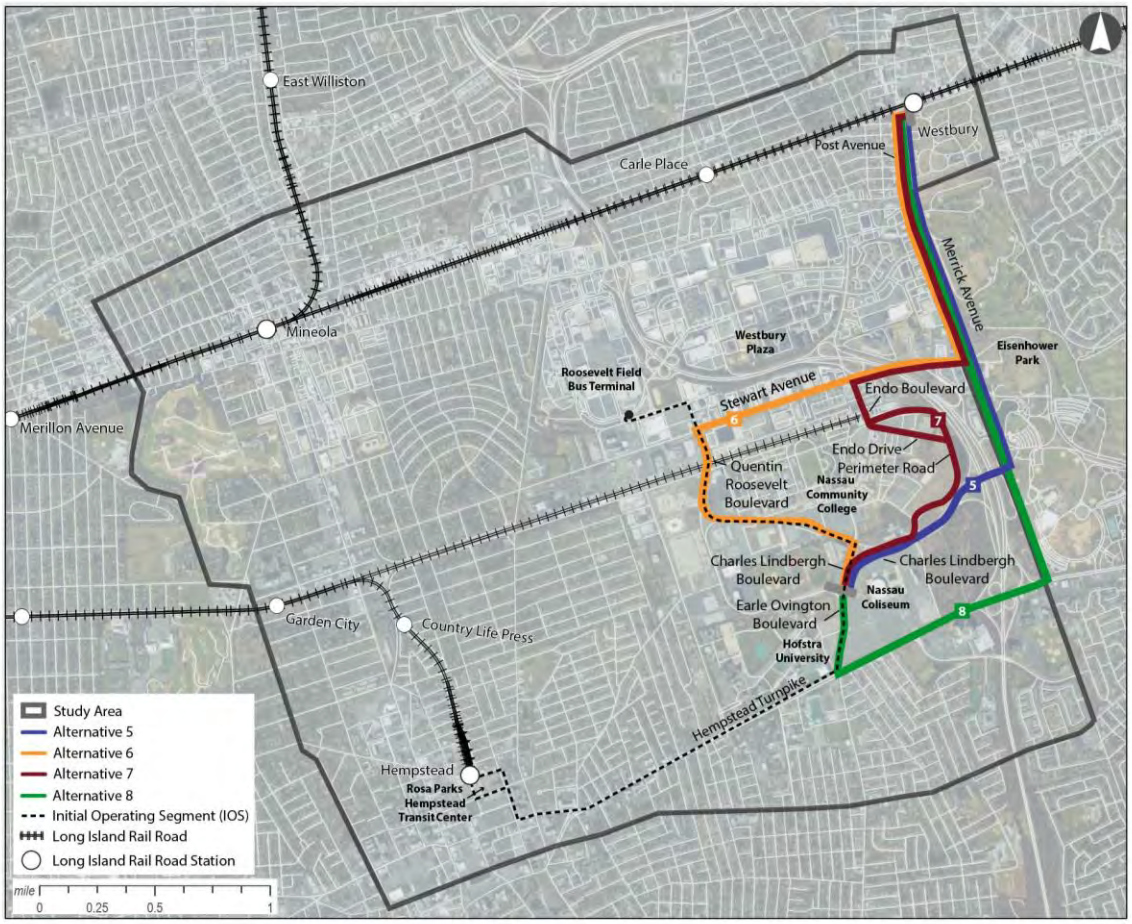
Figure 5-4: Mineola Alternative 5



5.3 WESTBURY ALTERNATIVES

The following are the Refined Long List Alternatives for connecting the Village of Westbury's LIRR station and the Nassau Coliseum site, both located in the Town of Hempstead. At this time, no specific routing to access the termini at Village of Westbury's LIRR station or the Nassau Coliseum site has been identified. Alignment termini locations are subject to change and may result in variations to the Refined Long List Alternatives. Additionally, proposed stop locations are subject to change. See Figure 5-5 for the overview map of the Refined Long-List Alternatives for the connection to the Village of Westbury.

Figure 5-5: Refined Long-List Westbury Alternatives



5.3.1 Refined Long List Westbury – Alternative 5

Alternative 5 (Figure 5-6) would travel south from the Westbury LIRR station, down Post Avenue. Post Avenue is a bi-directional two-lane roadway with parking on both sides of the street. On the eastern side of Post Avenue is the Cemetery of the Holy Rood while the western side is composed of single-family, two-family, and multi-family residential and commercial uses. The Alternative would continue traveling south as Post Avenue becomes Merrick Avenue at Old Country Road. Merrick Avenue is a four-lane bi-directional roadway with a center running turning lane and no shoulder parking. On the eastern side of the roadway is Eisenhower Park and on the western side are primarily commercial uses with one multi-family residential building. Continuing south on Merrick Avenue, the Alternative would then make a right turn on Charles Lindbergh Boulevard, heading west and then south on Earle Ovington Boulevard to access the Nassau Coliseum site, which serves as the termini for the BRT route.

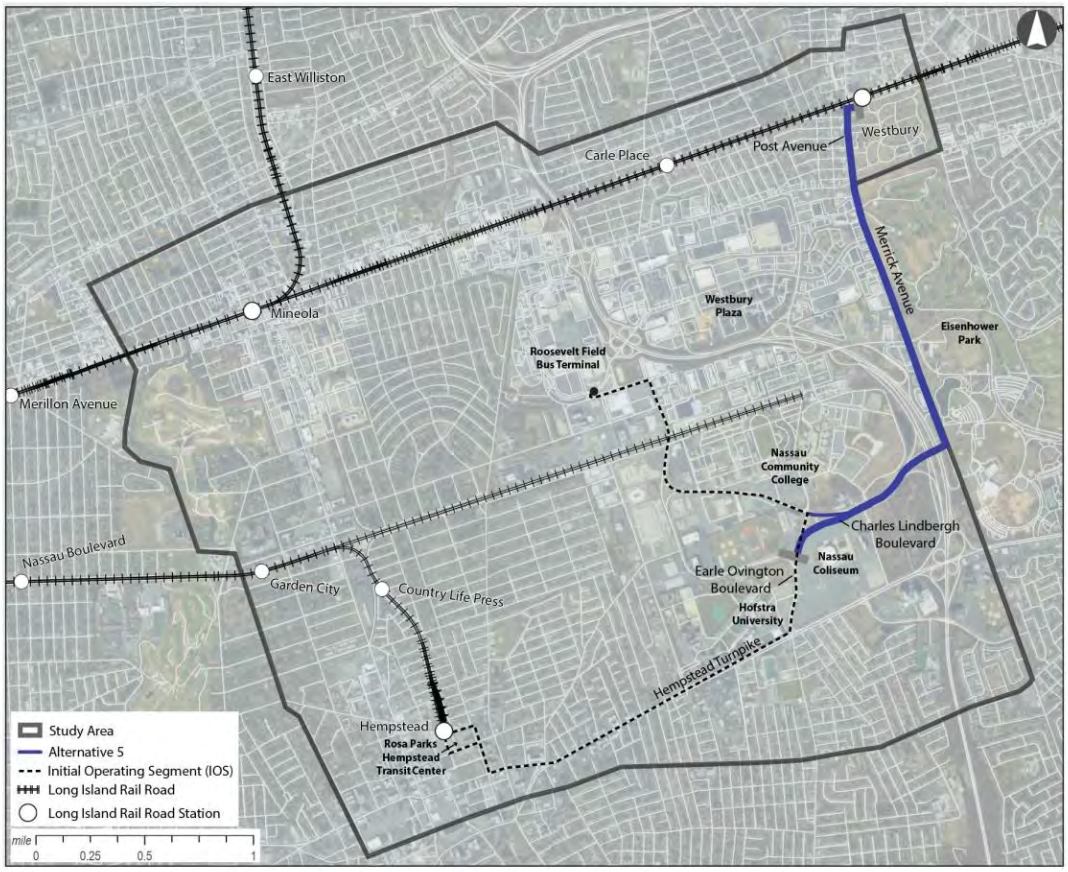
One intermediary stop is proposed for Alternative 5 located between Corporate Drive and Park Boulevard/Stewart Avenue, connecting to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue.

Table 5-5 provides key characteristics of Alternative 5 relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

Table 5-5: Westbury Alternative 5 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 5 – 12 minutes (8.5 minutes average) South Bound: 5 – 11.5 minutes (8.1 minutes average)
(4) Attractors and Generators Served	• Downtown Westbury/Westbury Long Island Rail Road (LIRR) station • Nassau Coliseum • Hofstra University
(5) Connection To Existing and Future Transit Services	LIRR Westbury Station Nassau Inter-County Express (NICE) Bus Route 24 Stops: • Merrick Avenue & Old Country Road/ Post Avenue& Old Country Road NICE Bus Route 35 Stops: • Railroad Avenue & Post Avenue • Lafayette Avenue & Post Avenue • Merrick Avenue & Privado Road NICE Bus Route 43 • Travels a portion of route along Earle Ovington Boulevard but no stops along Alternative (closest stop located at Hofstra University & East Gate) Alternative connects to the future Initial Operating Segment at Earle Ovington Boulevard and Charles Lindbergh Boulevard.
(6) Supportive Land Use	• Mill Creek transit-oriented development on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Cornerstone Westbury on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Selby on Merrick Avenue north of Stewart Avenue.

Figure 5-6: Westbury Alternative 5



5.3.2 Refined Long List Westbury – Alternative 6

Alternative 6 (Figure 5-7) would travel south from the Westbury LIRR station down Post Avenue. Post Avenue is a bi-directional two-lane roadway with parking on both sides of the street. On the eastern side of Post Avenue is the Cemetery of the Holy Rood while the western side is composed of single-family, two-family, and multi-family residential and commercial uses. The Alternative would continue traveling south as Post Avenue becomes Merrick Avenue at Old Country Road. Merrick Avenue is a four-lane bi-directional roadway with a center running turn lane and no shoulder parking. On the eastern side of the roadway is Eisenhower Park and on the western side are commercial uses with one multi-family residential building. The Alternative would continue to the Stewart Avenue intersection and turn right. Stewart Avenue has a mixture of both commercial and multi-family residential. Continuing west on Stewart Avenue, the Alternative would make a left at Quentin Roosevelt Boulevard, traveling on the full IOS. This area is generally composed of commercial uses and public facilities such as museums and colleges. The Alternative would travel south and then east in the counter flow lane on Charles Lindbergh Boulevard. At Earle Ovington Boulevard, the Alternative would turn right and travel south to reach the termini at the Nassau Coliseum site.

Five intermediary stops are being proposed for Alternative 6. The first stop is located between Corporate Drive and Park Boulevard/Stewart Avenue, connecting to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The second stop is located around the intersection of Stewart Avenue and Merrick Avenue, which would connect to adjacent commercial uses. A third stop is proposed at the intersection of Stewart Avenue and Selfridge Avenue, which would connect to the adjacent multi-family residences and commercial businesses. A fourth stop is located at Charles Lindbergh Boulevard and Railroad Avenue, serving the museum and adjacent office parks. A fifth stop is located at Charles Lindbergh Boulevard near Library Road West, serving Nassau Community College.

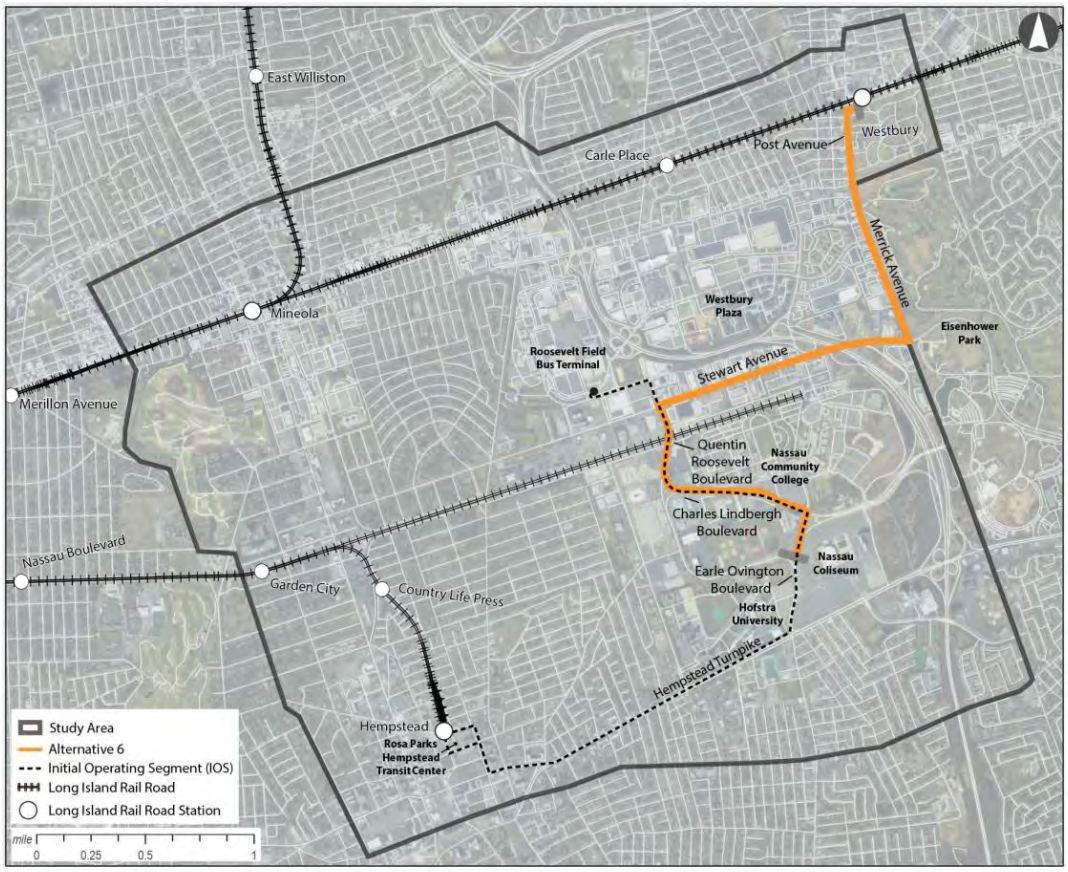
Table 5-6 provides key characteristics of the Alternative relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

Table 5-6: Westbury Alternative 6 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 6.6 – 16.6 minutes (11.6 minutes average) South Bound: 7.5 – 17.3 minutes (12.5 minutes average)
(4) Attractors and Generators Served	• Downtown Westbury/Westbury Long Island Rail Road (LIRR) • Nassau Community College • Nassau Coliseum • Hofstra University • Museum Row
(5) Connection To Existing and Future Transit Services	LIRR Westbury Station Nassau Inter-County Express (NICE) Bus Route 16 Stops: • Post Office & Stewart Avenue • Selfridge Avenue& Stewart Avenue NICE Bus Route 24 Stops: • Merrick Avenue & Old Country Road / Post Avenue & Old Country Road NICE Bus Route 35 Stops: • Railroad & Post Avenue • Lafayette Avenue & Post Avenue • Merrick Avenue & Privado Road • Selfridge Avenue & Stewart Avenue • Post Office & Stewart Avenue NICE Bus Route 43 Stops: • Charles Lindbergh Boulevard & Museum • Charles Lindbergh Boulevard & Aviation • Northbound Bus Travels a portion of route along Earle Ovington Boulevard but no stops along Alternative (closest stop located at Hofstra University & East Gate) Alternative connects to the future Initial Operating Segment at Quentin Roosevelt Boulevard.

Evaluation Metrics	Outcome
(6) Supportive Land Use	• Mill Creek transit-oriented Development on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Cornerstone Westbury on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Selby on Merrick Avenue north of Stewart Avenue. • The Avalon Garden City on Stewart Avenue and Endo Boulevard.

Figure 5-7: Westbury Alternative 6



5.3.3 Refined Long List Westbury – Alternative 7

Alternative 7 (Figure 5-8) would travel south from the Westbury LIRR station, down Post Avenue. Post Avenue is a bi-directional two-lane roadway with parking on both sides of the street. On the eastern side of Post Avenue is the Cemetery of the Holy Rood, while the western side is composed of single-family, two-family, and multi-family residential and commercial uses. The Alternative would continue traveling south as Post Avenue becomes Merrick Avenue at Old Country Road. Merrick Avenue is a four-lane bi-directional roadway with a center running turn lane and no shoulder parking. On the eastern side of the roadway is Eisenhower Park and on the western side are primarily commercial uses with one multi-family residential building. The Alternative would continue to the Stewart Avenue intersection and turn right. Stewart Avenue has a mixture of both commercial and multi-family residential. The Alternative would continue traveling west on Stewart Avenue. The Alternative would then take a left onto Endo Boulevard. The Alternative would then travel southeast on Endo Drive, a new roadway opened recently by Nassau Community College. The roadway change reflects the updated roadway network which differs slightly from the original proposed Alternative 7. From Endo Drive, the Alternative would travel south onto Perimeter Road, making a left turn to access Charles Lindbergh Boulevard. From Charles Lindbergh Boulevard, the Alternative would travel west and then south, making a left turn onto Earle Ovington Boulevard to reach the termini at the Nassau Coliseum site.

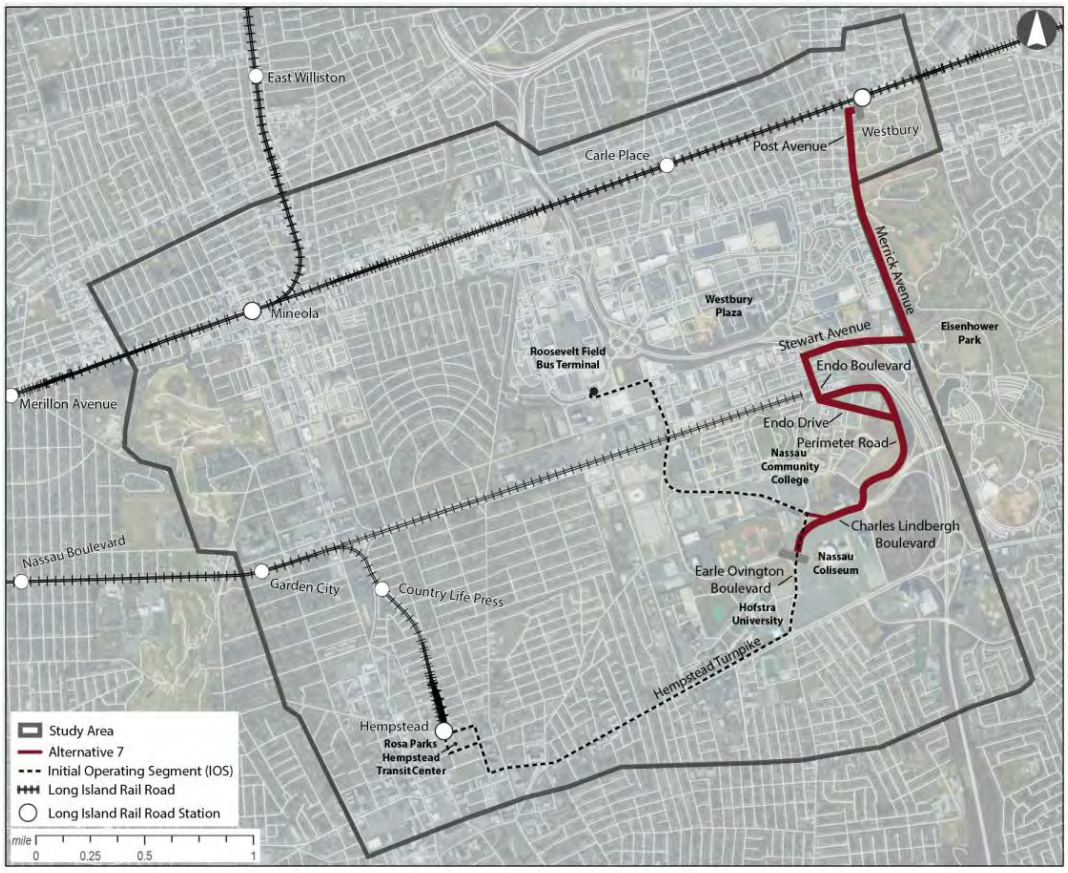
Four intermediary stops are being proposed for Alternative 7. The first stop is located between Corporate Drive and Park Boulevard/Stewart Avenue, which would connect to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The second stop is located around the intersection of Stewart Avenue and Merrick Avenue, which would connect to adjacent commercial uses. A third stop is located at the intersection of Stewart Avenue and Endo Boulevard, adjacent to commercial and residential uses. A fourth stop is located at the intersection of Endo Boulevard, Perimeter Road, and Endo Drive, which would provide access to Nassau Community College.

Table 5-7 provides key characteristics of the Alternative relative to the evaluation metric used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

Table 5-7: Westbury Alternative 7 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 7.3 – 16.6 minutes (11.6 minutes average) South Bound: 7.7 – 16 minutes (12.5 minutes average)
(4) Attractors and Generators Served	• Downtown Westbury/ Westbury Long Island Rail Road (LIRR) • Nassau Community College • Nassau Coliseum • Hofstra University
(5) Connection To Existing and Future Transit Services	LIRR Westbury Station Nassau Inter-County Express (NICE) Bus Route 16 Stops: • Endo Boulevard & Stewart Avenue NICE Bus Route 24 Stops: • Merrick Avenue & Old Country Road / Post Avenue & Old Country Road NICE Bus Route 35 Stops: • Railroad & Post Avenue • Lafayette Avenue & Post Avenue • Merrick Avenue & Privado Road • Selfridge Avenue & Stewart Avenue • Post Office & Stewart Avenue NICE Bus Route 43 Stops: • Endo Boulevard & Stewart Avenue Alternative connects to the future Initial Operating Segment at Earle Ovington Boulevard and Charles Lindbergh Boulevard.
(6) Supportive Land Use	• Mill Creek transit-oriented development on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Cornerstone Westbury on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Selby on Merrick Avenue north of Stewart Avenue. • The Avalon Garden City on Stewart Avenue and Endo Boulevard.

Figure 5-8: Westbury Alternative 7



5.3.4 Refined Long List Westbury – Alternative 8

Alternative 8 (Figure 5-9) would travel south from the Westbury LIRR station, down Post Avenue. Post Avenue is a bi-directional two-lane roadway with parking on both sides of the street. On the eastern side of Post Avenue is the Cemetery of the Holy Rood, while the western side is composed of single-family, two-family, and multi-family residential and commercial uses. The Alternative would continue traveling south as Post Avenue becomes Merrick Avenue at Old Country Road. Merrick Avenue is a four-lane bi-directional roadway with a center running turning lane and no shoulder parking. On the eastern side of the roadway is Eisenhower Park and on the western side are commercial uses with one multi-family residential building. The Alternative would then continue on Merrick Avenue, traveling southward towards Hempstead Turnpike. The Alternative would then turn right onto Hempstead Turnpike, traveling west to Earle Ovington Boulevard where it would make a right turn to reach the termini at the Nassau Coliseum site.

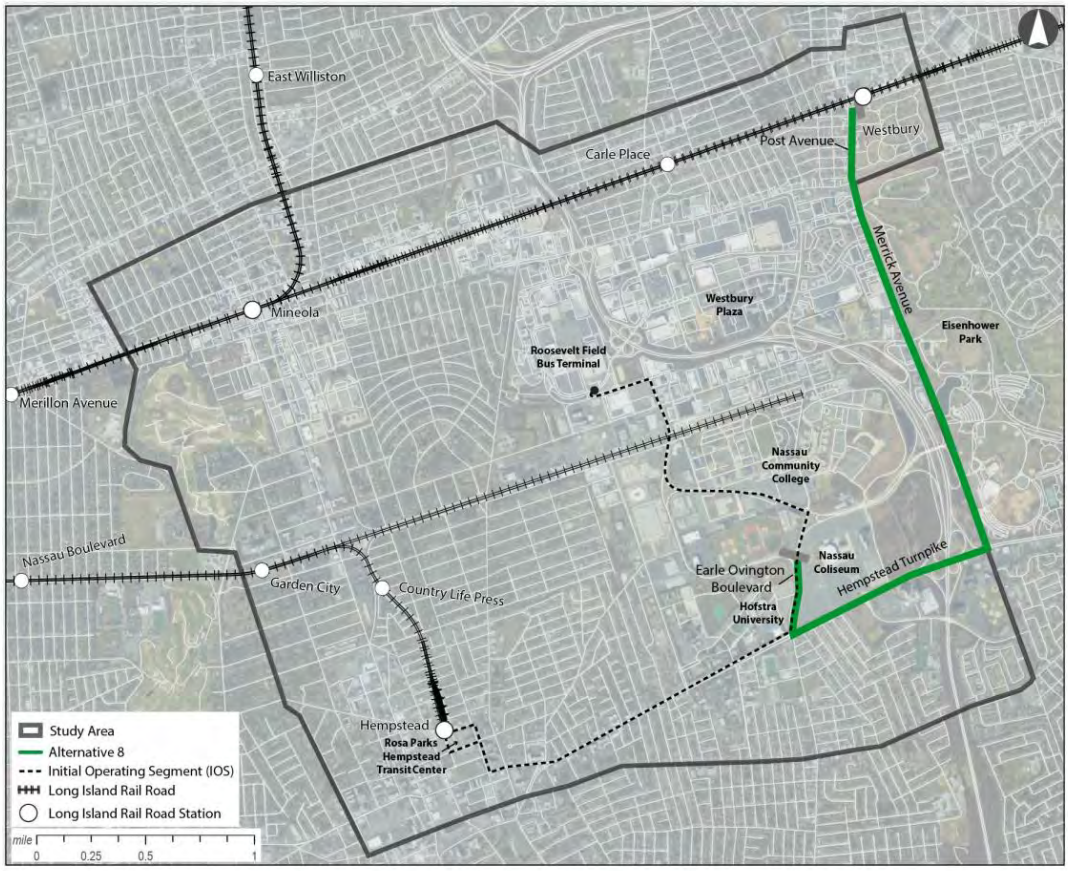
Three intermediary stops are being proposed for Alternative 8. The first stop is located between Corporate Drive and Park Boulevard/Stewart Avenue, which would connect to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The second stop is located at the intersection of Stewart Avenue and Merrick Avenue, which would connect to adjacent commercial uses. A third stop is located at the intersection of Merrick Avenue and Hempstead Turnpike, which would provide access to the adjacent commercial uses, public recreational facilities at Eisenhower Park, and multi-family residential south of Hempstead Turnpike.

Table 5-8 provides key characteristics of the Alternative relative to the evaluation metrics used in the Refined Long List Screening. Evaluation metrics for political and agency support and encouragement of use of Alternative transportation modes are not Alternative specific and are not included in this table.

Table 5-8: Westbury Alternative 8 Key Characteristics

Evaluation Metrics	Outcome
(1) Travel Time	North Bound: 8.7 – 22 minutes (15.4 minutes average) South Bound: 7.7 – 20.7 minutes (14.2 minutes average)
(4) Attractors and Generators Served	• Downtown Westbury/ Westbury Long Island Rail Road (LIRR) • Nassau Coliseum • Hofstra University
(5) Connection To Existing and Future Transit Services	LIRR Westbury Station Nassau Inter-County Express (NICE) Bus Route 24 Stops: • Merrick Avenue & Old Country Road / Post Avenue & Old Country Road NICE Bus Route 35 Stops: • Railroad Avenue & Post Avenue • Lafayette Avenue & Post Avenue • Merrick Avenue & Privado Road NICE Bus Route 43 Stops: • Hempstead Turnpike & Uniondale Avenue • Hofstra University & East Gate NICE Bus Route 70 Stops: • Hempstead Turnpike & Merrick Avenue • Hempstead Turnpike & James Doolittle Boulevard • Hempstead Turnpike & Walton Avenue • Hempstead Turnpike & Uniondale Avenue Alternative connects to the future Initial Operating Segment at Hempstead Turnpike.
(6) Supportive Land Use	• Mill Creek transit-oriented development on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Cornerstone Westbury on Railroad Avenue between Post Avenue and School St is a block away from the Westbury LIRR station. • The Selby on Merrick Avenue north of Stewart Avenue. • Meadowbrook Pointe East Meadow south of the intersection of Merrick Avenue and Hempstead Turnpike

Figure 5-9: Westbury Alternative 8



5.4 REFINED LONG LIST SCREENING RESULTS

As part of the three-tiered screening evaluation process, the Refined Long-List Screening broadly analyzed the Refined Long-List Alternatives for their ability to address the AA Update's goals. The Refined Long-List screening was divided into two phases. The first phase prioritized Evaluation Metric 1, Travel Time, as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. The second phase of the screening further analyzed the remaining Alternatives based on Evaluation Metrics 2, 3, 4, 5, and 6. Below are the outcomes of the screening analysis.

5.4.1 Mineola – Refined Long List Screening Results

5.4.1.1 Evaluation Metric 1 – Travel Time (Phase One)

This evaluation metric is part of first phase of the Refined Long List Screening and relates to Study Goal 2, "Develop an Alternative that provides travel time savings compared to existing options." The objective is to develop a transportation service that provides fast and reliable connections between the LIRR Main Line, the Nassau Coliseum site, and key locations within the Study Area. Currently, travel times on the bus service that provides access between the Mineola LIRR station and the Nassau Coliseum site range from 30 to 50 minutes, depending on time of day. Additionally, there is no direct bus service between the two locations, which means that riders must transfer between buses, adding additional time.

A quantitative analysis was performed to determine the travel time of the proposed Alternatives. The travel times do not include the time for boarding or alighting, which may vary based on attributes of the BRT system such as fare collection or all door boarding. Out of the three proposed Alternatives, Alternative 3 would provide the best travel time compared to all Mineola Alternatives, with an average travel time of 13 minutes northbound and 13.3 minutes southbound between the Mineola LIRR and the Nassau Coliseum site. This would result in a significant savings in travel time between the two termini. Alternative 2 would provide the second shortest average travel time of 15.7 minutes northbound and 16 minutes southbound. Alternative 5 would provide the third shortest travel time of 16.5 minutes northbound and 17.3 minutes southbound.

While all proposed Alternatives would provide a faster connection than the existing bus service and, therefore, support the Goal and Objective, Alternatives 2 and 3 would provide the two shortest travel times overall. Therefore, Alternatives 2 and 3 best meet the associated Goal and Objective and are designated by a dark green check mark in Table 5-9. Alternative 5 supports the associated Goal and Objective and is designated by a light green check mark in Table 5-9.

5.4.1.2 Evaluation Metric 2 – Encourages the Use of Alternative Transportation Modes (Phase Two)

This evaluation metric is related to Study Goal 1, "Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways." The objective is to understand whether the Alternatives would encourage use of Alternative transportation modes such as walking, bicycling, and carpooling, over travel by automobile to access the transit system. Serving County residents and visitors that travel to and from public transportation by walking, biking, scootering, or carpooling is key to extending the reach of the proposed Alternatives. Two distinct efforts to encourage use of Alternative transportation modes, described below, are ongoing within Nassau County and the Village of

Mineola. The proposed Alternatives would support these efforts, thereby supporting the Goal and Objective.

All proposed Alternatives would support the County's effort to develop shared mobility services. Shared mobility services are transportation services and resources that are shared among users and bridge the gap between first/last mile travel to fixed transportation routes. Services include transit options such as bike share, scooter share, or ride hailing. While specific locations for implementing shared mobility services are not yet known, the proposed BRT service would extend trips for Alternative transportation users by providing key connections between major locations such as the Village of Mineola, the Nassau Coliseum site, and Hofstra University. Once more information is known, bus stop locations could be designed to also accommodate shared mobility services.

The Village of Mineola recently approved projects under a Federal Housing and Urban Development Community Development Block Grant.[68] Projects include new lighting along pedestrian walkways and building exterior improvements to create a harmonious, clean, and inviting aesthetic in the village that will enhance and encourage walking. It is anticipated that the BRT service would benefit from the enhanced pedestrian access and help to reduce private automobile usage in the area by capturing trips between Downtown Mineola, the LIRR station, and other key destinations along the proposed Alternatives.

All Alternatives would encourage the use of Alternative transportation modes to connect from or to the BRT service. Therefore, all Alternatives equally support the associated Goal and Objective and are designated in light green check mark Table 5-9.

5.4.1.3 Evaluation Metric 3 – Political and Local Agency Support (Phase Two)

This evaluation metric is related to Study Goal 1, "Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways." The objective is to understand whether an Alternative contains physical, institutional, and/or operational restrictions that would not permit its implementation and operation. Ongoing discussions with key decision makers in both the County Executive's administration and the Village of Mineola between winter 2019 and fall 2022 have indicated that there may be limited support for the proposed Main Line Connection Alternatives to access the Mineola LIRR station located in Downtown Mineola.

All Alternatives connecting to the Village of Mineola could be equally implementable, depending upon further discussions with key decision makers. Therefore, all Alternatives equally support the associated Goal and Objective and are designated in a light green check mark in Table 5-9.

5.4.1.4 Evaluation Metric 4 – Attractors and Generators Served (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop an Alternative that serves LIRR stations, intermodal centers, and as many of the Essential Attractors/Generators in the Study Area as feasible, while being consistent with typical BRT service. Essential Attractors/Generators were defined in the Long

68 https://mineolaamerican.com/2022/03/mineola-village-board-approves-community-development-block-grant/

List Alternative screening. Essential Attractors/Generators for the Mineola Alternatives include Downtown Village of Mineola and Mineola LIRR station, Nassau Community College, Hofstra University, and the Nassau Coliseum site. Typical BRT station spacing is approximately 0.75 miles with shorter distances between stops at key activity nodes.[69] In general, the locations of the proposed stops for the Alternatives are driven by the connection to Attractors and Generators. Stops along the Mineola Alternative alignments are either spaced approximately a mile apart or clustered around Essential Attractors and Generators to capture ridership.

All Mineola Alternatives serve all four Essential Attractors/Generators: Downtown Mineola and the Mineola LIRR station, Nassau Community College, the Nassau Coliseum site, and Hofstra University. All Alternatives also serve the Nassau County Government Complex, which is an Important Attractor/Generator. Alternative 3 also serves Museum Row, which is an Important Attractor or Generator. Given that all Alternatives serve Essential Attractors/Generators to the extent feasible, all Alternatives sufficiently support the associated Goal and Objective and are designated by a light green check mark in Table 5-9.

5.4.1.5 Evaluation Metric 5 – Connection to Existing and Future Transit Services (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop a transportation Alternative that will provide additional connections to public transit services such as LIRR and NICE Bus and the IOS, Nassau County's future BRT service between the Rosa Parks-Hempstead Transit Center and Roosevelt Field Mall. Existing and future public transit services will help to support ridership on the proposed Alternatives. All Alternatives terminate at a LIRR Main Line Station, which provides an east-west connection within Nassau County, NYC, and Suffolk County. Additionally, MTA LIRR's Third Track and East Side Access projects provide service improvements, which may lead to additional ridership to destinations along the routes of the proposed Alternatives.

All Alternatives overlap with existing NICE Bus routes that provide both east-west and north-south connections within Nassau County (see Table 5-2, Table 5-3, and Table 5-4 for specific routes and stops). Alternative 2 connects to NICE Bus routes 15, 16, 22x, 22, 24, 27, 35, and 43. Alternative 3 connects to NICE Bus routes 15, 16, 22x, 22, 24, 27, and 35. Alternative 5 connects to NICE Bus routes 15, 22x, 22, 27, 35, and 43.

All Main Line Connection Alternatives were developed as extensions of IOS, which will be in place before the Main Line Connection BRT service. The IOS service connects the Rosa Parks-Hempstead Transit Center and Roosevelt Field Mall. All Alternatives will be able to connect into the IOS and extend its reach. Alternative 3's alignment would overlap with the IOS service between the Rosa Parks-Hempstead Transit Center and Stewart Avenue. Alternatives 2 and 5 would overlap with the IOS service between the Rosa Parks-Hempstead Transit Center and Earle Ovington Boulevard and diverge at the intersection of Charles Lindbergh Boulevard and Earle Ovington Boulevard.

69 https://nacto.org/docs/usdg/service_design_guidelines_vta.pdf

As all Alternatives connect to LIRR, NICE Bus services, and the future IOS service, all Alternatives equally support the associated Goal and Objective and are designated by a light green check mark in Table 5-9.

5.4.1.6 Evaluation Metric 6 - Supportive Land Use (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop an Alternative that is supported by existing and planned local land use policies. Currently, the Village of Mineola, the Town of North Hempstead, and the Town of Hempstead are working to implement infill development and TOD in underutilized parcels. TOD aligns investment in transit with economic development and sustainable growth. TOD promotes the development of lively, walkable, mixed-use communities within transit corridors and stations. This approach leverages public investment in transit to encourage private investment in residential and mixed-use development. Successful TOD includes aspects such as medium to higher-density development surrounded by a mix of land uses, a high-quality pedestrian environment, multi-modal connectivity, and limited managed parking.

The Village of Mineola is home to multiple TODs. Within Downtown Mineola, three notable buildings would serve the proposed Alternatives. The first is Morgan Parc at 199 Second Avenue. This TOD is infill development that has 266 residential units. The second is One Third Avenue located at 250 Old Country Road. This TOD is infill development that has 315 residential units. The third is an anticipated TOD, a proposed development called BLD Mineola, located between Third Street and Mineola Boulevard and Third Street and Station Road. This TOD will have approximately 160 residential units. All Alternatives would support these TOD developments and provide quick access to key destinations south of the Village of Mineola.

Additionally, all Alternatives have routes that support multi-family residential infill. Buildings such as The Florent and Avalon Garden City on Stewart Avenue are infill developments that can benefit from the proposed Alternatives. While many of these residents have or will have cars, the proposed Alternatives afford an opportunity for these residents to access nearby destinations such as the Nassau Coliseum site or the Westbury LIRR station quickly and easily, without the need to drive or find parking.

Overall, all Alternatives will be supported by the above-mentioned TODs and infill developments occurring within the Town of Hempstead, Town of North Hempstead, and the Village of Mineola. Alternatives 2 and 5 would provide an additional connection to the Avalon Garden City, an infill development, over Alternative 3. Therefore, Alternatives 2 and 5 best meet the associated Goal and Objective and are designated by a dark green check mark in Table 5-9. Alternative 3 supports the associated Goal and Objective and is designated by a light green check mark in Table 5-9.

5.4.1.7 Refined Long List Screening Results

Table 5-9, Table 5-10, and Table 5-11 summarize the results of the Refined Long List screening. Table 5-9 provides a full overview of all Main Line Connection Alternatives to Mineola based on the analysis provided in Sections 5.4.1.1 to 5.4.1.6. Alternatives that best meet the Goals and Objectives are indicated by a dark green check mark. Alternatives that support the Goals and Objectives as identified in Sections 5.4.1.1 to 5.4.1.6 are indicated with a light green check mark.

Table 5-9: Refined Long List Screening Results Mineola Alternatives

Alternatives	Evaluation Metrics					
	Phase One	Phase Two				
	(1) Travel Time	(2) Alternative Transportation Connections	(3) Political and Agency Support	(4) Attractors and Generators Served	(5) Connection to Existing Public Transportation	(6) Supportive land use and infill development
2	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓

5.4.1.7.1 Phased Refined Long List Screening Results Mineola

The Refined Long List Screening used a phased approach to identify the Alternatives that should move onto the Short List screening. The first phase of the Refined Long List Screening prioritized Evaluation Metric 1, Travel Time, as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. The top two Alternatives that best meet this Goal and Objective were advanced to the second phase (see Table 5-10). The second phase of the Refined Long List Screening further analyzed the remaining Alternatives based on Evaluation Metrics 2, 3, 4, 5, and 6 (see Table 5-11).

Table 5-10: Phase 1 Refined Long List Screening Results Mineola Alternatives

Alternatives	Evaluation Metrics (Phase One)	Outcome
	(1) Travel Time	
2	✓	**Alternative best meets goal and objective.**
3	✓	**Alternative best meets goal and objective.**
5	✓	**Alternative meets goal and objective.**

Table 5-11: Phase 2 Refined Long List Screening Results Mineola Alternatives

Alternatives	Evaluation Metrics (Phase Two)					Outcome
	(2) Alternative Transportation Connections	(3) Political and Agency Support	(4) Attractors and Generators Served	(5) Connection to Existing Public Transportation	(6) Supportive land use and infill development	
2	✓	✓	✓	✓	✓	**Alternative best meets goal and objective 6. Alternative meets goals and objectives 2-5.**
3	✓	✓	✓	✓	✓	**Alternative meets goals and objectives 2-6.**

5.4.1.8 Mineola Alternatives

The first phase of the Refined Long List Screening prioritized travel time as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. Based on the first phase of screening, Alternatives 2 and 3 are the fastest Alternatives. These Alternatives were advanced to the second phase of the Refined Long List Screening due to the advantages they provide for travel times. Alternative 5 has the longest travel time of the three Alternatives and for this reason would likely be less desirable compared to Alternative 2 or 3.

The second phase of the Refined Long List Screening analyzed the remaining Alternatives against Evaluation Metrics 2, 3, 4, 5, and 6. Based on this analysis, Alternative 2 provides the best combination of travel time, access to Essential Attractors and Generators, and connections to land uses that are supportive of BRT service, followed by Alternative 3.

Overall, Alternative 2 is the highest performing Alternative and was advanced to the final screening phase. However, further coordination with key decisionmakers in the Village of Mineola is needed to pursue further analysis for the Main Line Connection.

5.4.2 Westbury – Refined Long List Screening Results

5.4.2.1 Evaluation Metric 1 - Travel Time (Phase One)

This evaluation metric is part of first phase of the Refined Long List Screening and is related to Study Goal 2, "Develop an Alternative that provides travel time savings compared to existing options." The objective is to develop a transportation service that provides fast and reliable connections between the LIRR Main Line, the Nassau Coliseum site, and key locations within the Study Area. Currently, travel times on the bus service that provides access between the Westbury LIRR station and the Nassau Coliseum site ranges from 20 to 50 minutes, depending on time of day. Additionally, there is no direct bus service between the two locations, which means that riders must transfer between buses, adding additional time.

A quantitative analysis was performed to determine travel times of the proposed Alternatives. The travel times do not include the time for boarding or alighting, which may vary based on attributes of the BRT system such as fare collection or all door boarding. Out of the four proposed Alternatives,

two Alternatives provide the best travel time compared to all Alternatives. Alternative 5 would provide the fastest service between the Westbury LIRR and the Nassau Coliseum site. The average travel time of Alternative 5 is approximately 8.5 minutes north bound and 8.1 minutes southbound. This would result in a significant savings in travel time between the two termini. Both Alternative 6 and Alternative 7 would also provide a reduced travel time compared to the existing transportation service, approximately 11.6 minutes northbound and 12.5 minutes southbound. Alternative 8 would provide the slowest average travel time at approximately 15.4 minutes northbound and 14.2 minutes southbound.

While all proposed Alternatives would provide a faster connection than the existing bus service and, therefore, support the Goal and Objective, Alternatives 5, 6, and 7 would provide the fastest service overall. These Alternatives best meet the associated Goal and Objective and are designated by a dark green check mark in Table 5-12. Alternative 8 still supports the associated Goal and Objective but is designated by a light green check mark in Table 5-12 due to its slower average travel time.

5.4.2.2 Evaluation Metric 2 - Encourages the Use of Alternative Transportation Modes (Phase Two)

This evaluation metric is related to Study Goal 1, "Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways." The objective is to understand whether the Alternatives would encourage use of Alternative transportation modes such as walking, bicycling, and carpooling, over travel by automobile to access the transit system. Serving County residents and visitors that travel to and from public transportation by walking, biking, scootering, or carpooling is key to extending the reach of the proposed Alternatives. Two distinct efforts to encourage use of Alternative transportation modes, described below, are ongoing within Nassau County and the Village of Westbury. The proposed Alternatives would support these efforts, thereby supporting the Goal and Objective.

All proposed Alternatives would support the County's effort to develop shared mobility services. Shared mobility services are transportation services and resources that are shared among users and bridge the gap between first/last mile travel to fixed transportation routes. Services include transit options such as bike share, scooter share, or ride hailing. While specific locations for implementing shared mobility services are not yet known, the proposed BRT service would extend trips for Alternative transportation users by providing key connections between major locations such as the Village of Westbury, the Nassau Coliseum site, and Hofstra University. Once more information is known, bus stop locations could be designed to also accommodate shared mobility services.

The Village of Westbury, MTA, and building owners adjacent to the LIRR Westbury station are working to increase pedestrian accessibility to, from, and within the downtown area and LIRR station.[70] It is anticipated that the BRT service would benefit from the easier pedestrian access and would help reduce private automobile usage in the area by capturing trips between Downtown Westbury, the LIRR station, and other key destinations along the proposed Alternatives.

70 Specifics of Westbury's Downtown Revitalization Initiative to improve pedestrian accessibility can be found here: http://www.villageofwestbury.org/vertical/Sites/%7B9CC594E0-0361-4F4F-A372-F1B738810B0F%7D/uploads/0_Westbury_DRI_FinalPlan_4.14.17.pdf

All Alternatives would encourage the use of Alternative transportation modes to connect from or to the BRT service. Therefore, all Alternatives equally support the associated Goal and Objective and are designated by a light green check mark in Table 5-12.

5.4.2.3 Evaluation Metric 3 - Political and Local Agency Support (Phase Two)

This evaluation metric is related to Study Goal 1, "Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways." The objective is to understand whether an Alternative contains physical, institutional, and/or operational restrictions that would not permit its implementation and operation. Ongoing discussions with key decision makers for the Village of Westbury during the fall of 2021 and summer of 2022 have indicated that there is support for the proposed Main Line Connection Alternatives to access the Westbury LIRR station located in Downtown Westbury. Additionally, Alternative 7 traverses through Nassau Community College. Currently, Nassau Community College is in discussion with NICE Bus and other stakeholders to shift automotive traffic away from new pedestrian zones and avoid routing NICE buses through the campus. This would create a designated bus pick up/drop off area and realign roadways to provide quicker access to the campus. Further discussion will be needed to identify the specific routing on Nassau Community College's campus for Alternative 7.

All Alternatives connecting to the Village of Westbury could be reasonably implemented. Therefore, all Alternatives equally support the Goal and Objective and are designated by a light green check mark in Table 5-12.

5.4.2.4 Evaluation Metric 4 – Attractors and Generators Served (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop an Alternative that serves LIRR stations, intermodal centers, and as many of the Essential Attractors and Generators in the Study Area as feasible, while being consistent with typical BRT service. Essential Attractors and Generators were defined in the Long List Alternative screening. Essential Attractors and Generators for the Westbury Alternatives include the Downtown Village of Westbury and Westbury LIRR, Nassau Community College, Hofstra University, and the Nassau Coliseum site. Typical BRT station spacing is approximately 0.75 miles, with shorter distances between stops at key activity nodes.[71] In general, the locations of the proposed stops for the Alternatives are driven by the connection to Attractors and Generators. Stops along the Westbury Alternative alignments are either spaced approximately 1 mile apart or clustered around Essential Attractors/Generators to capture ridership.

All Westbury Alternatives serve at least three Essential Attractors/Generators: Downtown Westbury and the Westbury LIRR station, the Nassau Coliseum site, and Hofstra University. Only Alternatives 6 and 7 serve Nassau Community College, and only Alternative 6 serves Nassau Community College on both the north and south sides of the campus. Additionally, Alternative 6 serves Museum Row, which, while not an Essential Attractor or Generator, is an additional location that may provide ridership. Given that all Alternatives serve Essential Attractors/Generators to the extent feasible, all Alternatives sufficiently support the Goal and Objective. However, both Alternative 6 and

[71] https://nacto.org/docs/usdg/service_design_guidelines_vta.pdf

Alternative 7 provide the most accessibility to Essential Attractors/Generators. Therefore, these Alternatives best meet the associated Goal and Objective and are designated by a dark green check mark in Table 5-12. Alternatives 5 and 8 support the associated Goal and Objective and are designated by a light green check mark in Table 5-12.

5.4.2.5 Evaluation Metric 5 – Connection to Existing and Future Transit Services (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop a transportation Alternative that will provide additional connections to public transit services such as the LIRR, NICE Bus, and the IOS, Nassau County's future BRT service between the Rosa Parks-Hempstead Transit Center and Roosevelt Field Mall. Existing and future public transit services will help to support ridership on the proposed Alternatives. All Alternatives terminate at an LIRR Main Line Station, which provides an east-west connection within Nassau County, NYC, and Suffolk County. Additionally, MTA's Third Track and East Side Access projects provide service improvements that may lead to additional ridership to destinations along the routes of the proposed Alternatives.

All Alternatives overlap with existing NICE Bus routes that provide both east-west and north-south connections within Nassau County (see Table 5-5, Table 5-6 Table 5-7 and Table 5-8 for specific routes and stops). Alternative 5 connects to NICE Bus routes 24, 35, and 43. Both Alternative 6 and 7 connect to NICE Bus routes 16, 24, 35, and 43. Alternative 8 connects to NICE Bus routes 24, 35, 43, and 70.

All Main Line Connection Alternatives were developed as extensions of the IOS, which will be in place before the Main Line Connection BRT service. All Alternatives were developed to connect into the IOS; however, only three would naturally extend beyond the reach of the IOS. Alternatives 5, 6, and 7 provide an extension from the service between Charles Lindbergh Boulevard, Earle Ovington Boulevard, and Stewart Avenue. Alternative 8 accesses the Nassau Coliseum and Hofstra University via Hempstead Turnpike and Earle Ovington Boulevard traveling north/south. Connecting the two services, at this time, would require the services to travel in the reverse direction on Earle Ovington Boulevard to connect at Hempstead Turnpike. Therefore, Alternative 8 would not reasonably connect to the IOS service and, therefore, would not support the Goal and Objective.

All Alternatives connect to the LIRR and NICE Bus services. Alternatives 5, 6, and 7 would reasonably connect into the future IOS BRT service while Alternative 8 would not. Therefore, Alternatives 5, 6, and 7 equally support the associated Goal and Objective and are designated by a light green check mark in Table 5-12. Alternative 8 was determined to not satisfy the Goal and Objective and is designated by a pink X mark.

5.4.2.6 Evaluation Metric 6 – Supportive Land Use (Phase Two)

This evaluation metric is related to Study Goal 3, "Develop transit improvements that encourage sustainable, transit-friendly infill development and support economic development activities in major development hubs." The objective is to develop an Alternative that is supported by existing and planned local land use policies. Currently, the Village of Westbury, the Town of North Hempstead, and the Town of Hempstead are working to implement infill development and TOD in underutilized parcels. TOD aligns investment in transit with economic development and sustainable growth. TOD promotes the development of lively, walkable, mixed-use communities within transit corridors and

stations. This approach leverages public investment in transit to encourage private investment in residential and mixed-use development. Successful TOD includes aspects such as medium- to higher-density development surrounded by a mix of land uses, a high-quality pedestrian environment, multi-modal connectivity, and limited managed parking.

Currently, two notable TODs are being built within the Village of Westbury, complementing existing TODs in the downtown. The first is the Cornerstone Westbury at 425 Railroad Avenue and 471 Railroad Avenue. This residential development will create 130 residential units adjacent to the Westbury LIRR station. The second is the Mill Creek TOD Development located in the Westbury LIRR Commuter Parking Lot, southwest of the LIRR station. The development will include mixed-use housing and retail that will add 200 to 250 residential units. Also located near the Westbury LIRR station are several existing TODs, such as the Horizon at Westbury, located at 130 Post Avenue. All proposed Alternatives would support these TOD developments and provide quick access to key destinations south of the Village of Westbury.

Additionally, all Alternatives have routes that support multi-family residential infill. Buildings such as the Avalon Garden City on Stewart Avenue, the Selby on Merrick Avenue, and Meadowbrook Pointe East Meadow are infill developments that can benefit from the proposed Alternatives. While many of these residents have or will have cars, the proposed Alternatives afford an opportunity for these residents to access nearby destinations such as the Nassau Coliseum site or the Westbury LIRR station quickly and easily, without the need to find parking.

Overall, all Alternatives would be supported by the above-mentioned TODs and infill developments occurring within the Town of Hempstead, the Town of North Hempstead, and the Village of Westbury. Therefore, all Alternatives support the Goal and Objective. However, Alternatives 6, 7, and 8 provide the most accessibility to both TOD and infill development compared to Alternative 5. Therefore, Alternatives 6, 7, and 8 best meet the associated Goals and Objectives and are designated by dark green check marks in Table 5-12. Alternative 5 supports the associated Goal and Objective and is designated by a light green check mark in Table 5-12.

5.4.2.7 Refined Long List Screening Results

Table 5-12 summarizes the results of the Refined Long List screening of all Main Line Connection Alternatives to Westbury based on the analysis provided in Sections 5.4.2.1 to 5.4.2.6. Alternatives that best meet the Goals and Objectives as identified in Sections 5.4.2.1 to 5.4.2.6 are indicated by a dark green check mark. Alternatives that support the Goals and Objectives are indicated with a light green check mark. Alternatives that do not support the Goals and Objectives are indicated by a pink X mark.

Table 5-12: Refined Long List Screening Results Westbury Alternatives

Alternatives	Evaluation Metrics					
	Phase One	Phase Two				
	(1) Travel Time	(2) Alternative Transportation Connections	(3) Political and Agency Support	(4) Attractors and Generators Served	(5) Connection to Existing Public Transportation	(6) Supportive land use and infill development
5	✓	✓	✓	✓	✓	✓
6	✓	✓	✓	✓	✓	✓
7	✓	✓	✓	✓	✓	✓
8	✓	✓	✓	✓	X	✓

5.4.2.7.1 Phased Refined Long List Screening Results Westbury

The Refined Long List Screening used a phased approach to identify the Alternatives carried forward to the Short List screening. The first phase of the Refined Long List Screening prioritized Evaluation Metric 1, Travel Time, as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. As stated in the introduction to Section 5, the top two Alternatives that provide the shortest travel time between the LIRR Main Line and the Nassau Coliseum site would advance to the second phase of the Refined Long-List Screening. However, given that both Alternative 6 and 7 have similar travel times, both Alternatives were advanced to the second phase of screening, in addition to Alternative 5, which has the shortest travel time (see Table 5-13). The second phase of the Refined Long List Screening further analyzed the remaining Alternatives based on Evaluation Metrics 2, 3, 4, 5, and 6 (see Table 5-14).

Table 5-13: Phase 1 Refined Long List Screening Results Westbury Alternatives

Alternatives	Evaluation Metrics (Phase One)	Outcome
	(1) Travel Time	
5	✓	Alternative best meets goal and objective.
6	✓	Alternative best meets goal and objective.
7	✓	Alternative best meets goal and objective.
8	✓	Alternative meets goal and objective.

Alternative 8 provides the slowest average travel time of the four Alternatives at approximately 15.4 minutes northbound and 14.2 minutes southbound and would likely be less desirable compared to Alternatives 5, 6, or 7. Therefore, it was screened out and no longer considered in the Phase 2 screening.

5.4.2.8 Westbury Alternatives

The first phase of the Refined Long List Screening prioritized travel time as the most important metric because the existing public travel options do not provide fast and reliable connections between the LIRR Main Line and the Nassau Coliseum site. Based on the first phase of screening, Alternatives 5, 6, and 7 advanced to the second phase of the Refined Long List Screening due to the advantages they provide for travel times.

The second phase of the Refined Long List Screening analyzed the remaining Alternatives against Evaluation Metrics 2, 3, 4, 5, and 6. Based on this analysis, Alternative 6 and 7 provide the best combination of short travel time, connections to Attractors and Generators, and connections to land uses that are supportive of BRT service. However, Alternative 6 provides slightly better access to Attractors and Generators compared to Alternative 7 because of its access to Nassau Community College at two stops. Alternative 5 does not provide as many connections to Attractors and Generators or supportive land uses.

Table 5-14: Phase 2 Refined Long List Screening Results Westbury Alternatives

Alternatives	Evaluation Metrics (Phase Two)					Outcome
	(2) Alternative Transportation Connections	(3) Political and Agency Support	(4) Attractors and Generators Served	(5) Connection to Existing Public Transportation	(6) Supportive land use and infill development	
5	✓	✓	✓	✓	✓	**Alternative meets goal and objectives 2-6.**
6	✓	✓	✓	✓	✓	**Alternative best meets goal and objectives 4 and 6. Alternative meets goal and objectives 2, 3, and 5.**
7	✓	✓	✓	✓	✓	**Alternative best meets goal and objectives 4 and 6. Alternative meets goal and objectives 2, 3, and 5.**

Overall, Alternative 6 is the highest performing Alternative followed by Alternative 7 and Alternative 5.

5.5 ALTERNATIVES ADVANCING TO SHORT-LIST SCREENING

Coordination with key decisionmakers for the Main Line Connection to Mineola has not proceeded far enough to advance the Alternatives. In the future, Nassau County may choose to proceed with further developing a Main Line Connection to the Mineola LIRR station and utilize the findings in the Long-List and Refined Long-List Screenings as a basis for that service.

Coordination with key decisionmakers for the Main Line Connection to the Westbury LIRR station has been advancing consistently throughout this AA Update process. As a result, all three remaining Refined Long List Alternatives to the Westbury LIRR station (Alternatives 5, 6, and 7) were advanced to the Short-List Screening.

6 Physical Characteristics of Short-List Alternatives

This section provides a description of each of the Short-List Alternative's alignments (Alternatives 5, 6, and 7) and their proposed stop locations. All Alternatives proposed in the Short-List will be operated as BRT service, which is consistent with the technology identified for use in the IOS, and would operate via the IOS. The alignments and stop locations for each Alternative reflect modifications made to the Refined Long-List Alternatives (Section 5), based on technical analyses and input from local stakeholders and the public. Analysis of the Short-List assumes that no new facility (operations, maintenance, or storage) will be needed to accommodate the buses to operate the Main Line Connection. Nassau County is currently undertaking efforts to upgrade and expand existing facilities or add new facilities to accommodate new technologies, such as battery electric buses, and the buses proposed for this service are expected to use those upgraded or expanded facilities. As specified in Section 5.5, the Short-List Alternatives are identified as the Alternatives connecting to the LIRR station in the Village of Westbury (see Figure 6-1).

Figure 6-1: Short-List Alternatives 5, 6, and 7

Source: WSP, 2023

6.1 CONNECTION FROM THE INITIAL OPERATING SEGMENT

The Main Line Connection service would extend from the IOS alignment connecting the Rosa Parks-Hempstead Transit Center located in the Village of Hempstead to the LIRR station in the Village of Westbury (see Figure 6-2 for the IOS alignment). The Rosa Parks-Hempstead Transit Center is an intermodal hub that offers convenient and extensive transfers among the local NICE Bus routes and to the LIRR commuter rail service. From the Rosa Parks-Hempstead Transit Center, the eastbound bus service would operate on Jackson Street, then south on Washington Street in mixed traffic. Westbound, the bus service would operate in mixed traffic on Washington Street, then west on West Columbia Street into the Rosa Parks-Hempstead Transit Center.

At Hempstead Turnpike, the eastbound IOS alignment would operate in mixed traffic to Duncan Road, then in a dedicated BRT lane to Earle Ovington Boulevard. The westbound IOS bus service along Hempstead Turnpike would operate entirely within a dedicated BRT lane between Earle Ovington Boulevard and Washington Street, with the exception of a small segment of operation in mixed traffic between Oak Street and Surrey Lane, where there are capacity constraints. BRT stops along Hempstead Turnpike would be located at Clinton Street, Warner Avenue, and Oak Street. The Oak Street stop would serve Hofstra University.

On Earle Ovington Boulevard, the IOS bus service in both directions would use a dedicated lane. A stop is proposed in the vicinity of the Nassau Coliseum site. On Charles Lindbergh Boulevard, the bus service in both directions would continue in a dedicated lane. Two separate BRT stops would be sited to serve Nassau Community College and Museum Row. The IOS alignment would continue west onto Charles Lindbergh Boulevard, then turn north and continue in a dedicated BRT lane on the east and west sides of Quentin Roosevelt Boulevard. The IOS bus service would continue in mixed traffic in both directions on South Street, where another stop is proposed. On Ring Road East, a dedicated bus lane would be provided on the north side at the edge of the retention basin, and the IOS bus service would operate in mixed traffic on the south side of Ring Road East. The IOS bus service would operate in mixed traffic through the Roosevelt Field parking lot. The northern terminus would be at the Roosevelt Field Bus Terminal adjacent to the mall.

Figure 6-2: Initial Operating Segment

Source: WSP, 2023

6.2 ALTERNATIVE 5

Alternative 5 to the Westbury LIRR station would extend the IOS eastward approximately 2.5 miles starting at Charles Lindbergh Boulevard, north of the Nassau Coliseum site (see Figure 6-3). The alignment would utilize all the travel time savings benefits and nine stops (including the southern terminus) along the IOS until it reaches Charles Lindbergh Boulevard north of the Coliseum site. The extension of the IOS to the LIRR Main Line would operate exclusively within mixed traffic in both directions with transit signal priority implemented at key intersections. Traveling northbound toward the Westbury LIRR station from the IOS, the alignment would travel in mixed traffic from Charles Lindbergh Boulevard to Merrick Avenue. At Merrick Avenue, the alignment would turn left and travel north, transitioning onto Post Avenue to the Westbury LIRR terminus. Traveling southbound, away from the Westbury LIRR station, the alignment would travel in mixed traffic down Post Avenue and onto Merrick Avenue. The alignment would then turn right, traveling on Charles Lindbergh Boulevard to connect to the IOS on Earle Ovington Boulevard.

In total, the alignment between the Rosa Parks-Hempstead Transit Center and the Westbury LIRR station is approximately 4.85 miles in each direction and approximately 9.7 miles round trip. Five

additional stops are proposed for the connection from the IOS to the LIRR Main Line via Alternative 5 (see Table 6-1). One intermediary stop with a northbound and southbound stop is proposed for Alternative 5 to be located between Corporate Drive and Park Boulevard/Stewart Avenue, connecting to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The terminus for the alignment would be located at the Westbury LIRR station in the Village of Westbury.

Figure 6-3: Alternative 5

Source: WSP, 2023

Table 6-1: Alternative 5 Stops

	Stop	Location/Cross Streets	Attractors/Generators Served
Initial Operating Segment Stops	Rosa Parks-Hempstead Transit Center	Jackson Street and Station Plaza	Downtown Village of Hempstead, Nassau Inter-County Express Bus, Hempstead Station (Long Island Rail Road [LIRR])
	Clinton Street/ Washington Street/ Fulton Avenue	Fulton Avenue and Washington/Clinton Street	Downtown Village of Hempstead
	Warner Avenue	Warner Avenue and Fulton Avenue	Residential and Commercial Uses
	Oak Street	Hempstead Turnpike and Oak Street	Hofstra University
	Nassau Veterans Memorial Coliseum	Earle Ovington Boulevard and East Gate Road	Hofstra University and Nassau Veterans Memorial Coliseum
New Stop	Stewart Avenue & Merrick Avenue	Stewart Avenue and Merrick Avenue	Residential, Commercial, Recreational Uses
New Stop	Corporate Drive and Merrick Avenue	Corporate Drive and Merrick Avenue	Residential and Commercial Uses
New Stop	Downtown Westbury	Union Avenue	Downtown Village of Westbury, Westbury LIRR Station

6.3 ALTERNATIVE 6

Alternative 6 to the Westbury LIRR station would extend the IOS eastward approximately 2.4 miles starting at the intersection of Quentin Roosevelt Boulevard, South Street, and Stewart Avenue (see Figure 6-4). The alignment would utilize all the travel time savings benefits and 13 stops (including the southern terminus) along the IOS until it reaches Stewart Avenue. The extension of the IOS to the LIRR Main Line would operate exclusively within mixed traffic in both directions, with transit signal priority implemented at key intersections. Traveling northbound toward the Westbury LIRR station from the IOS, the alignment would head east towards Merrick Avenue in mixed traffic. At Merrick Avenue, the alignment would turn left and travel north, transitioning onto Post Avenue to the Westbury LIRR terminus. Traveling southbound, away from the Westbury LIRR station, the alignment would travel in mixed traffic down Post Avenue and onto Merrick Avenue. The alignment would then turn right, traveling onto Stewart Avenue where it would connect to the IOS at the intersection of Quentin Roosevelt Boulevard and South Street.

In total, the alignment between the Rosa Parks-Hempstead Transit Center and the Westbury LIRR station is approximately 5.85 miles in each direction and approximately 11.7 miles round trip. Seven additional stops are proposed for the connection from the IOS to the LIRR Main Line via Alternative 6 (see Table 6-2). The first stop is located between Corporate Drive and Park Boulevard/Stewart Avenue, connecting to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The second stop is located around the intersection of Stewart Avenue and Merrick Avenue,

which would connect to adjacent commercial uses. A third stop is proposed at the intersection of Stewart Avenue and Selfridge Avenue, which would connect to the adjacent multi-family residences and commercial businesses.

Figure 6-4: Alternative 6

Source: WSP, 2023

Table 6-2: Alternative 6 Stops

	Stop	Location/Cross Streets	Attractors/Generators Served
Initial Operating Segment Stops	Rosa Parks-Hempstead Transit Center	Jackson Street and Station Plaza	Downtown Village of Hempstead, Nassau Inter-County Express Bus, Hempstead Station (Long Island Rail Road [LIRR])
	Clinton Street/ Washington St/ Fulton Ave	Fulton Avenue and Washington/Clinton Street	Downtown Village of Hempstead
	Warner Avenue	Warner Avenue and Fulton Ave	Residential and Commercial Uses
	Oak Street	Hempstead Turnpike and Oak Street	Hofstra University
	Nassau Veterans Memorial Coliseum	Earle Ovington Boulevard and East Gate Road	Hofstra University and Nassau Veterans Memorial Coliseum
	Nassau Community College	Charles Lindbergh Boulevard & Cradle of Aviation Museum	Cradle of Aviation Museum
	Museum Row	Charles Lindbergh Boulevard and Rail Road Avenue	Long Island Children's Museum
New Stop	Stewart Avenue and Selfridge Avenue	Stewart Avenue and Selfridge Avenue	Nassau Community College, Residential and Commercial uses
New Stop	Stewart Avenue & Merrick Avenue	Stewart Avenue and Merrick Avenue	Residential and Commercial uses
New Stop	Corporate Drive and Merrick Avenue	Corporate Drive and Merrick Avenue	Residential and Commercial Uses
New Stop	Downtown Westbury	Union Avenue	Downtown Village of Westbury, Westbury LIRR Station

6.4 ALTERNATIVE 7

Alternative 7 to the Westbury LIRR station would extend the IOS eastward approximately 3.2 miles starting at Charles Lindbergh Boulevard, north of the Nassau Coliseum site (see Figure 6-5). The alignment would utilize all the travel time savings benefits and nine stops (including the southern terminus) along the IOS until it reaches Charles Lindbergh Boulevard north of the Coliseum site. The extension of the IOS to the LIRR Main Line would operate exclusively within mixed traffic in both directions with transit signal priority implemented at key intersections. Traveling northbound toward the Westbury LIRR station from the IOS, the alignment would travel in mixed traffic from Charles Lindbergh Boulevard to Perimeter Road. At Perimeter Road, the alignment would turn right to continue on Perimeter Road and travel north towards the Nassau Community College parking lot on Endo Boulevard and then into the parking lot via Endo Drive. The alignment would then make a right turn at Stewart Avenue and a left turn onto Merrick Avenue and travel north, transitioning onto Post Avenue to the Westbury LIRR terminus. Traveling southbound, away from the Westbury LIRR station, the alignment would travel in mixed traffic down Post Avenue and onto Merrick Avenue. The alignment would then turn right at Stewart Avenue and then turn left at Endo Boulevard, connecting into Endo Drive. The alignment would then connect into Perimeter Road where it would travel south, turning left to continue on Perimeter Road. The alignment would then turn left, connecting into Charles Lindbergh Boulevard, where it would connect into the IOS on Earle Ovington Boulevard.

In total, the alignment between the Rosa Parks-Hempstead Transit Center and the Westbury LIRR station is approximately 5.4 miles in each direction and approximately 10.8 miles round trip. Five stops are being proposed for Alternative 7 (see Table 6-3). The first stop is located between Corporate Drive and Park Boulevard/Stewart Avenue, which would connect to the adjacent residential/commercial/and open space uses adjacent to Merrick Avenue. The second stop is located around the intersection of Stewart Avenue and Merrick Avenue, which would connect to adjacent commercial uses. A third stop is located at the intersection of Stewart Avenue and Endo Boulevard, adjacent to commercial and residential uses. A fourth stop is located at the intersection of Endo Boulevard, Perimeter Road, and Endo Drive, which would provide access to Nassau Community College.

Figure 6-5: Alternative 7

Source: WSP, 2023

Table 6-3: Alterantive 7 Stops

	Stop	Location/Cross Streets	Attractors/Generators Served
Initial Operating Segment Stops	Rosa Parks-Hempstead Transit Center	Jackson Street and Station Plaza	Downtown Village of Hempstead, NICE Bus, Hempstead Station (Long Island Rail Road [LIRR])
	Clinton Street/ Washington St/ Fulton Ave	Fulton Avenue and Washington/Clinton Street	Downtown Village of Hempstead
	Warner Avenue	Warner Avenue and Fulton Ave	Residential and Commercial Uses
	Oak Street	Hempstead Turnpike and Oak Street	Hofstra University
	Nassau Veterans Memorial Coliseum	Earle Ovington Boulevard and East Gate Road	Hofstra University and Nassau Veterans Memorial Coliseum
New Stop	Nassau Community College	Endo Boulevard, Endo Drive, Perimeter Road	Nassau Community College
New Stop	Stewart Avenue & Merrick Avenue	Stewart Avenue and Merrick Avenue	Residential and Commercial uses
New Stop	Corporate Drive and Merrick Avenue	Corporate Drive and Merrick Avenue	Residential and Commercial Uses
New Stop	Downtown Westbury	Union Avenue	Downtown Village of Westbury, Westbury LIRR Station

6.5 VEHICLE BASE AND MAINTENANCE FACILITY

Vehicles used to operate the Main Line Connection service would be accommodated at the Mitchel Field NICE Bus facility at 700 Commercial Avenue in Garden City, New York, which has sufficient capacity to store and maintain the BRT fleet for the proposed service. The existing facility would serve the following functions:

- Storage for vehicles, maintenance equipment, and supplies.
- Service and maintenance of the bus fleet dedicated to the BRT service.
- Operator reporting and dispatching for the BRT service.
- Miscellaneous infrastructure maintenance and support services for the BRT service.

7 Land Use and Development

Land use, development, and public transportation have a synergistic relationship. Land use and development can drive potential public transit ridership, while the presence of public transit can shape and influence land uses around stops. This section provides a summary of the existing land uses in the Study Area, followed by existing and proposed development and redevelopment opportunities within key communities and at significant activity centers that would be affected by one or more of the Short-List Alternatives.

7.1 OVERVIEW

As described in Section 2, the 10.3 SQ MI Study Area contains the largest concentration of commercial uses within Nassau County, including a regional mall, hotels, numerous office complexes, and a wide variety of shops, restaurants, and service establishments. Approximately 20 percent of land in the Study Area is dedicated to commercial uses, including Roosevelt Field Mall and the land adjacent to Stewart Avenue to the east. Nineteen percent of the land within the Study Area is dedicated to community services, including municipal buildings for Nassau County, the Villages of Mineola, Hempstead, and Westbury, and Nassau Community College. Approximately 32 percent of the total Study Area is dedicated to residential use, including both single-family homes and multi-family apartment buildings.

Additionally, the Study Area supports large office parks and has an extensive supply of off-street parking, which represents a significant land use feature in the area. Much of the off-street parking is located around the Nassau Coliseum site. Parking usage throughout the Study Area is difficult to quantify as it varies greatly based on a number of variables, including time of day, season, and use.

7.2 STUDY AREA CHANGES

Over the past five years, the Study Area has experienced continuous construction of residential and commercial developments. It has become increasingly desirable to build residential units near transit hubs, a trend that is evident in the Villages of Mineola, Westbury, and Hempstead, and the number of infill residential developments have been increasing throughout the Study Area. Notable developments include the Avalon Garden City at 998 Stewart Avenue (completed in 2013), the Florent at 555 Stewart Avenue (currently under construction), and The Selby at 659 Merrick Avenue (recently completed). Additionally, Northwell Health Ice Center, located within Eisenhower Park, is complete and serves as a practice rink for the New York Islanders hockey team. As more transit-oriented developments are approved within the County, opportunities to increase public transit usage will emerge. As the public transit network improves and expands its service options, it is likely that additional infill will occur.

7.3 VILLAGE OF WESTBURY

The Village of Westbury was awarded a Downtown Revitalization Initiative grant in 2016. The Village identified a number of activities and actions to implement within the downtown to allow for the community to capitalize on existing and future investments. These include rezoning of the downtown to promote TOD adjacent to the LIRR station, implementing streetscape improvements, improving and upgrading the Village's Senior/Community Center, Recreation Building, and Sports Center, acquiring a property for the Westbury Arts Council, and implementing other capital improvements in partnership with the Village's Business Improvement District. [72]

In 2019, the Village finalized the rezoning of 50 acres in the downtown area. The rezoning encourages mixed-use development, increases lot coverage ratios, widens sidewalks, increases connectivity to the LIRR station, and increases open space. In conjunction with ongoing improvements around the Village of Westbury's LIRR station, the MTA and private developers have begun the process of redeveloping the parcels south of the station along Railroad Avenue. In the southern parking lot, MTA and Mill Creek Residential Trust are currently working together on a TOD project to develop an apartment complex. East of the parking lot, Terwilliger & Bartone Properties (a private developer), is working on another TOD project called the Cornerstone at Westbury. The Cornerstone consists of two apartment buildings with some workforce housing units. [73]

Beyond existing TOD efforts in the Village or Westbury, the Downtown Revitalization Initiative identified a number of parcels within the downtown that would be potential soft sites for redevelopment (see red oval in Figure 7-1). These sites were identified by analyzing the current allowable square feet and determining if the parcel had less than half the allowable square footage built. Lots along Post Avenue, Union Avenue, Maple Avenue, and Linden Avenue were identified as potential locations for redevelopment because the current structures are less than half of the buildable square footage. Vacant land and parking lots along these roadways present opportunities for infill development and additional residential and mixed-use TOD. Developing vacant land and parking lots will complement existing development patterns; there are parcels along these roadways that already support the goal of developing a vibrant downtown and, therefore, would not be suitable for redevelopment.

72 https://www.villageofwestbury.org/index.asp?SEC=E795C070-CD1F-414F-9EE4-479E3C3E9998
73 https://nassauillustrated.com/2021/10/westbury-approves-bartone-development/

Figure 7-1: The Village of Westbury Downtown Revitalization Initiative Soft Site Redevelopment Potential

Source: Village of Westbury Downtown Revitalization Grant 2016

7.4 NASSAU VETERANS MEMORIAL COLISEUM SITE

Since 1998, there have been numerous proposals to redevelop the land surrounding the Nassau Coliseum. In 2018, RXR Realty and BSE Global were selected to redevelop the 72-acre site. In 2023, the Las Vegas Sands Corporation secured the long-term lease of the Nassau Coliseum site to develop a proposed $4 billion-dollar integrated resort, which would include a casino, luxury hotel, and an entertainment venue on the site.[74] Such a development proposal must receive various approvals at the state and local level, and these approvals have not yet been received. While it is anticipated that a redevelopment of the site will occur, at this time there is no confirmed information on the specific site layout or land uses.

7.5 LAND USE SUPPORTIVE OF BUS RAPID TRANSIT

Within the Study Area there are transit-supportive land use patterns that would support the implementation of a BRT connection from the IOS to the LIRR Main Line in the Village of Westbury. All Short-List Alternatives will benefit from the connections to the community within the Town of

74 https://abc7ny.com/nassau-county-casino-las-vegas-sands-long-island/13283049/

Hempstead and will be supported by existing and new developments occurring along Stewart Avenue, Merrick Avenue, at the Nassau Coliseum site, and within the downtown of the Village of Westbury in the Town of North Hempstead. However, the alignments included in Alternatives 6 and 7 have more direct access to the infill developments along Stewart Avenue than Alternative 5, which provides only a direct connection between the Nassau Coliseum site and the Village of Westbury and does not connect to new developments on Stewart Avenue (see Figure 7-2).

Figure 7-2: Short-List Alternatives 5, 6, and 7

Source: WSP, 2023

8 Operations

The following section presents the preliminary operating plans for the Short-List Alternatives. All Alternatives are proposed as BRT and would connect into the IOS.

8.1 HOURS OF SERVICE AND SERVICE FREQUENCY

The proposed transit services for Alternatives 5, 6, and 7 would operate from 5:30 AM to midnight, seven days per week (see Table 8-1). The most frequent service would operate during the morning and evening peak hours. The proposed service frequency is 10 minutes during the weekday peak hours and 15 minutes during the off-peak weekday period. During the weekends, service would operate every 20 minutes throughout the day.

It is anticipated that departure times at the Village of Westbury and Village of Hempstead termini would be coordinated with LIRR and NICE Bus service arrival times at the Westbury LIRR station and the Village of Hempstead's Rosa Parks-Hempstead Transit Center station. In cases of special events, such as an event at the Nassau Coliseum site, additional service could be provided.

As part of the Nassau Hub Transit Initiative, ridership forecasts were developed and fare structure was assumed based on the existing NICE Bus fares, including free transfers between the new transit service's BRT vehicles and existing NICE Bus services. No free transfers are proposed between the LIRR and the proposed new BRT service.

Table 8-1: Main Line Connection Operating Hours and Frequency

Day of Week	Time of Day	Time Period	Frequency
Monday – Friday	Early AM	5:30 AM to 6:59 AM	15 Minutes
	AM Peak	7:00 AM to 8:59 AM	10 Minutes
	Mid-day	9:00 AM to 3:59 PM	15 Minutes
	PM Peak	4:00 PM to 5:59 PM	10 Minutes
	Evening	6:00 PM to 12:00 AM	15 Minutes
Saturday, Sunday, Holidays	All day	5:30 AM to 12:00 AM	20 Minutes

8.1.1 Operational Variant A

Both Alternatives 5 and 7 have been expanded to include one operational variant as part of their potential service. Under this operational variant (Operational Variant A), Alternative 5 or Alternative 7 would include additional service via the near-term IOS Phase One service. IOS Phase One provides a premium bus service with a reduced number of travel time savings benefits compared to the IOS alignment described in Section 6.1 that would provide BRT service. It is

anticipated that the IOS Phase One service will be in place before construction of the Main Line Connection BRT service would begin.

Operationally, Alternative 5 or Alternative 7 would continue to run as defined in Section 6. IOS Phase One would operate based on its existing parameters and run in parallel with the Main Line Connection service until it reaches the intersection of Charles Lindbergh Boulevard and Earle Ovington Boulevard. Alternative 5 or Alternative 7 would diverge east and the IOS Phase One service would continue west toward Nassau Community College, Museum Row, and the Roosevelt Field Bus Terminal. The IOS Phase One service would utilize the travel time savings benefits implemented for the Main Line Connection until it diverges west. Capital improvements associated with the IOS Phase One service and its operations and maintenance costs are not assumed as part of the Main Line Connection phase of the Nassau Hub Transit Initiative.

8.2 OPERATING POLICIES

Vehicle loading standards assumed for purposes of the Short-List Alternatives' operations planning are based on guidelines from the Transportation Research Board's Transit Cooperative Research Program *Transit Capacity and Quality of Service Manual, Second Edition*.[75] Transit vehicle-load levels of service (LOS) are a set of measures used to reflect, from the passenger's point of view, the comfort level while on board a transit vehicle. This measure considers the passenger's ability to find a seat and overall crowding levels within the vehicle. For planning purposes, it was assumed that the BRT vehicles would have a passenger load corresponding to LOS D (indicating that all seats are filled and some passengers must stand but can do so comfortably) and a load factor of 1.25 during the peak period (see Table 8-2).[76]

Table 8-2: Bus Rapid Transit Vehicle Capacity Characteristics

Characteristics	
Number of Seats in a Bus Rapid Transit Vehicle[77]	40
Level of Service for Passenger Load Level	D
Peak Load Factor	1.25
Additional Standing Passengers Possible	10
Total Passengers Per Vehicle (seated and standing)	50

75 https://www.trb.org/Main/Blurbs/169437.aspx
76 The load factor is the ratio of passengers actually carried versus the total passenger seating capacity of a vehicle. A load factor of greater than 1.0 indicates that there are standees on that vehicle
77 Based on New Flyer NG Spec: https://www.newflyer.com/bus/xcelsior-charge-ng/

8.3 RUNNING TIME ESTIMATES

The following assumptions were used to develop stop-to-stop running times for Alternatives 5, 6, and 7 between the Rosa Parks-Hempstead Transit Center and the Westbury LIRR station (see Table 8-3 to Table 8-5).

- Running times were developed using Google Maps travel times running along the specific route for AM Peak (7:30 AM), mid-day (12:00 PM), and PM Peak (5:00 PM). The average speed-run times, by time of day, were used as the basis for the listed running times. Dwell times were added and travel time discounts were applied where priority bus treatments are proposed.
- Dwell times at stops were assumed to be 30 seconds. Dwell time represents the time the BRT/premium bus spends stopped at a stop while passengers board and alight from the vehicle.[78]
- It is assumed that all dedicated ROWs for the BRT would provide a 10 percent travel time savings.
- It is assumed that all signalized intersections would have transit signal priority and would provide a 20 second time saving benefit for the purpose of this analysis. However, a detailed analysis of time savings for traffic signals will be performed for the LPA when it advances into engineering.

78 The typical dwell time for bus vehicles is longer than for rail vehicles due to access configuration, the number of doors for boarding and alighting the vehicle, the height of vehicle boarding and, in some instances, on-board fare payment.

Table 8-3: Alternative 5 Travel Time Between New Main Line Connection Stops During Peak Hours

From Passenger Stop	To Passenger Stop	Distance	Run Time (Minutes: Seconds)
North/Eastbound			
Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	Nassau Coliseum Site (Initial Operating Segment)	2.1 Miles	12:00
Nassau Coliseum Site (Initial Operating Segment)	Merrick Avenue/Stewart Avenue/Park Avenue	1.6 Miles	3:50
Merrick Avenue/Stewart Avenue/Park Avenue	Merrick Avenue and Corporate Drive	0.5 Miles	1:40
Merrick Avenue and Corporate Drive	Downtown Village of Westbury/Westbury Long Island Rail Road (LIRR)	0.6 Miles	3:20
Totals		Approximately 4.8 Miles	Approximately 21 Minutes
South/Westbound			
Downtown Village of Westbury/Westbury LIRR	Merrick Avenue and Corporate Drive	0.6 Miles	2:50
Merrick Avenue and Corporate Drive	Merrick Avenue/Stewart Avenue/Park Avenue	0.5 Miles	2:10
Merrick Avenue/Stewart Avenue/Park Avenue	Nassau Coliseum Site (Initial Operating Segment)	1.6 Miles	3:30
Nassau Coliseum Site (Initial Operating Segment)	Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	2.1 Miles	8:10
Totals		Approximately 4.8 Miles	Approximately 17 Minutes

Table 8-4: Alternative 6 Travel Time Between New Main Line Connection Stops During Peak Hours

From Passenger Stop	To Passenger Stop	Distance	Run Time (Minutes: Seconds)
North/Eastbound			
Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	Museum Row (Initial Operating Segment)	3.0 Miles	15:50
Museum Row (Initial Operating Segment)	Stewart Avenue & Selfridge	0.9 Miles	2:20
Stewart Avenue & Selfridge	Merrick Avenue/Stewart Avenue/Park Avenue	0.8 Miles	2:20
Merrick Avenue/Stewart Avenue/Park Avenue	Merrick Avenue and Corporate Drive	0.5 Miles	1:40
Merrick Avenue and Corporate Drive	Downtown Village of Westbury/Westbury Long Island Rail Road (LIRR)	0.6 Miles	3:20
Totals		Approximately 5.8 Miles	Approximately 25 Minutes
South/Westbound			
Downtown Village of Westbury/Westbury LIRR	Merrick Avenue and Corporate Drive	0.6 Miles	2:50
Merrick Avenue and Corporate Drive	Merrick Avenue/Stewart Avenue/Park Avenue	0.5 Miles	2:10
Merrick Avenue/Stewart Avenue/Park Avenue	Stewart Avenue & Selfridge	0.8 Miles	2:40
Stewart Avenue & Selfridge	Museum Row (Initial Operating Segment)	0.9 Miles	1:40
Museum Row (Initial Operating Segment)	Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	3.0 Miles	11:40
Totals		Approximately 5.8 Miles	Approximately 22 Minutes

Table 8-5: Alternative 7 Travel Time Between New Main Line Connection Stops During Peak Hours

From Passenger Stop	To Passenger Stop	Distance	Run Time (Minutes:Seconds)
North/Eastbound			
Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	Nassau Coliseum Site (Initial Operating Segment)	2.1 Miles	12:00
Nassau Coliseum Site (Initial Operating Segment)	Endo Drive/Endo Boulevard/ Perimeter Road	1.3 Miles	5:10
S Endo Drive/Endo Boulevard/ Perimeter Road	Merrick Avenue/Stewart Avenue/Park Avenue	0.7 Miles	3:10
Merrick Avenue/Stewart Avenue/Park Avenue	Merrick Avenue and Corporate Drive	0.5 Miles	1:40
Merrick Avenue and Corporate Drive	Downtown Village of Westbury/Westbury Long Island Rail Road (LIRR)	0.6 Miles	3:20
Totals		Approximately 5.2 Miles	Approximately 25 Minutes
South/Westbound			
Downtown Village of Westbury/Westbury LIRR	Merrick Avenue and Corporate Drive	0.6 Miles	2:50
Merrick Avenue and Corporate Drive	Merrick Avenue/Stewart Avenue/Park Avenue	0.5 Miles	2:10
Merrick Avenue/Stewart Avenue/Park Avenue	Endo Drive/Endo Boulevard/ Perimeter Road	0.7 Miles	2:10
Endo Drive/Endo Boulevard/ Perimeter Road	Nassau Coliseum Site (Initial Operating Segment)	1.3 Miles	3:50
Nassau Coliseum Site (Initial Operating Segment)	Rosa Parks-Hempstead Transit Center (Initial Operating Segment)	2.1 Miles	8:10
Totals		Approximately 5.8 Miles	Approximately 20 Minutes

8.4 FLEET SIZE REQUIREMENT

Based on the operating plans defined for Alternatives 5, 6, and 7, the number of buses required was calculated. For each of the three Alternatives, a fleet size of 10 buses is required. This includes eight buses required for peak operation and two spare buses (using a 20 percent spare ratio).[79]

8.5 OPERATING STATISTICS

Operating statistics were calculated based on the proposed operating plans for each Alternative. The operating parameters and the corresponding operating statistics for Alternatives 5, 6, and 7 are presented in Table 8-6.

79 Further information regarding the Federal Transit Administration's 20 percent spare ratio policy can be found in FTA Circular 9300.1or FTA Circular 9030.1.

Table 8-6: Operating Parameters

Operating Parameter	Alternative 5	Alternative 6	Alternative 7
Alignment Length (Route Miles)	9.7 miles	11.7 miles	10.8 miles
Average Operating Speed (miles per hours)	16.9 miles per hour	15.7 miles per hour	15.1 miles per hour
Number of Days Per Year Service is Operated (Days)	365 days	365 days	365 days
Span of Weekday Service (Hours)	18.5 hours	18.5 hours	18.5 hours
Span of Weekend Service (Hours)	18.5 hours	18.5 hours	18.5 hours
End to End One Way Run Time Peak Northbound (Minutes Rounded)	21 minutes	25 minutes	25 minutes
End to End One Way Run Time Peak Southbound (Minutes Rounded)	17 minutes	22 minutes	20 minutes
Peak Layover Time (Minutes Rounded)	11 minutes	7 minutes	8 minutes
Round Trip Peak Time (Minutes Rounded)	60 minutes	61 minutes	61 minutes
Weekday Peak Headways (Minutes Rounded)	10 minutes	10 minutes	10 minutes
Peak Buses in Service	8 buses	8 buses	8 buses
Spare Ratio (20% of peak vehicle requirement)	2 buses	2 buses	2 buses
Total Fleet Size	10 buses	10 buses	10 buses
Total Number of New Stops*	5 stops	7 stops	7 stops
Total Revenue Vehicle Hours (Annual)	42,555 annual hours	42,555 annual hours	42,555 annual hours

*Note: *See Section 6 for stop location information*

9 Capital Cost

This section presents the preliminary order-of-magnitude capital cost estimates, in 2023 dollars, for the Short-List Alternatives. It summarizes the capital cost estimate structure and development, cost categories, quantities of materials, unit-cost data sources, contingencies, and finance charges. The capital cost estimates for Alternatives 5, 6, and 7 were developed for the purpose of comparing the Alternatives. The estimates are based on the concept-level design plans developed for the Alternatives, appropriate for the current AA phase of project planning. Detailed cost analysis will be required during subsequent phases of project planning for the LPA.

9.1 COST ESTIMATE STRUCTURE AND DEVELOPMENT

Capital cost estimates for the three Short-List Alternatives were based on the concept-level designs developed for each Alternative. The cost estimate utilizes the FTA guidance and Standard Cost Category (SCC) structure, and a three-step process was employed to develop the capital cost estimates:

- The quantities of materials needed to support each Alternative were estimated.
- Unit costs were applied to arrive at a total estimated subtotal cost.
- Contingencies were allocated across construction costs and construction management.

Contingencies are intended to account for unforeseen items of work, quantity fluctuations, and variances in unit costs that develop as the project progresses through the various stages of development. The level of contingency applied to each cost category reflects the relative potential variability of those costs. Capital costs were developed in 2023 dollars. A specific build year has not been determined and a mid-point for construction capital cost estimates has not been developed. The calculation of the total concept-level capital cost estimate for each Alternative is as follows:

$$\text{Capital Cost} = \text{Quantity of Materials} \times \text{Unit Cost} + \text{Contingency}$$

9.2 COST CATEGORIES

9.2.1 Standard Cost Categories

Accurate capital costs are vital to the financial planning of the proposed project and allow the project to be seamlessly integrated into the FTA's New Starts/Small Starts program. Costs were determined based on each Alternative's physical characteristics and required quantities of structures, equipment, and other materials. Costs were organized according to the set of 10 capital cost categories described by the FTA.[80] Due to the concept level of design of the Short-List Alternatives, project contingencies and allowances were also applied to capture the costs of unknown or unquantifiable items at this stage of project development so that the estimates reflect complete

80 https://www.transit.dot.gov/regulations-and-guidance/cost-estimation-fta-funded-transit-projects

project costs. As the proposed project advances to future stages of design and additional details are developed, the estimates of capital costs will also be refined.

9.2.2 Category Details

Table 9-1 identifies the 10 capital cost categories organized according to the FTA's SCC structure. Applicable cost categories from Table 9-1 were used for the capital cost estimates.

Table 9-1: Federal Transit Administration Standard Cost Categories

Standard Cost Category	Examples
10: Guideway & Track Elements	Guideway grading, drainage, retaining walls, bridges and tunnels. Track work. Roadway construction.
20: Stations, Stops, Terminals, Intermodal	Enclosures, canopies, fixtures, bus stops.
30: Support Facilities: Yards, Shops, Administrative Buildings	Maintenance facilities, mid-day layover facilities, administration and/or operations buildings
40: Sitework & Special Conditions	Demolition, clearing, and earthwork; utilities and utility relocation; site remediation; environmental mitigation; noise mitigation; site structures; access roadways; temporary facilities required during construction phase; surface parking lots at stations; pedestrian and bicycle accommodations; landscaping, fencing and lighting
50: Systems	Roadway protection; communication systems; dispatching system and software, fare collection, signal priority systems.
60: Right-Of-Way, Land, Existing Improvements	Acquisition of right-of-way or easements for guideway, stations.
70: Vehicles	Bus Rapid Transit vehicles, non-revenue vehicles
80: Professional Services (Applies To Categories 10-50)	Engineering; final design; project management for design and construction; construction administration and management; professional liability and other non-construction insurance; legal; permits; review fees by other agencies, surveys, testing; investigation, inspection, startup.
90: Unallocated Contingency	Overall project contingency and reserves
100: Finance Charges	This category includes the finance charges to pay the interest on the bonds used to finance the project, where necessary.

9.3 QUANTITY OF MATERIALS

9.3.1 20: Stations, Stops, Terminals, Intermodal

This cost category refers to the capital costs related to earthwork and siting of the station locations.

Alternative 5 assumes five stops at the following locations:

- Merrick Avenue at Stewart Avenue and Park Boulevard (2 stops)
- Merrick Avenue at Corporate Drive (2 stops)
- Westbury LIRR station (1 stop as the terminus)

Alternative 6 assumes seven stops at the following locations:

- Stewart Avenue at Selfridge Avenue (2 stops)
- Stewart Avenue at Merrick Avenue (2 stops)
- Merrick Avenue at Corporate Drive (2 stops)
- Westbury LIRR station (1 stop as the terminus)

Alternative 7 assumes seven stops at the following locations:

- Nassau Community College at Endo Boulevard, Endo Drive, and Perimeter Road (2 stops)
- Stewart Avenue at Merrick Avenue (2 stops)
- Merrick Avenue at Corporate Drive (2 stops)
- Westbury LIRR station (1 stop as the terminus)

9.3.2 40: Site Work and Special Conditions

Capital costs for permitting, specific attributes of the shelter, engineering drawings and calculations, survey operations, the engineers field office, and mobilization were estimated for all three Short-List Alternatives. With the exception of the estimates for shelter-specific items, all items are measured as lump sum, each, or monthly.

9.3.3 50: Systems

The systems capital cost category captures the capital costs for modification to existing traffic signals, installing signals, and implementing transit signal priority. All Short-List Alternatives assume that 10 signals will be upgraded to implement transit signal priority. Each installation includes a new traffic controller unit, transit signal priority equipment, and an auxiliary traffic cabinet.

9.4 UNIT COST DATA SOURCES

Unit costs were developed using various local source data based on recent cost estimates developed for the implementation of IOS Phase One, which is similar in terms of scope and material.

9.4.1 Professional Services

In addition to the unallocated contingencies, allowances were included in the estimate for "soft costs" or professional services (SCC 80). These are project management and engineering costs, which were added to the total cost of each Alternative. These soft costs include typical project management and engineering costs and are determined based on a percentage of the projected capital cost.

The soft-cost contingency percentages were based on recent cost estimates developed for the implementation of IOS Phase One, which is similar in terms of scope and material.

9.4.2 Allocated and Unallocated Contingencies

No allocated contingencies were utilized in the cost estimates for this project. Allocated contingencies are associated with individual cost estimate categories. These contingencies are intended to account

for unforeseen items of work, quantity fluctuations, and variances in unit costs that develop as the proposed project progresses through the various stages of development.

Unallocated contingencies (SCC 90) were applied to the overall total capital cost estimate for each Alternative. Unallocated contingencies account for potential changes to the project scope (e.g., design changes that may be required) and other unforeseeable project cost increases that are not directly associated with any particular cost category. Based on the conceptual level of design completed for each Alternative, 30 percent of construction costs were included in the unallocated contingency cost category.

9.4.3 Finance Charges

A value for FTA Category 100, Finance Charges, has not been included in the capital cost estimates and is pending development of a proposed financing plan and design and construction schedule. A financial plan and schedule will be developed based on the LPA resulting from this AA Update. Once a financing plan and construction schedule are prepared during the Project's Engineering stage, and if the financial plan's components include issuance of bonds or otherwise accrue financing charges, a cost value for Category 100, Finance Charges, will be developed and incorporated into a refined capital cost estimate.

9.5 CAPITAL COSTS

The seven direct cost categories and the two indirect cost categories (unallocated contingencies and professional services) provide an overall estimate of the capital cost for each Alternative. Estimated capital costs in 2023 dollars for the Short-List Alternatives are presented in Table 9-2 through Table 9-4.

Table 9-2: Alternative 5 Capital Cost Estimate ($2023)

Standard Cost Categories (SCC)		Total
10	Guideway & Track	$0
20	Stations, Stops, Terminals, Intermodal	$67,000
30	Support Facilities: Yards, Shops, Administration Buildings	$0
40	Sitework & Special Conditions	$351,000
50	Systems	$686,000
	CONSTRUCTION SUBTOTAL (10-50)	**$1,103,000**
60	Right-of-Way & Land, Existing Improvements	$0
70	Vehicles*	$0
80	Professional Services	$229,000
	SUBTOTAL (10-80)	**$1,332,000**
90	Unallocated Contingency (30% of lines 10 through 80 + Field Change Payment (5% of Construction Subtotal) +10% for Construction Management)	$410,000
	SUBTOTAL (10-90)	**$1,742,000**
100	Finance Charges	$0
	TOTAL PROJECT COST (10-100)	**$1,742,000**

*Note: *The acquisition of buses will be completed outside of this project.*

Table 9-3: Alternative 6 Capital Cost Estimate ($2023)

Standard Cost Categories (SCC)		Total
10	Guideway & Track	$0
20	Stations, Stops, Terminals, Intermodal	$87,952
30	Support Facilities: Yards, Shops, Administration Buildings	$0
40	Sitework & Special Conditions	$445,703
50	Systems	$685,788
	CONSTRUCTION SUBTOTAL (10-50)	**$1,219,443**
60	Right of Way & Land, Existing Improvements	$0
70	Vehicles*	$0
80	Professional Services	$246,028
	SUBTOTAL (10-80)	**$1,465,471**
90	Unallocated Contingency (30% of lines 10 through 80 + Field Change Payment (5% of Construction Subtotal) +10% for Construction Management)	$449,268
	SUBTOTAL (10-90)	**$1,914,739**
100	Finance Charges	$0
	TOTAL PROJECT COST (10-100)	**$1,914,739**

*Note: *The acquisition of buses will be completed outside of this project.*

Table 9-4: Alternative 7 Capital Cost Estimate ($2023)

Standard Cost Categories (SCC)		Total
10	Guideway & Track	$0
20	Stations, Stops, Terminals, Intermodal	$88,000
30	Support Facilities: Yards, Shops, Administration Buildings	$0
40	Sitework & Special Conditions	$446,000
50	Systems	$686,000
	CONSTRUCTION SUBTOTAL (10-50)	**$1,219,000**
60	Right-of-Way & Land, Existing Improvements	$0
70	Vehicles*	$0
80	Professional Services	$246,000
	SUBTOTAL (10-80)	**$1,465,000**
90	Unallocated Contingency (30% of lines 10 through 80 + Field Change Payment (5% of Construction Subtotal) +10% for Construction Management)	$449,000
	SUBTOTAL (10-90)	**$1,915,000**
100	Finance Charges	$0
	TOTAL PROJECT COST (10-100)	**$1,915,000**

*Note: *The acquisition of buses will be completed outside of this project.*

Overall, the three Short-List Alternatives have relatively similar capital costs. Alternative 5's capital cost is estimated at approximately $1.7 million while Alternatives 6 and 7 have capital costs of approximately $1.9 million. Of the three Alternatives, Alternative 5 has the least expensive capital cost compared to Alternatives 6 and 7 because it has fewer stop locations.

10 Ridership

This section presents the summary of travel forecasts for future ridership developed to support the evaluation of the Nassau Hub Transit Initiative's Short List Alternatives. Ridership is a key metric for comparing the Short List Alternatives as it is a critical component for analyzing transit efficiency indicators such as operations and maintenance cost per trip or per passenger mile, farebox recovery ratio, and potential reduction of air pollutants related to personal VMT.

The ridership forecasts were developed using FTA's Simplified Trips-on-Project Software (STOPS) Version 2.50 in synthetic mode. The travel patterns associated with the Study Area were identified using a combination of datasets and travel models in the region. The forecasts were developed with guidance from FTA's Section 5309 Capital Investment Grant Program and include an estimate of the number of trips using the Short List Alternatives and the anticipated change in automobile VMT. These estimates were subsequently used to calculate metrics related to mobility improvements, congestion relief, cost effectiveness, and environmental benefits of the Project. STOPS is fundamentally a conventional "4-step" model set that considers zone-to-zone travel markets stratified by household automobile ownership, employs a conventional mode-choice model to predict zone-to-zone transit travel based on zone-to-zone travel characteristics of the transit and roadway networks, and then assigns the trips predicted to use fixed guideways onto various transit facilities. STOPS, when applied to a project like the Nassau Hub Transit Initiative, allows for direct comparisons of the ridership potential between Alternatives and modes of transportation.

The model for this ridership estimate uses data from the Census Transportation Planning Products (CTPP) Program, the ACS, NICE Bus ridership transit count data from 2016 to 2018, and LIRR's 2013 origin-destination transit survey. Population and employment estimates at the Transportation Analysis Zone (TAZ) level of detail and TAZ-to-TAZ highway peak time and distance matrices, known as skims, were obtained from the NYMTC Best Practice Model (BPM). Special market estimates for educational uses, such as Hofstra University and Nassau Community College, and projected residential and employment uses were also derived from NYMTC's BPM.

The model assumes that accessing the Main Line Connection service would be done via walking or transfers from other public transit services; no park and rides were assumed for this analysis. The STOPS model was previously calibrated for a 2017 base year using NICE Bus General Transit Feed Specification data. Therefore, forecasts for the project rely on the previous model with no updates or changes to the parameters previously developed when forecasting ridership for the first phase of the IOS in 2019.

10.1 TRANSPORTATION ANALYSIS ZONE

TAZs are delineated areas that contain area-specific traffic-related information such as how many trips are produced by or attracted to a given area. For modeling purposes, TAZs are simplified into a zone centroid, which is a point located at the center of the TAZ from which trips begin or end.

A large TAZ may impact walking access to transit due to isolated zone centroids and long/illogical walk distances between zone centroids and transit stops. By splitting a larger TAZ, the smaller TAZs provide more localized data, and the zone centroid provides a more realistic walk link between the TAZ and transit stops.

A review of TAZ boundaries before calibration of the model in the core of the Project's Study Area revealed that the existing TAZs were quite large or did not represent existing conditions for transit modeling purposes. Therefore, TAZs were split as shown in **Error! Reference source not found.**.

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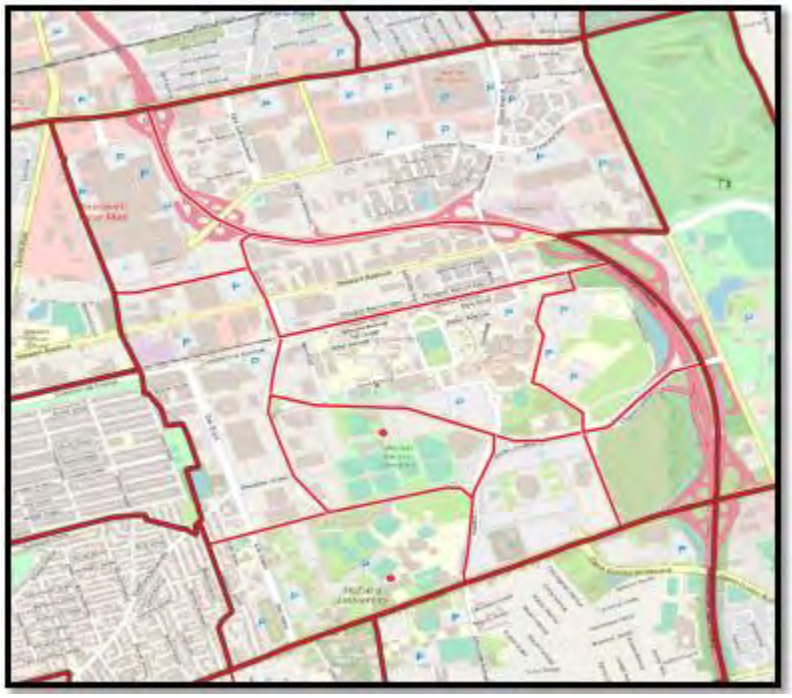


ACS Census Geography over Land Use, shows original boundary and updated subdivision boundary.
Source: WSP, 2023

10.2 WALK NETWORK

The path-building component of STOPS can generate zone-to-station/stop walk connector links using two different techniques: straight line distances (the default) or by using street databases to represent the exact path used by pedestrians to access transit stops. While the default is adequate in most cases, the street database approach often more accurately represents walk access barriers. A walk network was developed from a full street network for the region from which limited-access highway links were removed. The resulting walk link network was reviewed in the vicinity of high ridership transit routes and additional walk links were added to improve the representation of connectivity to transit stops and to proposed potential stations.

Figure 10-1 shows the original walk network in green with additional connections added in yellow to better serve the project and provide access to the Nassau Coliseum site and adjacent uses such as Hofstra University, Nassau Community College, and the Cradle of Aviation Museum.

Figure 10-1: Walk Network

Source: WSP, 2023

10.3 SPECIAL MARKETS

STOPS can be run in two different modes, and making a decision on which mode is appropriate is one of the first steps in the model development. The STOPS synthetic mode relies primarily on CTPP transit trips to develop the initial person trip tables for a region. As CTPP data provides only home-to-work trips, STOPS sometimes underestimates non-work-related travel on transit, particularly when special markets such as universities and hospitals are a factor. Therefore, in addition to the synthetic

model for STOPS, a special market estimate for the university market (Hofstra University and Nassau Community College) was derived from the NYMTC BPM and included in the STOPS application.

10.4 MODEL CALIBRATION

The goal of the model calibration is to adjust the system-wide parameters so that STOPS accurately represents:

- Overall linked and unlinked trips
- Distribution of transit by access mode (e.g., walk, transfer from public transit)
- District-to-district transit trips for all trips

The following key parameters were applied during the calibration process:

- The Transfer Penalty to apply was updated from 1.0 to 1.1, meaning that a transfer penalty of 5.5 minutes was used in the calibrated model.
- The Ratio of Unlinked to Linked Transit Trips was kept at the default value.
- The Group calibration approach was set to origin- destination (OD) Matrix Adjustment, using Route boardings.
- Calibration settings were updated for the Walk Weight parameter to 1.40, whereas the Auto Time Factor was kept at default.
- Station specific penalties were used during the calibration.
- The Partial Type Fixed Guideway Setting was set at a default value of 0.0 as the Nassau Hub project runs on less than 50 percent dedicated ROW.

The model was calibrated using 2016 ridership data and 2017 socioeconomic information.

10.5 RIDERSHIP FORECAST

The forecast results include total system-wide linked transit trips and transit trips by trip purpose and car ownership. Transit weekday daily ridership by transit mode and route, as well as change in automobile VMT, are also presented in this section. As mentioned, the model previously calibrated for the Nassau Hub Transit Initiative was utilized directly with no parameter changes or adjustments to maintain project consistency with forecasts developed for the first phase of the IOS.

Two travel forecasts were completed and are known as the Base Year model and the Horizon Year model. The Base Year model is calibrated for 2017 and uses the 2016 transit network and 2017 land use and travel time data. The Horizon Year model is calibrated for the 2045 forecast year and uses the 2019 transit network, 2045 land use data, and 2045 highway matrices from the NYMTC BPM. Both models compare a no build scenario, where the project has not been implemented, to a build scenario, where the project has been implemented, within their respective models.

The Main Line Connection BRT service was modeled based on the parameters listed in Section 8 with 10-minute frequency for peak and 15 minutes in off-peak service. Operating speeds were estimated between 12 and 19 mph, depending on the proposed Alternative. The ridership results for Alternatives 5, 6, and 7 are presented in Table 10-1 to Table 10-3.

Table 10-1: Alternative 5 Daily Ridership Estimate for Base Year (2017) and Horizon Year (2045)

Stop	Base Year	Horizon Year
Rosa Parks-Hempstead Transit Center	725	1,088
Clinton-Washington/Fulton	60	91
Fulton Warner	299	449
Hempstead/Oak	618	927
Nassau Veterans Memorial Coliseum	434	652
Merrick/Stewart	62	93
Merrick/Corporate	209	314
Westbury LIRR	531	797
Total Ridership	**2,938**	**4,410**

Table 10-2: Alternative 6 Daily Ridership Estimate for Base Year (2017) and Horizon Year (2045)

Stop	Base Year	Horizon Year
Rosa Parks-Hempstead Transit Center	1,088	1,571
Clinton-Washington/Fulton	104	150
Fulton Warner	373	539
Hempstead/Oak	642	928
Nassau Veterans Memorial Coliseum	269	388
Nassau Community College (Charles Lindbergh Boulevard)	289	418
Museum Row	305	440
Stewart/Selfridge	193	279
Stewart/Merrick	5	8
Merrick/Corporate	178	257
Westbury Long Island Rail Road	527	761
Total	**3,973**	**5,738**

Table 10-3: Alternative 7 Daily Ridership Estimate for Base Year (2017) and Horizon Year (2045)

Stop	Base Year	Horizon Year
Rosa Parks-Hempstead Transit Center	710	1,037
Clinton-Washington/Fulton	62	91
Fulton Warner	298	436
Hempstead/Oak	615	898
Nassau Veterans Memorial Coliseum	338	493
Nassau Community College (Endo Boulevard)	223	326
Stewart/Merrick	4	6
Merrick/Corporate	197	288
Westbury Long Island Rail Road	479	700
Total	**2,926**	**4,275**

10.6 MODELING RESULTS

Results of the ridership modeling for Horizon Year 2045 for Alternatives 5, 6, and 7 are summarized in Table 10-4.

Table 10-4: Ridership Forecast for 2045

Metric	Alternative 5	Alternative 6	Alternative 7
Total Trips On the Project	1,375,920	**1,790,256**	1,333,800
Annual non-transit dependent trips	572,832	**687,336**	539,760
Annual transit dependent trips	803,088	**1,102,920**	794,040
Daily projected boardings	4,410	**5,738**	4,275
New Daily Transit Trips	391	**583**	263
Annual revenues (fare cost at $2.75)	$3,783,780	**$4,923,204**	$3,667,950
Annual change in private vehicle miles traveled (VMT) compared to the No Build Scenario *	-49,353	**-447,295**	-33,072
Annual change in private vehicle passenger miles traveled (PMT) compared to the No Build Scenario *	-54,288	**-492,024**	-36,515

*Four contributing factors influence the outcome of both the annual change in private vehicle miles and annual change in private vehicle passenger miles traveled compared to the no build scenario. The combination of providing high quality bus service (compared to current services), serving the most ridership attractors, high number of automotive users with travel mode choices for journey to work trips, and long trip lengths of private automobile trips that would get converted to bus trips, leads to the highest number of potential riders and reduction in automobile VMT and PMT in Alternative 6. The STOPS model assumes that bus routes around Roosevelt Field Mall would be curtailed leading to limited access to the Roosevelt Field Mall in Alternatives 5 and 7, compared to Alternative 6. This results in a much lower reduction in VMT and PMT in Alternatives 5 and 7. Within the STOPS model, the internal mechanism generates the shortest path between every combination of regional origin and destination and assigns trips based on available modes, which can result in the shifting of potential transit riders back to the automobile, limiting the reduction in VMT and PMT compared to the no build. Within the STOPS model, existing public transportation timetables are pre-set. Therefore, connections from existing services, such as the LIRR, may favor an alternative that provides access to the LIRR with shorter wait times, such as Alternative 6 rather than Alternative 5 and 7.

Overall, Alternative 6 has the highest ridership estimate compared to Alternatives 5 and 7. Alternative 6 provides the highest number of annual non-transit dependent trips, transit dependent riders, new daily transit trips, and the largest reduction in VMT and PMT compared to the No Build

Scenario. In all three Alternatives, the highest number of riders would board and alight at the Hempstead Transit Center, the Hofstra University stop at Oak Street and Hempstead Turnpike, and the Westbury LIRR station in the Village of Westbury as identified in Table 10-1 through Table 10-3. Alternatives 5, 6, and 7 result in a reduction in private automotive VMT and private automotive PMT as compared to the No Build Scenario.

As the project continues to progress, additional consideration will be made for stop locations with lower ridership.

11 Operating and Maintenance Costs

11.1 OPERATING AND MAINTENANCE COST ESTIMATING APPROACH

This section provides an overview of the development and structure of preliminary O&M cost estimates for Alternatives 5, 6, and 7 operating as a BRT service and the resultant order-of-magnitude O&M cost estimates by Alternative.

The O&M cost methodology is structured as follows:

- Costs are computed by estimating labor and materials needed to provide a given LOS; unit costs are then applied to the estimated future labor and materials cost items.
- Costs are calculated based on operating statistics by mode (rather than system-wide for all modes combined).
- Each labor and non-labor expense item is calculated separately, which ensures that equations are mutually exclusive and cover all operating costs.
- Cost items are variable, meaning that cost estimates will change with projected changes in service.

System characteristics and operating statistics serve as driving variables in an O&M cost model. Current expenses are paired with relevant driving variables to derive unit costs that represent current rates of consumption and labor productivity. An O&M cost model uses current unit costs as the basis for estimating future costs of transit Alternatives under consideration.

The basic structure of a resource build-up model is a series of line items representing specific labor or non-labor costs. Each item is linked, either directly or indirectly, to an input variable that reflects LOS or some other system attribute. Examples of LOS variables include annual revenue vehicle miles and the number of vehicles in peak-period service.

The O&M cost models were developed for each of the Short-List Alternatives and comprised the following O&M cost categories:

- *Vehicle Operations*: Annual costs associated with vehicle operations such as rail/bus operator and rail/bus operation supervisor wages and fringe benefits, and costs associated with traction power (e.g., electricity or fuel).
- *Vehicle Maintenance*: Annual costs associated with vehicle maintenance such as mechanic and supervisor wages and fringe benefits, and vehicle maintenance materials (e.g., spare parts, lubricants, tools and uniforms/protective clothing, etc.).
- *Stops*: Annual costs associated with stop maintenance, such as transit facility maintainer's wages and fringe benefits.

NICE Bus provided its current operating costs for its buses. NICE Bus is the proposed operator of the BRT service to connect the IOS to the LIRR Main Line in Westbury. In 2011, Nassau County entered into a contract for the operation and maintenance of its bus services with Transdev (formerly Veolia

Transportation), a private transportation provider that runs NICE Bus for Nassau County. The cost per vehicle hour for buses at NICE Bus in 2023 was $172.88. NICE Bus relies on a shelter contractor to operate and maintain the stops. The annual O&M cost is approximately $1,500 per stop. Given that the shelter design will incorporate new elements such as lighting and variable signage, annual O&M costs for the shelters were increased to $2,000 per stop to accommodate additional O&M expenditures.

11.2 OPERATING AND MAINTENANCE COST METHODOLOGY

11.2.1 Key Supply Variables

Development of a model to estimate O&M costs began with the selection of key driving supply variables. The key supply variables used to drive related expense items (i.e., cost items) are described below.

- *Annual Revenue Vehicle Hours* represents the total number of hours that vehicles operate with revenue service in one year (i.e., the amount of time that the vehicles are available for travel by the general public). Vehicle operating costs are closely related to the amount of time transit vehicles spend in revenue operation, as these costs are largely driven by the labor costs of operators. Per National Transit Database reporting instructions, revenue service includes layover time at terminals since an operator is on duty during rest periods.[81]
- *Number of Stops* represents the total number of stops along the alignment. Costs associated with stop maintenance include labor costs, maintenance materials and supplies, and contracted services.

11.2.2 Data Assembled

Data from Transdev's NICE Bus operations were used as inputs to the O&M cost model. Following the identification of the functional areas, the next step was to record peer system expenses in a series of line items. Once line items were established, each one was assigned a key supply variable as its most relevant cost driver (see Table 11-1).

81 https://www.transit.dot.gov/ntd/national-transit-database-ntd-glossary

Table 11-1: Cost Categories for Operations and Maintenance

Cost Category and Cost Line Item	Key Supply Variable
Vehicle Operations & Vehicle Maintenance	Annual Revenue Vehicle Miles
Stops	Number of Stops

The basic formula used for calculating O&M costs is as follows:

O&M Expense = Unit Cost [$/quantity] x Service Quantity

Using the data for stop facility maintainers, maintenance materials and supplies, and contracted services developed in the 2014 AA, unit costs and the model's base-year cost were calculated. Table 11-2 shows the O&M cost model used to estimate O&M costs for the three Main Line Connection Alternatives.

Table 11-2: Unit Costs for Operations and Maintenance Estimates

Cost Category and Cost Line Item	Average Unit Cost (2023)	
Vehicle Operations & Vehicle Maintenance	$172.88	Per Revenue Vehicle Hour
Stops	$2,000	Per Stop

11.2.3 Variable Quantities for Bus Rapid Transit

Table 11-3 provides the units of service that were utilized as inputs into the O&M cost model.

Table 11-3: Operating Parameters

Operating Parameters	Alternative 5	Alternative 6	Alternative 7
Operating hours (hours)	18.5	18.5	18.5
Hours of Peak Service	4	4	4
Hours of Off-Peak Service	14.5	14.5	14.5
Number of Buses in Peak Service	8	8	8
Number of Buses in Off-Peak Service	6	6	6
Weekday Service Total	255	255	255
Weekend Service Total	110	110	110
Total Stops	5	7	7
Total Revenue Vehicle Hours (Annual)	42,555	42,555	42,555

11.3 OPERATING AND MAINTENANCE RESULTS

Below are the estimated annual O&M costs in 2023 for the Short-List Alternatives (see Table 11-4 to Table 11-6). The estimated O&M cost for Alternatives 5, 6, and 7 are the same at approximately $7.37 million.

Table 11-4: Estimated Operations and Maintenance Cost for Alternative 5 ($2023)

Cost Category	Cost per Category
Vehicle Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$7,357,000
Stop Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$10,000
Totals	$7,367,000

Table 11-5: Estimated Operations and Maintenance Cost for Alternative 6 ($2023)

Cost Category	Cost per Category
Vehicle Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$7,357,000
Stop Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$14,000
Totals	$7,371,000

Table 11-6: Estimated Operations and Maintenance Cost for Alternative 7 ($2023)

Cost Category	Cost per Category
Vehicle Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$7,357,000
Stop Operations and Maintenance	
Operation, Maintenance and Administration (fixed rate)	$14,000
Totals	$7,371,000

12 Environmental Screening

An environmental screening of the three Short-List Alternatives was performed to identify significant environmental issues that would preclude the implementation of one or more of the Short-List Alternatives, and to compare the relative environmental impacts and benefits of each Alternative. A summary of the findings of this environmental screening is presented in Table 12-1. Potential environmental impacts will be evaluated in greater detail during the environmental review phase of the Study after the LPA is selected. This section summarizes the findings of the environmental screening by environmental impact category.

Table 12-1: Summary of Environmental Screening Findings

Category	Summary of Findings
Land Use & Neighborhood Character	*No adverse impact on land use or neighborhood character* anticipated with any of the Alternatives.
Consistency with Public Policy and Plans	*All Alternatives are supportive of the long-range vision* for Nassau County and are consistent with the mobility goals of locally adopted plans.
Socioeconomics/ Environmental Justice (EJ)	*No Alternatives would result in disproportionally high or adverse impacts to Environmental Justice Populations.* All Alternatives will offer mobility benefits to both Environmental Justice populations and populations without automotive access.
Transportation	*All Alternatives improve mobility* and provide quicker access to, from, and through the Study Area.
Air Quality	*All Alternatives may potentially create minor increases in traffic volume* accessing the proposed stops but this would be negated by the benefits of the decrease in traffic from automobile users being diverted to the BRT/premium bus service.
Noise and Vibration	*None of the Alternatives would result in noise or vibration impacts.*
Hazardous Materials	*None of the Alternatives would disturb hazardous materials* as there is limited construction related to implementation of the proposed service.
Open Space and Recreational Resources	*None of the Alternatives would use open space or recreational resources.*
Cultural Resources	*None of the Alternatives would have an adverse effect on historic resources.*
Section 4(f)	*No use associated with a Section 4(f) resource* for the proposed project.
Floodplains	*No adverse effect to the floodplain itself* and no change to the flood risk for adjacent areas would occur as a result of implementation of any of the three Short-List Alternatives.
Water Quality	*No adverse effect to the water quality.* None of the Alternatives would cross or approach a New York State Division of Water water body.
Ecology/Endangered Species	*All Alternatives may affect threatened and endangered species that have been found along roads.* The development of stop sites on presently undeveloped land (including mowed lawn areas) may affect threatened and endangered species that are found in disturbed areas. A detailed habitat and threatened and endangered species survey may need to be completed during the Nassau Hub Transit Initiative's environmental review phase.
Visual Resources	*No adverse impact anticipated* due to the implementation of the Alternatives.

12.1 LAND USE AND NEIGHBORHOOD CHARACTER

The Study Area contains the largest concentration of commercial uses within Nassau County, including a regional mall, hotels, numerous office complexes, and a wide variety of shops, restaurants, and service. Approximately 20 percent of land in the Study Area is dedicated to commercial uses, including Roosevelt Field Mall and land adjacent to Stewart Avenue to the east. Nineteen percent of the land within the Study Area is dedicated to community services, including municipal buildings for Nassau County, the Villages of Mineola, Hempstead, and Westbury, and Nassau Community College. About 32 percent of the total Study Area is dedicated to residential use, including both single-family homes and multi-family apartment buildings. Additionally, the Study Area supports large office parks and has an extensive supply of off-street parking, which represents a significant land use feature in the area. Parking usage throughout the Study Area is difficult to quantify as it varies greatly based on a number of variables, including time of day, season, and use.

To implement the three remaining Short-List Alternatives, no property acquisition that results in residential displacement would be required. All of the Alternatives would add a new transportation service along with new facilities (bus shelters), but the addition of these facilities would not change neighborhood characteristics as similar services are already provided. The BRT would operate within the existing ROW, and bus shelters would be installed on sidewalks that currently serve NICE Bus routes. The development of a new transit service provides access to existing uses and is supportive of existing land use and neighborhood character in the Study Area. Consequently, there would be no significant adverse effects on land use or neighborhood character anticipated with any of the Short-List Alternatives.

12.2 CONSISTENCY WITH PUBLIC POLICY AND PLANS

Studies and analyses regarding communities in Nassau County have identified problems of growing roadway congestion, a limited transit system, slowed population growth, and a need for additional economic growth. Additionally, these studies suggested strategies for directing growth to existing downtowns and targeted development areas, including the Study Area, as well as encouraged the use of public transit as a means of supporting growth without further exacerbating traffic congestion.

Recent and current public policies and plans are setting the foundation to transition the Study Area's future land use patterns from single-use, automobile-dependent developments to mixed-use developments that are higher density, more transit- and pedestrian-friendly, and provide connections to multi-modal transit centers. Nassau County's Shared Mobility Management Plan will identify opportunities for introducing new and enhanced mobility services to complement and extend the reach of existing transit services, such as NICE Bus, and to address long standing gaps in the transportation network.[82] The Town of Hempstead's Energy and Sustainability Master Plan looks to enhance its residents' quality of life by pursuing plans and programs that support sustainable energy use and protecting sensitive natural habitats.[83] The County, in coordination with the current leaseholder of the Nassau Coliseum site, are exploring new development opportunities for the site.

82 https://www.nassaumobility.com/
83 https://hempsteadny.gov/778/Energy-Sustainability-Master-Plan

Additionally, the Village of Westbury is continuing to redevelop its downtown to support more TODs.[84]

All Short-List Alternatives are supportive of the long-range vision for Nassau County's land use and economic development described in the County's Draft Master Plan, and the Shared Mobility Management Plan.[85] All Alternatives would support the Town of Hempstead's Energy and Sustainability Master Plan and the redevelopment of the Nassau Coliseum site. All Alternatives would also support the Village of Westbury's downtown redevelopment. All Short-List Alternatives can be considered consistent with the mobility goals of locally adopted plans.

12.3 SOCIOECONOMICS/ENVIRONMENTAL JUSTICE

Nassau County is home to vulnerable and underserved populations that may rely more heavily on public transportation to travel to school, work, medical appointments, and social or recreational activities, even if their household has access to a car. In addition to non-choice riders who do not have access to a private vehicle, differently abled persons, persons with limited English proficiency, and persons younger than 18 and older than 65 may all rely more on public transportation. Within vulnerable and underserved populations are also minority and low-income populations, which together comprise EJ communities. For the purposes of this EJ analysis, EJ communities are identified as census tracts with minority and/or low-income populations above the U.S. Census Bureau American Community Survey 2019 5-Year Estimates for Nassau County. Overall, approximately 40 percent of the population of Nassau County identifies as a minority (identified as Hispanic/Latino, Black/African American, American Indian/Alaska Native/Asian, or some other race) and 5.6 percent of the population has an income below the poverty level. Nine census tracts surrounding the Main Line Connection alignments to Westbury have been identified as EJ communities where the percentage of population is above the county average for populations identifying as a minority and/or living below the poverty level.

While automobile availability is not universally identified as a measure of potential lower-income status, in suburban areas that are typically more automobile-dependent than are areas such as Manhattan, lack of access to an automobile is also considered a reliable indicator of economic status, particularly when viewed in terms of other demographic data. The Study Area contains more households without access to vehicles as compared to Nassau County. Based on the 2019 American Community Survey 5-Year Estimate, 13 percent of households in the Study Area do not own vehicles, while just 7 percent of households in Nassau County do not own vehicles. Generally, households without vehicles are concentrated in Hempstead and Westbury where EJ communities with minority and low-income populations are also located.

None of the Short-List Alternatives would result in disproportionally high or adverse environmental effects, including human health, economic, and social effects, on minority and low-income communities. It is anticipated that the bus vehicles operated for the service would be battery electric, which would eliminate pollution from the operation of the service. All Alternatives would improve mobility and reduce or slow the growth of congestion by providing a viable Alternative to driving.

84 https://www.ny.gov/downtown-revitalization-initiative/long-island-westbury
85 https://www.nassaucountyny.gov/2872/Master-Plan

All Alternatives would offer mobility benefits to both EJ populations and populations without automotive access as they connect to areas with employment, education, retail, and other transportation modes.

12.4 TRANSPORTATION

The majority of residents that live in the Study Area commute to work using a private automobile. According to the 2019 American Community Survey 5-Year Estimate, 62 percent of workers drive alone to work, 9 percent carpool, 18 percent take public transportation, 1 percent take a taxi or bike, 5 percent walk, and 3 percent work from home. There is no direct LIRR service to many parts of the Study Area. The reliance on automobiles is further reinforced by current land use patterns, and residential neighborhoods, commercial stores, and other land uses are typically separated by major roads, vast surface parking areas, or areas with little or no transit access.

The Study Area experiences significant traffic congestion. All three Alternatives would travel along congested roadways and through congested intersections. Based on the New York State Traffic Data Viewer, many of the roadways where the Alternatives travel have an annual average daily traffic between 25,000 and 75,000. Roadways such as Stewart Avenue and Merrick Avenue have the highest annual average daily traffic compared to other roadways that serve the Alternatives. Despite the congestion levels, it is expected that implementing any of the Short-List Alternatives would improve mobility and reduce or slow the growth of congestion by providing a viable Alternative to driving, with frequent transit service to major trip Attractors and Generators. There is a risk that the Short-List Alternatives could potentially create minor increases in traffic volumes when accessing the proposed new stops, but the introduction of new transit in the area would increase the number of people moving in, out, and through the area at a faster rate than under current conditions, which would be a benefit.

Nassau County maintains information regarding on- and off-road bike lanes in the County. All Alternatives are adjacent to existing on- and off-road paved bike lanes within the Study Area. Two specific bike lane networks are located within the Study Area. The first is the Nassau Hub Trail Network which is composed of primarily off-road bike infrastructure, with the exception of the on-road bike lane on James Doolittle Boulevard. This infrastructure provides access to Hofstra University, Nassau Community College, the Nassau Coliseum site, and other uses in the Nassau Hub area. The second network is the Long Island Motor Parkway Trail network, which serves Eisenhower Park in the eastern portion of the Study Area. This infrastructure is all off road and would be supported by the Short-List Alternatives that would work to extend the reach of fixed transportation services.

All Short-List Alternatives improve mobility and slow the growth of congestion by providing transportation service to major activity centers within the Study Area, which will help to reduce the reliance on private automobiles. All Alternatives may make minor increases in traffic when accessing new stops. However, the increase of transit options within the area helps to increase the number of people moving in, out, and through the Study Area at a faster rate than under the current condition, thus creating a transportation benefit. All Alternatives would support connections to Alternative modes of transit such as biking.

12.5 AIR QUALITY

Nassau County has been designated as a non-attainment area for ozone and a maintenance area for particulate matter and carbon monoxide. All three Short-List Alternatives may help slow the growth in total VMT and, consequently, mobile-source pollutant emissions. Potential delays associated with signal priority for the transit service can be mitigated by adjusting signal control parameters. A traffic analysis, completed as part of the environmental work occurring in the Project's next phase, will analyze this issue in further detail. If typical compressed natural gas buses are used for the service, emissions would be generated. However, it is anticipated that the service would use battery electric buses, which would reduce particulate matter and carbon monoxide emissions. Although all three Alternatives could potentially create minor increases in traffic volume accessing the proposed stops, leading to some potential air quality degradation, this impact would likely be negated by the benefits of the decrease in traffic from automobile users being diverted to the new transit service.

12.6 NOISE AND VIBRATION

Noise-sensitive receptors in the Study Area that would be affected by all Alternatives are located primarily in the Hamlet of Uniondale and the Village of Westbury. The engine noise associated with buses is the only notable sound introduced with the Alternatives. The noise is not excessively loud; the consideration related to noise is the frequency of the noise, or how "annoying" the noise is, and whether the alignments would bring the noise closer to sensitive receptors. In terms of the latter, the alignments for all three Alternatives travel within existing roads for their routes. None of the Alternatives would bring a source of noise closer to a sensitive receptor than existing sources of noise (e.g., traffic on existing streets). Bus engine noise is currently audible at receptors on all roads that are proposed to be traversed by the Alternatives. The addition of new bus noise would not change the noise environment of the Study Area, but it may result in more frequent noise events.

No vibration impacts are anticipated with any of the Alternatives because the vehicles proposed are not generators of noticeable vibration.

12.7 HAZARDOUS MATERIALS

None of the Short-List Alternatives would disturb hazardous materials because there is limited construction related to implementation of the proposed transit service. All three Alternatives would require a maintenance facility, which would handle any hazardous materials in accordance with all applicable local, state, and federal requirements. Therefore, no hazardous materials impacts are anticipated as a result of any of the Alternatives.

12.8 OPEN SPACE AND RECREATIONAL RESOURCES

The implementation of any of the Short-List Alternatives would not result in impacts to open space or recreational resources. Nassau County's Department of Parks, Recreation, and Museums (Parks Department) identifies parks by the following categories: Active Parks, Passive Parks, Recreation, Preserves, and Campgrounds. The Parks Department also has jurisdiction over museum properties.

Museums are included in this screening assessment because they are open to the public, funded in part by public money, and serve as recreational resources. Eisenhower Park, located on the eastern edge of the Study Area, is managed by Nassau County. Additionally, the Hempstead Plains Preserve (Francis Purcell Preserve) is located within the boundaries of Nassau Community College within the Study Area. This preserve is owned by Nassau County and is managed by the non-profit organization Friends of Hempstead Plains Preserve.

12.9 CULTURAL RESOURCES AND SECTION 106

The cultural resource screening used readily available data obtained through a review of New York State's Cultural Resource Information System. Within the Study Area there are a number of buildings or building areas listed under New York State's Register of Historic Places and the National Register of Historic Places, as well as eligible and undetermined buildings. These sites are considered a Section 106 Resource. Historic resources are protected under federal law through Section 106 of the National Historic Preservation Act of 1966, as amended. All of the Short-List Alternatives have the potential to affect these historic places. More specifically, Alternatives 5, 6, and 7 have the potential to affect a religious institution, which is currently listed as undetermined in the New York State Cultural Resource Information System, at 85 Post Avenue in the Village of Westbury. Both Alternative 6 and 7 have the potential to affect the Mitchel Air Base and Flight Line, which also contains buildings that are listed in the National Register of Historic Places for historic uses related to national defense and transportation (aviation). All Short-List Alternatives, however, would not alter the historic structures or change their settings or viewsheds as all the Alternatives would remain on existing roadways adjacent to the historic sites, and bus shelters would remain on the existing transportation ROW. Therefore, it is unlikely that any of the Alternatives would have an adverse effect on the historic resources within the Study Area and would result in a *de minimis* impact to the historic structures or their viewsheds.

12.10 SECTION 4(F)

Section 4(f) requires consideration of any prudent and feasible Alternatives to the use of the Section 4(f) resources and prohibits the use of public funds for a project Alternative that would result in the use of a Section 4(f) resource if other prudent and feasible Alternatives exist. The Mitchel Air Base and Flight Line is considered a Section 4(f) resource. However, given that all Short-List Alternatives would operate on the existing roadways, there would be no use associated with a Section 4(f) resource for the new transit service.

12.11 FLOODPLAINS

One floodplain area has been identified in the Study Area; it is associated with the Hempstead Plains Preserve near Nassau Community College and the Meadowbrook State Parkway. This area is designated Federal Emergency Management Agency Flood Zone A, which means it is subject to a 1 percent annual chance of inundation (100-year flood zone). Only Alternative 7 would pass near the flood zone. As no improvements are proposed within the flood zone area, no adverse effect to the floodplain itself and no change to the flood risk for adjacent areas would occur as a result of implementation of any of the three Short-List Alternatives.

12.12 WATER QUALITY

The Study Area is located over a U.S. Environmental Protection Agency-designated Sole Source Aquifer known as the Nassau-Suffolk Aquifer System. The aquifer underlies all of Long Island, providing drinking water within the Study Area, as well as all of Nassau and Suffolk Counties. In addition, the Carle Place Water District operates a well field north of Old County Road adjacent to the east side of the Meadowbrook State Parkway. The well field supplies much of the potable drinking water for the Study Area.

All three Short-List Alternatives are alike in their potential to affect water quality. None of the Alternatives would cross or approach any New York State Division of Water water body. While the routes would cross over the Nassau-Suffolk Aquifer System, construction activities proposed in conjunction with the development of any of the Alternatives' infrastructure would not require excavation or dewatering to the extent that the aquifer would be affected.

12.13 ECOLOGY/ENDANGERED SPECIES

The U.S. Fish and Wildlife Service identified six threatened and endangered species known to occur within Nassau County; however, most of these species are associated with shoreline habitats and are found in and around the northern and southern shorelines of Long Island. The habitat areas supporting these species do not extend into the Study Area with the exception of the northern long-eared bat and the sandplain gerardia, the only plant on the U.S. Fish and Wildlife Service Threatened and Endangered Species list for the whole of New York State. The northern long-eared bat is found in 37 states and eight providences in North America and is typically found in forested habitats. The sandplain gerardia is found only at Sayville, the Hempstead Plains Preserve, and Montauk. Hempstead Plains Preserve, the preserved area within the boundary of Nassau Community College, is within the Study Area.

The New York State Department of Environmental Conservation maps the location of habitat communities of concern, areas known to support a diversity of plants and animals, many of which may be threatened or endangered. The Hempstead Plains Preserve grassland and Eisenhower Park are the only such areas identified within the Study Area.

Additionally, the New York State Natural Heritage Program provides data on state-listed species of concern. A search for threatened, endangered, or state-concern species in early 2023 identified 30 animal and 186 plant species that may be found within Nassau County. The habitats identified for the listed species were compared to the land cover, land forms, and known geology of the Study Area to determine the likelihood that the species occur in the Study Area.

Most of these species are most likely to be found in the Hempstead Plains Preserve or Eisenhower Park, neither of which would be affected by any Alternative. However, some listed species may occur in other locations within the Study Area that may be affected by all of the Alternatives, such as several plant species or northern long-eared bats that have been found to inhabit roadway rights-of-way and trees in roadway rights-of-way. The northern long-eared bat is the only animal species that may occur in the portions of the Study Area directly affected by all of the Alternatives. All three Alternatives are alike in that they may affect threatened and endangered species that

have been found along roads. The development of stop sites on presently undeveloped land (including mowed lawn areas) may affect threatened and endangered species that are found in disturbed areas. A detailed habitat and threatened and endangered species survey may need to be completed during the Nassau Hub Transit Initiative's environmental review phase.

12.14 VISUAL RESOURCES

The Study Area is generally characterized as densely developed, with a mix of historic and modern residential, commercial, and government structures, and a roughly gridded street network throughout. The Study Area also includes former military bases, such as Mitchel Air Field and Flight Line, which include open spaces and more recent development. The eastern side of the Study Area is predominantly commercial, with single-family residential development and classic downtown landscapes around the downtown of the Village of Westbury.

Visual resources for which intrusion in the form of new transit infrastructure may result in notable changes to their viewshed include portions of Nassau Community College, the historic district that previously served as Mitchel Air Field and Flight Line, and Eisenhower Park.

The Short-List Alternatives would not require new infrastructure that does not already exist in association with other transit services already operating within the Study Area. None of the visual changes with any of the Short-List Alternatives are anticipated to result in significant impact.

13 Public and Agency Involvement

A Public Involvement Plan was prepared for the Nassau Hub Transit Initiative that outlines the procedures to engage pertinent agencies, municipalities, stakeholder representatives, and the general public throughout the AA process. To accomplish the Nassau Hub Transit Initiative's public involvement goal of providing open and transparent communication about the AA Update, the following objectives were established:

- Establish means to reach out to and facilitate information-sharing with the public throughout the AA update process.
- Use the process to inform decisions related to goals, objectives, and Alternative selection.
- Educate the public and elicit public comments and suggestions regarding existing and potential issues within the Hub area, potential Alternatives for addressing them, and other study aspects.
- Employ outreach techniques that will allow for collection and coordination of public communication and comments in a manner that allows for the meaningful consideration of agency, stakeholder, and public input.
- Reach out to groups that have been historically underrepresented, such as EJ communities, minorities, Spanish-speaking residents, low-income residents, seniors, youth, and the disabled.

13.1 TECHNICAL ADVISORS

Technical Advisors provide topic-specific and technical input and play a vital part towards designing and implementing the project. Typically, Technical Advisors are representatives from municipal, county, and federal agencies and select service providers operating within the immediate Study Area. The potential group of Technical Advisors defined for the Nassau Hub Transit Initiative (including for future design phases) are listed in Table 13-1. Collectively, the Technical Advisors comprise a Technical Advisory Committee, and the County has held a variety of meetings throughout the Project to meet with selected Technical Advisors as a group or one-on-one.

Table 13-1: Technical Advisors

Technical Advisors	Participants (Including Potential Future Participants)
	• Federal Transit Administration Region 2 • Nassau Inter-County Express Bus • Metropolitan Transportation Authority • Long Island Rail Road • New York State Department of Transportation Region 10 • New York Metropolitan Transportation Council • PSEG Long Island • Commissioners (or staff representatives) from key departments in the relevant Villages, Towns, County (i.e., Planning, Economic Development, Engineering, Fire, Police) • New York State Historic Preservation Office • Other potential participants: Federal Highway Administration, New York State Department of Environmental Conservation, Environmental Protection Agency

Nassau County solicited input from Technical Advisory Committee participants throughout the AA Update process and used that input to refine alignment Alternatives. Regular meetings occurred with FTA Region 2 and NICE Bus, and representatives from MTA, LIRR, NYSDOT Region 10, NYMTC. Nassau County Commissioners were asked to provide input as needed. In late 2022, representatives from FTA Region 2, NYSDOT Region 10, NICE Bus, MTA, and LIRR were invited to join a stakeholder meeting that occurred on January 10, 2023, and focused on reviewing the Alternatives proposed to create a connection to the LIRR Main Line at the Village of Mineola or the Village of Westbury.

- Nassau County Department of Public Works – Meetings held on 6/16/20, 4/6/21, and 3/10/22
- FTA Region 2 – Meetings held on 8/26/20, 12/2/20, 4/21/21, 7/25/22, and 2/14/23
- NICE Bus – Meetings held on 10/20/20, 12/9/20, 4/6/21, 12/21/22, 2/17/23, and 3/10/23
- Village of Westbury – Meetings held on 10/5/21, 8/8/22, and 12/5/22
- LIRR – Meeting held on 8/22/22

13.2 STAKEHOLDERS

Stakeholders help support the project and achieve consensus between (potentially differing) interest groups. As part of the Nassau Hub Transit Initiative, stakeholders were engaged at key points in the AA Update process and asked to offer feedback on how alignment Alternatives could better service their constituents and the general public. Stakeholders included representatives from local and regional business organizations, institutions, community and environmental groups, and other civic entities, as well as elected officials and governmental entities (not represented as a Technical Advisor). Table 13-2 provides a list of the potential participants identified for various stakeholder subgroups.

Table 13-2: Stakeholder Subgroup

Stakeholders Subgroups	Participants (Including Potential Future Participants)
Regional Advocacy, Research, & Business Associations	• Vision Long Island, Tri-State Transportation Campaign, Long Island Builders Institute, Regional Plan Association
Local Community & Civic Organizations	• Central Garden City Property Owners Association, Hempstead Heights Civic Association, Uniondale Community Council
Local & Regional Chambers of Commerce	• Garden City Chamber of Commerce, Nassau Council of Chambers of Commerce, Town of Hempstead Chamber of Commerce
Regional Destinations in the Hub **Major Property Owners in the Hub**	• Nassau Veterans Memorial Coliseum, Hofstra University, Nassau Community College • Las Vegas Sands, RXR Realty, Simon Property Group, National Grid, Long Island Power Authority, PSEG Long Island
Local Outreach & Environmental Justice (EJ) Community Groups	• Long Island Cares, Island Harvest
Elected Officials & Non-Technical Advisory Governmental Entities	• Villages, towns, and associated agencies within Study Area • Pertinent Nassau County Legislative Districts, New York State (NYS) Assembly Districts, NYS Senate Districts, U.S. House Districts, U.S. Senators • Empire State Development Corporation, Long Island Regional Planning Council, Long Island Regional Economic Development Council

A meeting with selected stakeholder groups focusing on the addition of a connection to the LIRR Main Line was held on January 10, 2023. Stakeholder groups invited to this meeting included the Village of Hempstead, Village of Westbury, Nassau Community College, Hofstra University, Nassau County District 2 Legislator Siela A. Bynoe, Nassau County District 13 Legislator Thomas McKevitt, Nassau County District 14 Legislator Laura Schaefer, Vision Long Island, and the Tri-State Transportation Campaign.

Key points raised by stakeholders included:

- Concern regarding benefits to the villages that are connecting to the LIRR Main Line and the Nassau Hub. There is concern that these villages (such as Mineola), will bear the brunt of traffic, congestion, and construction for little benefit.
- Concern as to whether Alternative 2 to the Village of Mineola uses the County's ROW and could lead to removal of County employee parking spaces.
- Questions related to if the IOS alignment to the Village of Hempstead is finalized.
- Questions about ridership numbers and how well these routes serve students and workforce along the routes, particularly transit-dependent workers.
- Comments on potential equity outcomes that may result by improving access to jobs/medical/education opportunities.
- Location of micro-mobility hubs (e.g., bike and scooter shares) as well as how they relate to the stop locations.

- Questions about each Alternative's routes and stops, including how many stops are on the routes and if gaps between major destinations are served.
- Requests to learn more about the schedule for service and timeframes for operation.

Meeting attendees were advised that the LPA would be selected through a formal AA. Nassau County responded to comments provided during the stakeholder meeting and followed up directly with individual stakeholders regarding specific questions. The questions and comments provided during the stakeholder meeting can be found in the Appendix.

13.3 PUBLIC ENGAGEMENT

While the stakeholders represent the interests of many people and organizations, opportunities were also provided for the general public to give feedback and ask questions. A virtual public meeting was held on January 18, 2023. At this meeting, the general public was provided the opportunity to learn about the updated project and provide comments, questions, concerns, and support for the updated alignment and connection to the LIRR Main Line. The virtual public meeting included a presentation from Nassau County that reviewed the project background, provided updates on the IOS Phase One, and outlined the alignment Alternatives for the Main Line Connection. The meeting included a question-and-answer portion for the general public via the chat function of the virtual public meeting. In addition, the general public also had the opportunity to view the public presentation and submit questions or comments via the Project's website until February 1, 2023.

The virtual public meeting discussed the strategic role of the Nassau Hub area by providing local context and identifying the defining characteristics of the Study Area and related challenges such as automobile-dependent development patterns, traffic congestion, and lack of transit choices. The meeting outlined the Goals and Objectives of the Nassau Hub Transit Initiative, including identifying realistic and practical travel options, enhancing mobility and supporting transit equity, supporting sustainable and transit-friendly land use patterns and economic development, increasing quality of life while minimizing adverse environmental impacts, and supporting sustainable parking strategies. The meeting reviewed the outcome of the 2014 BRT work to identify the IOS. The meeting also reviewed the proposed Main Line Connection Alternatives and reviewed the Recommended Long-List of Alternatives.

Following the presentation, the Project Team held a question-and-answer session with meeting attendees. The questions and comments provided by the public during the comment period can be found in the Appendix.

13.4 WEBSITE

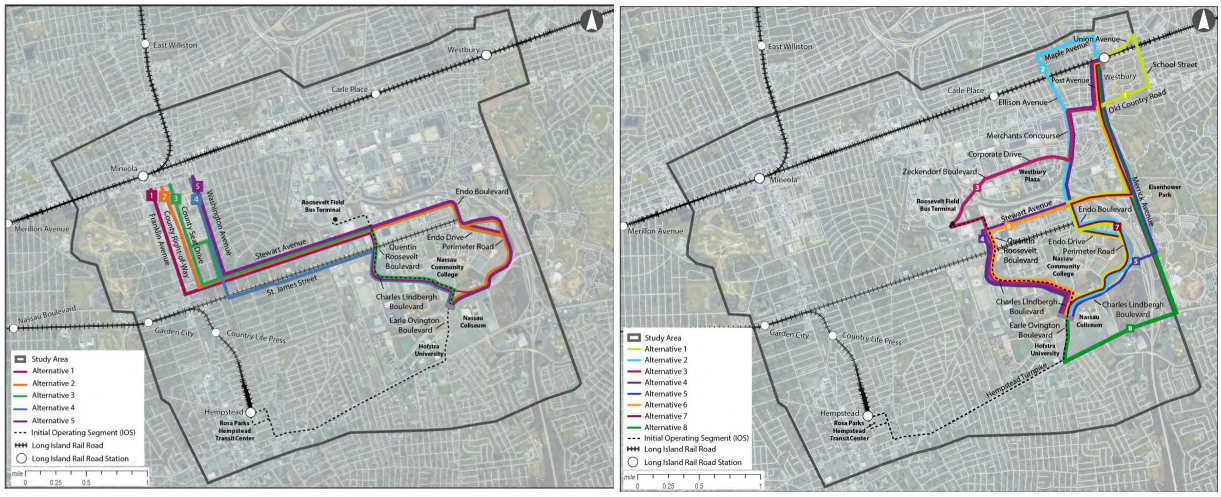
The Nassau Hub Transit Initiative website (www.nassauhubtransit.com) serves as a repository to provide the public with notification of all related meetings and events on the study and access to downloadable versions of materials developed for public distribution. Materials posted on the website, to date, include an overview of the study, meeting presentations, notices of public meetings, and contact information. The website includes an area to accept public comment. Once the AA Update for the Main Line Connection has been published, the project website will include the AA

report, maps, and documents, as well as a section with responses to Frequently Asked Questions. All materials and information on the website have been kept up to date during the Study. The website includes a translation tool for several languages, including Spanish.

14 Short List Alternatives – Screening Results and Locally Preferred Alternative

From the 13 Long-List Alternatives developed to connect the Nassau Coliseum site to the LIRR Main Line (five going to the Village of Mineola and eight going to the Village of Westbury), seven Alternatives (three to Mineola and four to Westbury) were advanced through the Long-List Screening as feasible BRT Alternatives meeting the Goals and Objectives established for the first tier of screening (see Figure 14-1).

Figure 14-1: Long List Alternatives to the Village of Mineola (Left) and the Village of Westbury (Right)



These seven Alternatives, known as the Refined Long-List Alternatives, were further analyzed in the Refined Long-List Screening against the Goals and Objectives established for the second tier of screening (see Figure 14-2). Based on the analysis completed in the Refined Long-List Screening and the stakeholder and public outreach conducted by Nassau County, three Alternatives connecting to the Village of Westbury were advanced as Short-List Alternatives (see Figure 14-3).

Main Line Connection Alternatives to the Village of Mineola were not advanced to the third tier of screening as coordination with key decisionmakers did not proceed far enough to advance Alternatives as realistic connections between the key Attractors and Generators in the Study Area. In the future, Nassau County may choose to proceed with further developing a Main Line Connection to the Mineola LIRR station and may utilize the findings in the Long-List and Refined Long-List Screenings as a basis for Mineola Alternatives.

Figure 14-2 Refined Long List Alternatives to the Village of Mineola (Left) and the Village of Westbury (Right)

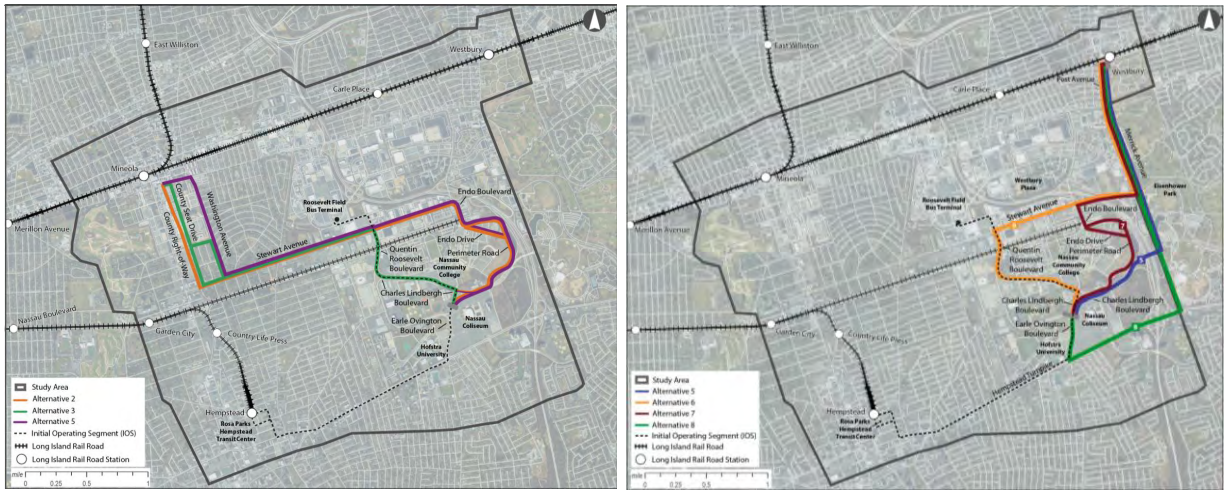


Figure 14-3 Short List Alternatives

Based on the Alternative development and screening evaluation results summarized in Sections 4 and 5 and the reflecting stakeholder and public input summarized in Section 13, the Short-List Alternatives were evaluated in the final phase of the three-tier screening evaluation process called the Short-List Screening. The purpose of the Short-List Screening was to comparatively evaluate the three remaining Alternatives against a set of criteria and evaluation measures directly related to the AA Update's Goals and Objectives, which, in turn, relate to the Purpose and Need for transit improvement in the Study Area and the underlying transportation related problems identified in the Study Area. The three remaining Alternatives include:

- **Alternative 5** – This Alternative connects the Nassau Coliseum and future development at the site, Eisenhower Park, and the Westbury LIRR station via Post Avenue/Merrick Avenue, and Charles Lindbergh Boulevard.

- **Alternative 6** – This Alternative connects the Nassau Coliseum and future development at the site, Nassau Community College, Museum Row, Eisenhower Park, and the Westbury LIRR station via Post Avenue/Merrick Avenue, Stewart Avenue, and Quentin Roosevelt Boulevard.

- **Alternative 7** – This Alternative connects the Nassau Coliseum and future development at the site, Nassau Community College, Eisenhower Park, and the Westbury LIRR station via Post Avenue/Merrick Avenue, Stewart Avenue, Endo Boulevard/Endo Drive, Perimeter Road, and Charles Lindbergh Boulevard.

Table 14-1 summarizes the Short-List Alternatives screening goals, objectives, evaluation criteria and evaluation measures used. Goals 1, 2, and 4 and their corresponding objectives were chosen as appropriate measures because their associated evaluation criteria would be able to refine the Short-List Alternatives to an LPA.

Table 14-1: Short-List Screening Goals, Objectives, Evaluation Criteria, and Evaluation Measures

Goal	Objective	Evaluation Criteria	Evaluation Measure
GOAL 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.	Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible.	Does the Alternative maximize capital work and transit benefits implemented in previous phases of the Nassau Hub Transit Initiative?	Percentage of route that utilizes the Initial Operating Segment (IOS) Phase Two alignment
	Increase public transportation options and use as a means of access to, from, and within the Study Area.	Total transit trips to, from, and within the Study Area should be maximized.	Number of Transit Trips on the Project
			Number of New Transit Trips
GOAL 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.	Develop an Alternative that will have a capital cost that is consistent with anticipated financial resource.	Total capital cost (2019$)*	Total capital cost
	Develop an Alternative that will have operating and maintenance (O&M) costs that can feasibly be funded with state and local resources.	Annualized O&M cost (2019$)	Total Annualized O&M cost
	Develop an Alternative that will have operating and maintenance (O&M) costs that can feasibly be funded with state and local resources.	Annualized O&M cost per trip should be minimized.	Annualized O&M cost per trip
	Develop an Alternative that is capable of being funded for operation through traditional or Alternative/innovative funding mechanisms.	Projected ratio of farebox recovery & operating subsidy should be maximized relative to projected operating costs.	Projected ratio of farebox recovery

Goal	Objective	Evaluation Criteria	Evaluation Measure
GOAL 4: Develop transit improvements that enhance quality of life and promote sustainability.	Use transit as part of a regional approach to address congestion related air quality concerns and regional air quality conformity; mitigate greenhouse gas (GHG) emissions; and mitigate overall energy consumption for trip making.	Reduction in air pollutants, GHG emissions and annual energy consumption based on reduction in vehicle miles traveled (VMT) should be maximized.	Reduction in Private Automobile VMT compared to the No Build Scenario

Note: *Based on a review of the cost of procuring battery electric buses as part of the Lo-No/ Bus and Bus facilities grant in 2021

Subsequent to the stakeholder and public outreach that occurred in January 2023, the Main Line Connection Alternatives connecting to the Westbury LIRR station were refined to include one operational variation, which assumed that the IOS Phase 1 premium bus service would be implemented before the Main Line Connection BRT service. Referred to in this document as Operational Variation A (A), this variant would operate the Main Line Connection BRT service and continue the operation of the near-term IOS Phase One premium bus service. Listed below are the Main Line Connection Alternatives and operational and physical variations considered as part of the Short-List Screening:

- Alternative 5
- Alternative 5A
- Alternative 6
- Alternative 7
- Alternative 7A

The Short-List Alternatives screening criteria and evaluation measures are presented in Table 14-2 and organized by the related Goals and Objectives. Following the screening evaluation against these criteria and evaluation measures, the Short-List Alternatives were assessed based on their ability to meet the Goals and Objectives.

Table 14-2: Short-List Screening Results

Goal	Objective	Evaluation Criteria	Evaluation Measure	Alternative 5	Alternative 5 A	Alternative 6	Alternative 7	Alternative 7 A
GOAL 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.	Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible	Does the Alternative maximize capital work and transit benefits implemented in previous phases of the Nassau Hub Transit Initiative?	Percentage of route that utilizes the Initial Operating Segment (IOS) Phase Two alignment	Medium - Alternative 5 utilizes 5 miles of the 7.4-mile 2014 Initial Operating Segment (67%). This includes utilization of dedicated right-of-way (ROW) and transit signal priority on Hempstead Tpk and Earle Ovington Blvd.	Medium - Alternative 5 utilizes 5 miles of the 7.4-mile 2014 Initial Operating Segment (67%). This includes utilization of dedicated ROW and transit signal priority on Hempstead Tpk and Earle Ovington Blvd. --- Operationally, first phase IOS service could continue to operate alongside this Alternative. Alternative 5 service would maximize the capital work identified for the IOS service for 5 miles until the intersection of Charles Lindbergh Blvd and Earle Ovington Blvd. The first phase IOS service would diverge from Alternative 5 at Charles Lindbergh Blvd and Earle Ovington Blvd and Roosevelt Field Bus Terminal and continue to Roosevelt Field Mall. Operating two services, however, may affect ridership on both services.	**High – Alternative 6 utilizes 7 miles of the 7.4-mile 2014 Initial Operating Segment (95%). This includes utilization of dedicated ROW and transit signal priority on Hempstead Tpk, Earle Ovington Blvd, and Charles Lindbergh Blvd.** --- **Operationally, IOS Phase One service would not continue to run in parallel with this Alternative. Alternative 6 would truncate first phase IOS service at Stewart Avenue. Service to/from Roosevelt Field Mall would be served by existing Nassau Inter-County Express (NICE) Bus service. Alternative 6 would maximize the capital work identified for the IOS (as identified in Section 6.1) service for 7 miles. Additionally, the service may benefit from not splitting the service between the Main Line terminus and the Roosevelt Field terminus.**	Medium - Alternative 7 utilizes approximately 5 miles of the 7.4-mile 2014 Initial Operating Segment (67%). This includes utilization of dedicated ROW and transit signal priority on Hempstead Tpk and Earle Ovington Blvd.	Medium - Alternative 7 utilizes approximately 5 miles of the 7.4-mile 2014 Initial Operating Segment (67%). This includes utilization of dedicated ROW and transit signal priority on Hempstead Tpk and Earle Ovington Blvd. --- Operationally, first phase IOS service could continue to operate alongside this Alternative. The first phase IOS service would maximize the capital work identified for the IOS service for 5 miles until the intersection of Charles Lindbergh Blvd and Earle Ovington Blvd. The first phase IOS service would diverge from Alternative 7 at Charles Lindbergh Blvd and Earle Ovington Blvd and Roosevelt Field Bus Terminal and continue to Roosevelt Field Mall. Operating two services, however, may affect ridership on both services.
Increase public transportation options and use as a means of access to, from, and within the Study Area.	Total transit trips to, from, and within the Study Area should be maximized.	Projected Annual Transit Trips On the Project	1,375,920	N/A	**1,790,256**	1,333,800	N/A
		Number of New Transit Trips	391	N/A	**583**	263	N/A

Key: Bold text indicates highest ranking Alternative per evaluation measure

Goal	Objective	Evaluation Criteria	Evaluation Measure	Alternative 5	Alternative 5 A	Alternative 6	Alternative 7	Alternative 7 A
GOAL 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.	Develop an Alternative that will have a capital cost that is consistent with anticipated financial resource.	Total capital cost (2023$)*	Total capital cost	**$1.742 Million Parameters – 5 stops, 10 intersections with transit signal priority**	$1.742 Million Parameters – 5 stops, 10 intersections with transit signal priority Operationally, if Alternative 5 and IOS Phase One service run in parallel, the service would require14 buses to run in peak service. At this time, the cost of buses is not included in the capital cost of this project because all Alternatives would be served by the existing NICE Bus fleet. Currently, NICE Bus is in the process of procuring battery electric buses as part of their typical yearly fleet purchasing and retiring. It is anticipated that battery electric buses will be utilized on the IOS and as part of the Main Line connection. If it is determined that buses must be procured as part of the project, the cost will be included in the capital cost. The current average cost of a battery electric bus is between $1.2 and $1.5 million per bus.*	$1.914 Million (10% higher than lowest capital cost) Parameters – 7 stops, 10 intersections with transit signal priority Operationally, Alternative 6 service would require 8 buses to run in peak service. At this time, the cost of buses is not included in the capital cost of this project because all Alternatives would be served by the existing NICE Bus fleet. Currently, NICE Bus is in the process of procuring battery electric buses as part of their typical yearly fleet purchasing and retiring. It is anticipated that battery electric buses will be utilized on the IOS and as part of the Main Line connection. If it is determined that buses must be procured as part of the project, the cost will be included in the capital cost. The current average cost of a battery electric bus is between $1.2 and $1.5 million per bus.*	$1.914 Million +(10% higher than lowest capital cost) Parameters – 7 stops, 10 intersections with transit signal priority + Does not include cost estimate for realignment of James Doolittle Blvd/Perimeter Rd/ Charles Lindbergh Blvd. The alignment can be run using the existing roadway configuration.	$1.914 Million +(10% higher than lowest capital cost) Parameters – 7 stops, 10 intersections with transit signal priority + Does not include cost estimate for realignment of James Doolittle Blvd/Perimeter Rd/ Charles Lindbergh Blvd as identified in the 2014 Alternatives Analysis. The alignment can be run using the existing roadway configuration. Operationally, if Alternative 7 and IOS Phase One service run in parallel, the service would require 14 buses to run in peak service. At this time, the cost of buses is not included in the capital cost of this project because all Alternatives would be served by the existing NICE Bus fleet. Currently, NICE Bus is in the process of procuring battery electric buses as part of their typical yearly fleet purchasing and retiring. It is anticipated that battery electric buses will be utilized on the IOS and as part of the Main Line connection. If it is determined that buses must be procured as part of the project, the cost will be included in the capital cost. The current average cost of a battery electric bus is between $1.2 and $1.5 million per bus.*
Develop an Alternative that will have operating and maintenance (O&M) costs that can feasibly be funded with state and local resources	Annualized O&M cost (2023$)	Total Annualized O&M Cost	**$ 7.37 Million $7.356 Million – Buses $10,000 – Shelter O&M (8 bus peak operation, 6 buses off-peak, 5 stops)**	$ 7.37 Million $7.356 Million – Buses $10,000 – Shelter O&M (8 bus peak operation, 6 buses off-peak, 5 stops) Operationally, if Alternative 5 and IOS Phase One service run in parallel, the service would need 14 buses to run in peak service and 10 in off-peak service. The O&M cost for all buses to operate is approximately $12.4 Million.	$ 7.37 Million $7.356 Million – Buses $14,000 – Shelter O&M (8 bus peak operation, 6 buses off-peak, 7 stops)	$ 7.37 Million $7.356 Million – Buses $14,000 – Shelter O&M (8 bus peak operation, 6 buses off-peak, 7 stops)	$ 7.37 Million $7.356 Million – Buses $14,000 – Shelter O&M (8 bus peak operation, 6 buses off-peak, 7 stops) Operationally, if Alternative 5 and IOS Phase One service run in parallel, the service would need 14 buses to run in peak service and 10 in off-peak service. The O&M cost for all buses to operate is approximately $12.4 million.

Note: * Based on a review of the cost of procuring battery electric buses as part of the Lo-No/ Bus and Bus facilities grant in 2021

Key: Bold text indicates highest ranking Alternative per evaluation measure

Goal	Objective	Evaluation Criteria	Evaluation Measure	Alternative 5	Alternative 5 A	Alternative 6	Alternative 7	Alternative 7 A
GOAL 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.	Develop an Alternative that will have an operating and maintenance (O&M) costs that can feasibly be funded with state and local resources	Annualized O&M cost per trip should be minimized	Annualized O&M cost per trip – O&M cost/ Annual number of trips expressed in $	Approximately $5.35	N/A	**Approximately $4.12**	Approximately $5.53	N/A
	Develop an Alternative that is capable of being funded for operation through traditional or Alternative/innovative funding mechanisms.	Projected ratio of farebox recovery & operating subsidy should be maximized relative to projected operating costs.	Projected ratio of farebox recovery – Fare Revenue / O&M cost expressed in a percentage	51%	N/A	**67%**	50%	N/A
GOAL 4: Develop transit improvements that enhance quality of life and promote sustainability.	Use transit as part of a regional approach to address congestion related air quality concerns and regional air quality conformity; mitigate greenhouse gas (GHG) emissions; and mitigate overall energy consumption for trip making	Reduction in air pollutants, GHG emissions and annual energy consumption based on reduction in vehicle miles traveled (VMT) should be maximized.	Reduction in Private Automobile VMT compared to the No Build Scenario	-49,353	N/A	**-447,295**	-33,072	N/A

Key: Bold text indicates highest ranking Alternative per evaluation measure

14.1 SHORT-LIST SCREENING RESULTS

Goal 1: Develop transit improvements that will provide additional realistic and practical travel options to, from, and within the Study Area and help to mitigate congestion on roadways.

Objective: *Develop a transit Alternative that maximizes the use of active or underutilized transportation infrastructure, where feasible. Increase public transportation options and use as a means of access to, from, and within the Study Area.*

Nassau County is planning to begin design on the IOS Phase Two between the Rosa Parks-Hempstead Transit Center and Roosevelt Field Mall. It is anticipated that the Main Line Connection Alternatives will utilize the travel time savings benefits developed for the IOS Phase Two service, which include dedicated bus travel lanes and transit signal priority along the route. A quantitative analysis was performed to determine how much of the IOS alignment (as described in Section 6.1) each of the Main Line Connection Alternatives would use.

Alternative 5 would travel 5 miles of the 7.4-mile IOS, approximately 67 percent of the route. This includes utilization of dedicated ROW and transit signal priority on Hempstead Turnpike and Earle Ovington Boulevard. Alternative 5A would include running Alternative 5 and the IOS Phase One service (as described in 8.1.1), which would increase the total number of buses being operated to 14. Alternative 5A would maximize the capital investment related to the IOS Phase One and Two services.

Alternative 6 would travel 7 miles of the 7.4-mile IOS, approximately 95 percent of the route. This includes utilization of dedicated ROW and transit signal priority on Hempstead Turnpike, Earle Ovington Boulevard, and Charles Lindbergh Boulevard.

Alternative 7 would travel 5 miles of the 7.4-mile IOS route, approximately 67 percent of the route. This includes utilization of dedicated ROW and transit signal priority on Hempstead Turnpike and Earle Ovington Boulevard. Alternative 7A would include the operation of the IOS Phase One service (as described in 8.1.1) running in parallel with Alternative 7, which would increase the total number of buses being operated to 14. Alternative 7A would maximize the capital investment related to the first and second phases of the IOS service.

Alternative 6 would best utilize the travel time savings benefits that would be implemented for the IOS compared to Alternatives 5 and 7. Operationally, Alternative 5A and 7A would also maximize the travel time savings benefits implemented for the IOS by operating both the IOS Phase One and the Main Line Connection services in parallel to maximize capital investment related to the IOS service. However, this would require six additional buses (14 in total).

Objective: *Increase public transportation options and use as a means of access to, from, and within the Study Area.*

Levels of ridership are directly related to the success of a Main Line Connection Alternative as ridership drives farebox revenue and the farebox recovery ratio. Alternative 5 is estimated to have

approximately 1,375,920 annual riders, Alternative 6 approximately 1,790,256 annual riders, and Alternative 7 approximately 1,333,800 annual riders. Out of the three Short-List Alternatives, Alternative 6 would provide the highest annual ridership.

Additionally, new riders are key to growing the bus service. While high ridership numbers can determine the success of a service, shifting existing riders from one service to another can reduce overall cost effectiveness for the bus system. Alternative 5 is estimated to result in approximately 391 new daily riders, Alternative 6 approximately 583 riders, and Alternative 7 approximately 263 riders. Overall, Alternative 6 would provide the highest number of new daily riders.

GOAL 2: Develop transit improvements that will enhance mobility and support transportation equity to, from, and within the Study Area in a cost-effective, innovative manner.

Objective: *Develop an Alternative that will have a capital cost that is consistent with anticipated financial resources.*

The Capital Costs for the Main Line Connection Alternatives are primarily driven by the number of transit signal priority installations and the number of shelters needed for a service. Alternatives 5, 6, and 7 all have 10 intersections where transit signal priority would be-implemented. Alternative 5 has five shelters, two less shelters compared to Alternatives 6 and 7. The capital cost for Alternative 5 is approximately $1,742,401, Alternative 6 is $1,914,739, and Alternative 7 is $1,914,739. Comparably, Alternative 5 has a marginally lower capital cost compared to Alternatives 6 and 7.

Objective: *Develop an Alternative that will have O&M costs that can feasibly be funded with state and local resources*

O&M costs for the Main Line Connection Alternatives are primarily driven by the number of buses in operation and the number of shelters needed for a service. Alternatives 5, 6, and 7 all have the same number of buses operating during peak and off-peak service, with eight buses and six buses, respectively. The O&M cost for buses for all three Short-List Alternatives is the same at $7.356 million.

Alternative 5 would require five new shelters for service. O&M costs for the shelters needed for Alternative 5 are approximately $10,000. The total cost for O&M for Alternative 5 (buses and shelters) is approximately $7.37 million.

Alternatives 6 and 7 would require seven new shelters for service. The O&M costs for the shelters needed for Alternatives 6 and 7 shelters is approximately $14,000. The total cost for O&M for Alternative 6 or 7 (buses and shelters) is approximately $7.37 million.

Comparably, Alternative 5 has a slightly lower O&M cost than Alternatives 6 and 7. However, the cost to operate and maintain the buses are the same across all Alternatives. The costs to operate and maintain the shelters are proportional. Alternative 5 has two fewer shelters than Alternative 6 and 7.

Efficiency indicators such as the annualized O&M cost per trip provide a basis for the cost to operate and maintain based on the projected ridership. The lower the cost of O&M per trip, the more

efficient a service is. Alternative 5 is projected to cost approximately $5.35 per trip, Alternative 6 is $4.12 per trip, and Alternative 7 is $5.53 per trip. Overall, Alternative 6 has the lowest cost of O&M per trip compared to Alternatives 5 and 7.

Objective: *Develop an Alternative that is capable of being funded for operation through traditional or Alternative/innovative funding mechanisms.*

The projected farebox recovery ratio indicates how much fare revenue can be used to fund the O&M of the service. Alternative 5 is estimated to recover approximately 51 percent of its projected O&M cost, Alternative 6 is estimated to recover approximately 67 percent, and Alternative 7 is estimated to cover approximately 50 percent. Overall, Alternative 6 has the highest ratio of farebox recovery.

GOAL 4: Develop transit improvements that enhance quality of life and promote sustainability.

Objective: *Use transit as part of a regional approach to address congestion-related air quality concerns and regional air quality conformity; mitigate GHG emissions; and mitigate overall energy consumption for trip making.*

A reduction in private VMT directly correlates with a reduction in GHG emissions, which helps to improve regional air quality. Both Alternatives 5 and 6 are projected to reduce private automotive VMT in the future. Alternative 5 is projected to reduce private automotive VMT by 49,353 miles per year, Alternative 6 is projected to reduce private automotive VMT by 447,295 miles per year, and Alternative 7 is projected to reduce private automotive VMT by 33,072. Overall, Alternative 6 provides the most reduction in VMT followed by Alternative 5 and Alternative 7.

14.2 EVALUATION RECOMMENDATION AND LOCALLY PREFERRED ALTERNATIVE

Alternative 6 is recommended to be advanced as the LPA. Alternative 6 provides the best balance between travel time savings, connections to Attractors and Generators, and maximization of existing County investment. Alternative 6 would utilize approximately 100 percent of the capital work that is being implemented for the IOS alignment (see Short-List Screening Goal 1). Additionally, the Alternative serves five ridership Attractors and Generators, including two stops that serve Nassau Community College on the north and south side of the campus. This allows for rapid access to Nassau Community College from either the Westbury or Hempstead terminus. Service between the Nassau Hub area and Roosevelt Field Mall would be available via existing NICE Bus service. Alternative 6 also has the potential to connect to four NICE Bus routes and serve four infill residential developments within the Study Area. Alternative 6 also has the highest projected ridership and total new riders compared to Alternatives 5 and 7. This translates to the lowest annualized O&M cost per trip and the highest farebox recovery ratio. Additionally, Alternative 6 is projected to provide the highest reduction in VMT compared to the No Build Scenario.

Comparably, Alternatives 5 and 7, which diverge from the IOS at the intersection of Charles Lindbergh Boulevard and Earle Ovington Boulevard, do not maximize the capital work related to the IOS to the same extent as Alternative 6. Alternatives 5 and 7 serve fewer Attractors and Generators, which impact transit efficiency indicators such as the operations and maintenance cost

per trip or per passenger mile, farebox recovery ratio, and potential reduction of air pollutants related to private automotive VMT. Additionally, both Alternatives 5 and 7 connect to fewer NICE Bus routes than the recommended Alternative 6.

Under Operational Variation A, Alternatives 5A and 7A would run in parallel with the IOS Phase One service to support a connection between the Nassau Hub area and Roosevelt Field Mall. Capital work completed as part of the IOS for the operation of its first phase would continue to be used, which would maintain the connection on the southwestern side of Nassau Community College, Museum Row, and Roosevelt Field Mall. Operating and maintaining both the IOS Phase One and Alternative 5 or Alternative 7 would require 14 buses during the peak period, six more than needed with just the Main Line Connection service included under Alternative 6. The O&M costs for 14 buses is approximately $12.4 million compared to $7.356 million for eight buses. Additionally, running two parallel services may split ridership at the joint stops, which could increase the O&M cost per trip, per passenger mile, and the farebox recovery ratio for both IOS Phase One and Alternatives 5 and 7.

Out of the three Alternatives advanced to the Short-List Screening, Alternative 6 has the operational benefits of Alternatives 5A and 7A at a reduced cost because fewer buses are required to access key Attractors and Generators.

14.3 NEXT STEPS

The Nassau Hub Transit Initiative AA Update was completed to identify the most appropriate transportation improvement for advancement in the Study Area and thereby select the LPA. The selection of an LPA will satisfy FTA requirements for a project to be eligible for federal funds. Nassau County intends to pursue federal Small Starts funds, among other sources, for the design and construction of the Main Line Connection. Accordingly, the next steps for the project include the following:

- Ongoing coordination with the FTA and stakeholders as project development advances.
- Ongoing coordination with the leaseholder and development team of the Nassau County Veterans Memorial Coliseum site (Las Vegas Sands), as it pertains to future development.
- Identifying state and local funding opportunities and working with local entities to refine funding sources.
- Refining project costs as the LPA is developed in more detail during the design phases.
- Completing the environmental review phase of project planning.
- Developing a detailed cash flow analysis and refining the overall financial plans.

Appendix - Public Meeting January 2023 - Summary of Comments and Responses

Table A-1 summarizes comments received and responses given during the public outreach period in January 2023. Unless otherwise noted, all comments were received during the question-and-answer session of the public meeting on January 18th, 2023.

Table A-1: Public Meeting January 2023 - Summary of Comments Received and Responses Given

Comment Number	Comment (as received)	Response
Economic Development		
1	Will the county go forward with development of the Nassau Hub plan even if the casino is not built?	The Project Team is anticipating that redevelopment of the Nassau Veterans Memorial Coliseum Site (Coliseum Site) will occur in the near future. However, the Nassau Hub Transit Initiative (the Project) has independent utility beyond providing a connection to the Coliseum Site. The transit service proposed by the Project will better connect medical, educational, residential, and other essential uses in the surrounding area, while also providing these uses with faster access to a Long Island Rail Road Main Line station.
2	How much more ridership is the proposed casino projected to bring in?	The casino proposal is in its initial stages, and specifics regarding both residential and/or employment numbers resulting from the development are unknown at this time. Once further information is available about development at the Nassau Veterans Memorial Coliseum Site (Coliseum Site), the Project Team will be able to fully analyze ridership for the proposed bus rapid transit Alternatives. The Project Team will also conduct analysis of the impact the casino would have on our proposed service, as the need arises.

Travel Options and Congestion Mitigation		
3	I work at RXR Plaza, directly across Hempstead Turnpike from the Coliseum property. Right now, it is difficult and time-consuming to get onto any main roads, either Hempstead Turnpike via Glenn Curtiss Blvd., or to Merrick Ave., also via Glenn Curtiss. The traffic from 5-5:30 pm is bumper-to-bumper. I am concerned that should the Nassau Hub project be approved, the traffic impact will make getting into and out of RXR Plaza next to impossible. I understand you have developed a mass transit plan, but the truth is that Long Island has a car culture. People who own cars (most LI residents do) will prefer to drive regardless of the transit options available. What are the plans to mitigate the traffic impact and how long will those plans take to come to fruition? Thank you.	As part of the environmental review work that will occur after the selection of the Locally Preferred Alternative for the Main Line Connection, the project will undergo a traffic study to understand potential impacts of extending the Initial Operating Segment to the Long Island Rail Road Main Line. The County plans to begin this environmental review work later this year.
4	Our roadways are currently congested and along with that comes environmental pollution. Will these buses be electric to help mitigate the environmental impact on our communities?	In March 2022, the Nassau County Legislature announced that battery electric buses (BEBs) will serve the Initial Operating Segment identified in the 2014 Alternatives Analysis Report (see the County Legislature press release here: https://www.nassaucountyny.gov/CivicAlerts.aspx?AID=9968). It is anticipated that the Locally Preferred Alternative connecting to the Long Island Rail Road Main Line would also use BEBs.
5	How much increased use of the Nassau Hub and Coliseum is the planning team factoring for with their plan?	The Project Team is anticipating that some redevelopment of the Nassau Veterans Memorial Coliseum Site (Coliseum Site) will occur in the near future. However, the exact scale of the development remains uncertain as of January 2023. Regardless of the development that occurs, the Project to implement bus rapid transit along the Initial Operating Segment with a connection to the Long Island Rail Road Main Line, has independent utility beyond providing a connection to the Coliseum Site. The transit service proposed by the Project will better connect medical, educational, residential, and other essential uses in the surrounding area, while also providing these uses with faster access to a Long Island Rail Road Main Line station. Once further information is available about development at the Coliseum Site, the Project Team will fully analyze ridership for the proposed bus rapid transit Alternatives and adjust any plans as needed.

6	How will it connect to the UBS Arena?	The Project is not proposing a direct connection to the UBS Arena in Elmont (western Nassau County). Existing connections to the UBS Arena will remain as is. This includes connections via the Long Island Rail Road Main Line at the Elmont and Belmont Park stations, and NICE Bus routes n6 and n6X.
7	Does the County propose lifting the bus ban on Stewart Ave?	Nassau County would need to revisit the bus restrictions currently in place on Stewart Avenue if a proposed Alternative using a portion of Stewart Avenue within the Village of Garden City is carried forward as a preferred Alternative to connect to the Mineola Long Island Rail Road station. Such actions would need to be done in coordination with the Village of Garden City. It is important to note that none of the Westbury Alternatives contemplate using the section of Stewart Avenue in the Village of Garden City that restricts buses.
8	You mentioned a shift in public attitude toward mass transit. Hasn't LIRR ridership been sharply down and slow to recover since the pandemic?	The statement regarding a "shift in public attitude" is related to the general desire by younger generations to prioritize public transportation access when considering where they live, work, and socialize, which was identified by various studies prior to the COVID-19 pandemic. Ridership on the Long Island Rail Road and other public transportation systems have continued to recover since the onset of the COVID-19 pandemic, and these systems will continue to play a critically important role in the NY metropolitan region
9	Because a lot of the streets you mention are in Uniondale, will Uniondale get special buses?	Based on the Federal Transit Administration's (FTA) bus rapid transit (BRT) guidelines, any bus used for the BRT service would be specifically branded for this Project. Specific branding has not yet been developed but will be consistent throughout the entire BRT system. Additionally, it is anticipated that the BRT service would use battery electric buses (BEBs) as announced by the Nassau County Legislature in 2022.
10	I vote for Mineola Alt 2!	Noted – thank you.

Enhanced Mobility, Quality of Life, and Sustainability		
11	Can one of the stops be the African American Museum of Nassau County in the Village of Hempstead being that you plan on including Museum Row?	The Joysetta & Julius Pearse African American Museum of Nassau County would be served by the stop at the Rosa Parks-Hempstead Transit Center, which is located approximately two blocks away. The Hempstead Transit Center will be served via the Initial Operating Segment which will tie into the Long Island Rail Road Main Line connection.
12	There is a stigma around busses in Nassau county. Is light rail, that was mentioned in previous iterations, off the table? Is using any of the Hempstead line RoW from Mineola or Hempstead secondary now off the table?	Light rail/modern streetcar was analyzed as part of the 2014 Alternatives Analysis, which sought to connect the Village of Hempstead, the Nassau Veterans Memorial Coliseum Site (Coliseum Site), and the Village of Mineola. While the Locally Preferred Alternative identified in the 2014 Alternatives Analysis report was proposed as a modern streetcar, the Initial Operating Segment was designed as a bus rapid transit (BRT) system to allow for construction and implementation to be faster and less expensive. Given the significant capital cost related to constructing a light rail/modern streetcar system and the potential environmental impacts that light rail/modern streetcar construction may have on the surrounding community, the County is not moving forward with the technology at this time and will instead be focusing on bus rapid transit. The County Right of Way (ROW) is a former Long Island Rail Road rail alignment that parallels Franklin Avenue and is adjacent to Nassau County's government offices in the Village of Garden City. This ROW is one option for a north-south connection to connect to the Mineola Long Island Rail Road Station for Mineola BRT Alternatives. The Garden City Secondary is the section of mostly disused track in the Village of Garden City that connects to Nassau Community College, and is currently owned by the Long Island Rail Road. Use of the Garden City Secondary as an option to create a dedicated east-west right of way connection for the BRT system is not being pursued at this time.
13	Wouldn't activated the old LIRR track in the back of Nassau Community College be a better solution than overwhelming our communities with buses?	The Garden City Secondary, the section of mostly disused track in the Village of Garden City that connects to Nassau Community College, is currently owned by the Long Island Rail Road. Use of the Garden City Secondary as an option to create a dedicated east-west right of way connection for the bus rapid transit system is not being pursued at this time.
14	Thank you for hosting this meeting! Do you have any statistics on the estimated daily ridership for the BRT system?	A ridership estimate was completed for the 2014 Alternatives Analysis. This estimate of ridership on the Initial Operating Segment indicated that daily ridership could range from 3,100 to 5,200 passengers, depending on the development scenario at the Nassau Coliseum Site. As part of the current project work being completed for the Long Island Rail Road Main Line Connection, a new ridership estimate will be generated to understand ridership potential.

15	Mineola connects the Oyster Bay line and the intermodal center in Mineola. it is also in zone 4 for LIRR vs zone 7 for Westbury making it less expensive and more attractive for use. Reposted: I commented before on zone 4 (mineola) vs zone 7 (westbury). Has the $35 additional monthly cost for Zone 7 from Zone 1 LIRR ticket been factored in to the decision to start from Westbury vs Mineola?	As part of the work being completed for the Long Island Rail Road Main Line Connection, a new ridership estimate will be generated to understand ridership potential. This estimate will account for the travel costs associated with the different Long Island Rail Road zones.
16	Hi there! I'm a student at Hofstra University and a frequent NICE rider. There is a high potential for public transit demand at Hofstra for access to essentials and attractions, with roughly half of all students living on-campus, many without cars. How much have you considered transit access for Hofstra students in designing the Alternative lines, and does the committee believe there is future room for transit expansion at Hofstra	The Project Team agrees that providing access to higher education institutions, such as Hofstra University and Nassau Community College, is one of the big benefits of the Initial Operating Segment and connection to the Long Island Rail Road Main Line. Both Hofstra University and Nassau Community College were identified as essential ridership Attractors/Generators, which are crucial locations to be served by the proposed bus rapid transit (BRT) system.
17	Will NICE Bus be part of the BRT?	The bus rapid transit (BRT) system would be folded into the larger NICE Bus system.
18	Have other surface modes such as light rail, or even elevated monorail been considered?	Light rail/modern streetcar was analyzed as part of the 2014 Alternatives Analysis which sought to connect the Village of Hempstead, the Nassau Veterans Memorial Coliseum Site (Coliseum Site), and the Village of Mineola. While the Locally Preferred Alternative identified in the 2014 Alternatives Analysis report was proposed as a modern streetcar, the Initial Operating Segment was designed as a bus rapid transit (BRT) system to allow for construction and implementation to be faster and less expensive. Given the significant capital cost related to constructing light rail/modern streetcar and the potential environmental impacts that light rail/modern streetcar construction may have on the surrounding community, the County is not moving forward with the technology at this time and will instead be focusing on bus rapid transit.
19	Thank you for this presentation. A few questions: Will the PDF for this be posted on the website? If this went ahead as a bus BRT, would NICE (Veolia) be operating this or would it be another vendor potentially? Has NICE been involved as part of this study overall?	The presentation in PDF format was made available on the County's website along with links to provide comments about the presentation via email. The comment period was open from January 18th through February 1st, 2023. The bus rapid transit (BRT) system will be folded into the larger NICE Bus system and will be operated and maintained by NICE Bus's operator.

20	It is expected that trip frequency and timing will be coordinated with LIRR schedules at the selected stations?	During the peak hours, the bus rapid transit (BRT) system could run every 10 minutes; during the off-peak hours, the BRT system could run every 20 minutes. Alternatively, the BRT system could run every 15 minutes during all hours of operation. It is anticipated that the BRT schedule would be timed with the Long Island Rail Road schedule.
21	How often would the buses run?	During the peak hours, the bus rapid transit (BRT) system could run every 10 minutes; during the off-peak hours, the BRT system could run every 20 minutes. Alternatively, the BRT system could run every 15 minutes during all hours of operation.
22	Are these the same routes that the charter buses will be using?	Potential privately-run charter bus routes to the Coliseum site have not yet been identified.
23	Will the buses include bike racks? Is additional bicycle parking planned at major points?	In 2021, NICE Bus announced its Bike & Ride program which installed bike racks on some of its buses, including the n6Xpress, and the n88. NICE continues to evaluate opportunities to expand this program across more of its fleet. Nassau County is also undertaking the Shared Mobility Management Plan (www.nassaumobility.com) to identify opportunities for introducing new and enhanced mobility services to complement and extend the reach of existing transit. These mobility services would improve transportation options for residents, workers, students, and visitors, and populations that are underserved. Shared mobility options can include both bike share and scooter share. The Nassau Hub Transit Initiative Alternatives Analysis Update has incorporated shared mobility options into the analysis of the Alternatives.

24 (Comment Received via Email During the Comment Period)	Have you considered using streetcars/trams/trolleys (all being a form of Light Rail) instead of going with a Bus Rapid Transit (BRT) system? In the following sections, I'm going to go over the benefits and drawbacks with the choice of Light Rail over a Bus Rapid Transit (BRT) system. The benefits of Light Rail over a BRT approach include but aren't limited to: The fleet can (and should) be electrified without the need for (costly) batteries. • Via installing either overhead catenary wires or a third-rail. • Thus no need to stop and charge the batteries, or lack thereof. • Having said that, a tiny battery is recommended for crossing intersections, which is made easier by temporarily disconnecting power. Light Rail vehicles are also longer in length than most buses, while still only needing a single driver. • Meaning less labor required per passenger, thus reducing operating expenses. Light rail has steel wheels against steel tracks. • Compared to buses, which have rubber tires against asphalt. • Less wear and tear, (downtime and maintenance costs). • A reduction in rolling resistance. Or in layman's terms, an increase in energy efficiency, thus reducing fuel/electricity expenses. However, there are some downsides with Light Rail:	In the 2014 Alternatives Analysis, a modern street-car, which would operate similar to light rail, was selected as the locally preferred Alternative and the Initial Operating Segment (IOS) was selected as a bus rapid transit (BRT) system. A BRT system was selected for the IOS due to its ability to be quickly rolled out, the lower level of construction required to implement transit service, resulting in an overall lower capital cost. The IOS and the BRT technology has also been cleared by both New York State's State Environmental Quality Review process and the Federal Transit Administration's National Environmental Policy Analysis review process. At this time, the Nassau Hub Transit Initiative is continuing with the technology identified in the 2014 AA for the IOS.

	Light rail vehicles are less flexible than buses. • If a parked car is stuck in the path, there's no moving around the obstruction. • If a route is closed for maintenance, Light Rail vehicles can't detour around the closure. The capital cost is likely a lot more than a BRT system. • Remember, this goes with a significant reduction in operating expenses vs BRT. In conclusion, please reconsider the selection of transit mode.	
	Other Topics	
25	Will it be union or non-union drivers driving for the brt?	Thank you for your comment, the Project Team cannot comment on NICE Bus's labor practices because it is out of scope of the project.
26	Will this project utilize any state or federal funding, or only county funds? Also, can you specify the cost of the project?	It is anticipated that the Long Island Rail Road Main Line Connection will use a combination of federal, state, and local funding to design and construct the Locally Preferred Alternative.
27	How much would this BRT service cost passengers to ride?	The expected fare for the proposed service is still to be determined. The Project Team recommends that the fare should be an integrated fare, that allows for seamless transfers to other NICE Bus existing services.
28	Labor will it be union or non-union drivers?	Thank you for your comment, the Project Team cannot comment on NICE Bus's labor practices because it is out of scope of the project.
29	What is the timing on Phase II design and implementation?	The Initial Operating Segment Phase II work will begin once funding has been identified.
30	Can we have another one of these meetings using zoom, this app has proven difficult for some. I am receiving many texts about the difficulties some residents are having using Microsoft teams.	Thank you for your feedback. We will take this into consideration for future meetings. For additional information or comments about the project, please email the Project Team at info@nassauhubtransit.com.
31	I would like to suggest that your next virtual meeting be more heavily promoted as I just found out about this meeting by accident. Perhaps Newsday could put it on their cover page a week in advance?	The public meeting was advertised in the local outlet of Patch.com on December 22, 2022, the local outlet of MSN.com on December 22, 2022, LongIsland.com on December 23, 2022, on Nassau County's website and Facebook page, on the Nassau Hub Transit Initiative website, and on NICE Bus's website and Facebook page and Twitter account.