METRO CONNECTOR

Assumptions for Future No-Build Conditions

February 2025

RIPTA

RHODE ISLAND PUBLIC TRANSIT AUTHORITY

Contents

1 Introduction

The Future Conditions Report serves as a critical component of the high-capacity transit alternatives analysis study in Rhode Island, providing a foundation for understanding how demographic, employment, land use, and transportation infrastructure changes will shape transit needs in the study area. By examining expected development trends and planned infrastructure investments, this report helps inform transit planning efforts to ensure efficient and effective service in the coming decades. Following the introduction, this report is structured into three key chapters:

- **Chapter 2: Future Land Use Methodology**
- **Chapter 3: Future No-Build Scenario**
- **Chapter 4: Next Steps**

Each chapter presents critical data sources, methodologies, and findings that contribute to a comprehensive understanding of the future landscape in which high-capacity transit alternatives will be evaluated.

Introduction

This report builds upon current land use patterns, population projections, employment growth trends, and transportation improvements to establish a data-driven framework for evaluating transit alternatives. Future transit planning decisions must align with these anticipated conditions to maximize ridership, enhance connectivity, and support economic development.

Summary of Report Contents

Chapter 2: Future Land Use Methodology

Understanding future land use trends is essential for designing transit services that align with expected residential and employment growth. This chapter presents an analysis of anticipated development based on municipal zoning plans, comprehensive plans, and development pipelines. The following methodologies were used to develop the future land uses:

- Future land use categories were scored based on zoning and comprehensive plans.
- The Rhode Island Statewide Travel Demand Model was used as a base but was supplemented with updated population projections using the modified Hamilton-Perry Method.
- TAZ-level population estimates were derived using population-weighted areal interpolation.
- Employment projections were refined by converting commercial square footage into job estimates based on industry-standard multipliers.

Chapter 3: Future No-Build Scenario

The No-Build Scenario establishes a baseline future transportation network, reflecting only confirmed infrastructure projects and transit service changes. This provides a critical reference point for evaluating the potential benefits of high-capacity transit investments. Sources for project selection included:

- Rhode Island's **2022-2031 State Transportation Improvement Program (STIP)**
- **Providence's 2024-2028 Capital Improvement Program**
- **Amtrak Northeast Corridor Capital Investment Plans (2019 and 2024)**
- Various local initiatives, including **Providence Safe Streets for All** and **Greater Kennedy Plaza improvements**.

Chapter 4: Next Steps

The final chapter outlines the steps following the Future Conditions analysis, including:

- Refining transit service concepts based on projected ridership demand.
- Identifying opportunities to align transit investments with high-growth areas.
- Engaging stakeholders, including municipalities and transit agencies, to ensure recommendations align with regional development goals.
- Establishing evaluation metrics to compare alternative transit scenarios.

2 Future Land Use Methodology

Understanding future land uses is crucial to recognizing and planning for the confluence of land use decisions and transportation service. When it comes to public transportation service, finding ways to connect nodes of activity, dense housing, mixed use areas, and primary job centers can help build ridership and support residents and workers who are in most need of transportation choices. Current land use patterns show us where development lies today across the study area, but an analysis of where development is likely to occur in the future can help us plan routes for the future to best serve the greatest number of potential riders.

Future Land Use Methodology

The project team developed future land uses based on future land uses, the Rhode Island Statewide Travel Demand Model, updated population projections, and pipeline lists from municipalities. The following sections describe how each data source was used to develop the future conditions.

Future Land Use

When it comes to public transportation, finding ways to connect nodes of activity, dense housing, mixed use areas, and primary job centers can help build ridership and support residents and workers who are in most need of transportation choices. Current land use patterns show us where development lies today across the study area, but an analysis of where development is likely to occur in the future can help us plan routes for the future to best serve the greatest number of potential riders.

Future land uses help align transit infrastructure with current and anticipated patterns of development, ensuring that the new services efficiently connect residential areas with employment centers, schools, and other public amenities. To better understand where future land use changes may be more apt to result in higher density residential, mixed use or commercial areas; the consultant team reviewed the current zoning districts and/or the future land use maps from Comprehensive Plans of the six impacted communities. Future land use maps contained information on use types and levels of development intensity which were then scored by the consultant team. The following scores were given four different land use categories for the six communities:

Future Land Uses and Scores Matrix				
	Medium Density Residential	High Density Residential	Commercial	Mixed Use
Score	1	2	1	2

For each TAZ across the study area, the consultant team identified the predominant future land use category from the community's most recent Comprehensive Plan and assigned a score. It is worth noting that only Central Falls and Providence were assigned points for high density residential as the other four communities did not indicate future land categories that would accommodate more than a maximum of 14 dwelling units an acre. The map in Figure 1 illustrates the resulting land use scores given to each TAZ across the study area. The map in Figure 2 illustrates the Future Land Uses identified in the study area.

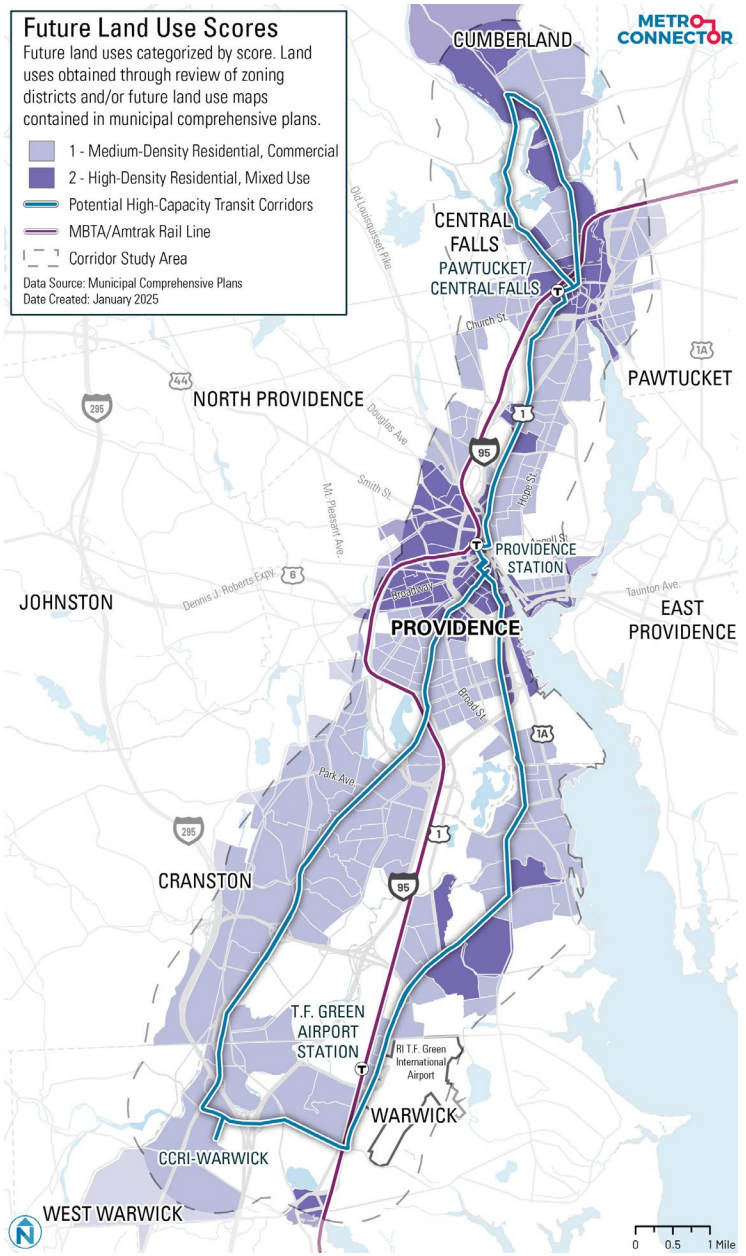

Figure 1 Future Land Use Scores

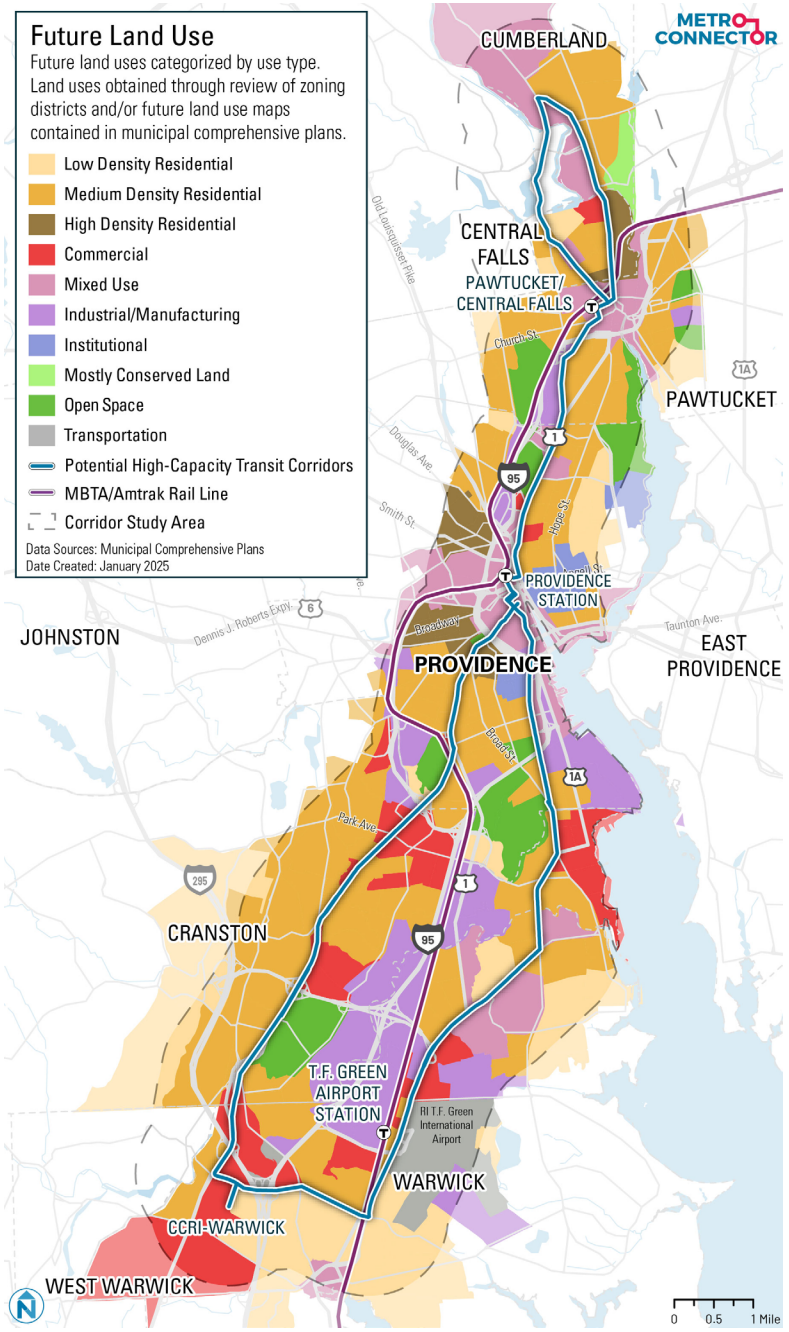

Figure 2 Future Land Uses

Rhode Island Statewide Travel Demand Model

A second input into the future conditions analysis was understanding where future population, households, and employment change is projected to occur over the next 25 years. For this analysis, the consultant team began with past, current, and future estimates from the Rhode Island Statewide Travel Demand Model. The current version of the Statewide Model includes projections for population, housing, and employment for the years 2022, 2025, 2030, and 2035. The model was developed using data available at the time of its creation which is now nearly 10 years old. The projections in the current model are outdated and do not provide sufficient input, particularly when accounting for recent residential and commercial development activity. Therefore, the consultant team supplemented the Statewide Model with updated data inputs to ensure the analysis reflected the most current and accurate information available.

Updated Population Projections

To address the challenges presented with the Statewide Model, the consultant team leveraged a population projection approach that uses a modified Hamilton-Perry Method (Hamilton-Perry, 1962, Marquez et al (2024)). The consultant team leveraged this specific approach because traditional population projection models are often reliant on data and vital statistics that are not typically available at smaller geographical scales, whereas this approach uses strictly American Community Survey (ACS) 5-year estimates to project future populations.

This modified Hamilton-Perry method utilizes all available ACS 5-Year estimates from 2009 to 2023 for each municipality. Using this approach, Cohort Change Ratios and Child to Woman Ratios are calculated across each year of data to serve as proxies for age specific population change such as mortality and fertility. ACS 5-year estimates across years effectively have population change embedded from in- and out-migration births and deaths so this approach estimates those changes creating conservative estimates across time and into the future. Furthermore, this approach leverages hierarchical smoothing methods to control large swings in small populations. In other words, smaller communities may see large percentage changes in population but in absolute numbers those changes are small compared to larger geographies. In this approach, those changes are smoothed to the broader changes, which have been shown to perform better in longer-term forecasts.

Using this approach, the consultant team forecasted the population of all six municipalities to create a baseline forecast of future populations. Given the known

development pipeline gathered from interviews conducted by the team, the consultant team also developed population forecasts that include the added population from these new developments. To create conservative estimates of these populations the consultant team leveraged US Census Public Use Microdata to isolate renters by age and gender living in multifamily buildings constructed in the last decade. This analysis produced a demographic distribution of renters by gender and age, weighted by population.

To estimate future tenants to these developments, the consultant team generated probability distribution for synthetic population using the derived age and gender characteristics. For each development, this distribution was applied to create a sample population of tenants, based on the number of units and the average household size. With these estimated sample populations by age and gender for each development, RKG integrated these populations into the baseline ACS estimates to create new population projections incorporating the existing pipeline as described in the report. Below are two tables describing the baseline scenario and the baseline plus development pipeline scenarios projected out to 2050. It should be noted that population growth from 2020 – 2025, in some instances, is driven by population gains estimated by the ACS through 2023 more so than new development.

Table 1: Smoothed Baseline Population Projections (rounded to nearest 10)

Smoothed Baseline Population Projections						
	Central Falls	Cranston	Cumberland	Pawtucket	Providence	Warwick
2010	19,390	80,580	33,290	71,660	178,290	83,680
2015	19,380	80,760	34,120	71,400	178,680	81,860
2020	19,440	81,250	34,980	71,820	179,470	81,040
2025	23,210	83,610	36,990	76,750	194,660	83,560
2030	25,050	85,870	38,420	80,360	205,870	85,220
2035	26,890	87,560	39,420	83,600	216,380	86,420
2040	28,730	88,750	40,090	86,270	225,860	86,960
2045	30,280	89,740	40,920	88,430	234,540	87,310
2050	31,710	90,830	41,720	90,410	242,000	87,800

Table 2: Smoothed Full Pipeline Population Projections (rounded to nearest 10)

Smoothed Full Pipeline Population Projections						
	Central Falls	Cranston	Cumberland	Pawtucket	Providence	Warwick
2010	19,390	80,580	33,290	71,660	178,290	83,680
2015	19,380	80,760	34,120	71,400	178,680	81,860
2020	19,440	81,250	34,980	71,820	179,470	81,040
2025	22,920	83,140	36,700	76,040	192,560	83,230
2030	24,750	85,210	38,060	79,660	203,990	84,740
2035	26,500	86,980	39,170	83,150	215,310	86,050
2040	28,130	88,920	39,850	86,450	225,930	86,840
2045	29,530	90,510	40,450	89,340	236,170	87,490
2050	30,790	91,960	41,050	91,900	245,640	88,100

Sources for both tables: ACS 5-Year Estimates, Municipal Staff, RKG Associates

TAZ Population Estimates

To provide these population estimates at the TAZ level, the consultant team used a method known as population-weighted areal interpolation to take municipal population totals and reallocate those populations at the TAZ level. To achieve this estimation, the consultant team used US Census block population estimates, which are the smallest Census geography, as areal weights to distribute population totals. Effectively this technique estimates population between the municipal and TAZ level by allocated population weighted against Census blocks to more accurately reflect population density across TAZ's within each municipality.

Pipeline Lists from Municipalities

Project pipeline lists were obtained from municipalities in the study area, including recent residential and commercial development projects. These lists encompassed projects at various stages—completed, under construction, and proposed—but were not exhaustive, as some projects were omitted or lacked detailed documentation. For our project, these pipeline lists served as a critical input to

refine and expand upon the Rhode Island Statewide Model.

Table 3: Summary of Population, Housing, and Employment Projections (rounded to nearest 10)

Municipality	POP2022	POP2035	HH2022	HH2035	EMP2022	EMP2035
Central Falls	16,900	19,560	7,190	9,180	3,100	2,740
Cumberland	26,160	28,860	10,940	12,570	6,040	6,540
Pawtucket	41,690	42,220	17,970	19,050	20,100	18,870
Providence	129,240	151,060	50,710	62,360	115,570	129,590
Cranston	55,620	57,040	22,290	24,530	31,060	31,930
Warwick	39,130	42,200	16,530	18,740	40,390	39,660

Source: RKG Projection Model Commercial Square Footage

To estimate the number of jobs associated with commercial developments, we converted commercial square footage into employment figures based on the type of development (such as office, retail, or mixed use). This process utilized industry-standard multipliers and commercial activity data acquired from each municipality. This approach enabled us to refine employment projections and align them with observed commercial growth trends, ensuring that job estimates were consistent with the scale and type of development activity in each municipality.

Table 2: Industry Standard Multipliers

Use Type	SF per Employee
Office Employees	200 SF
Retail Employees	200 SF
Lab/Life Science Employees	200 SF
Hotel Employees	Keys/Rooms x 500 SF then divide total SF by 2,300 SF per Employee
Industrial Employees	750 SF

Source: Urban Land Institute, RKG Associates

Key Findings

- Based on the commercial pipelines, by 2035 employment estimates are expected to be around 229,320.
- Based on the known residential development pipeline, there are an anticipated 7,120 new units expected from 2025 – 2035 within the six municipalities.
- Based on the population projections factoring in known development pipeline, the six municipalities are estimated to see a total population of around 589,450
- Only 93 out of 405 TAZ's across the study area had a future land use designation of either high density residential or mixed use, the two highest scoring land use categories. These were mostly located in Central Falls and Providence.

3 Future No-Build Scenario

The Metro Connector project team recommends the inclusion of changes to roadways, transit infrastructure, and transit services in the No Build Scenario. This chapter describes how projects were selected for inclusion in the future no-build scenario., information on the projects themselves, and data sources.

Development of the Future No-Build Model

It is necessary to have a thoughtful approach to confirming the infrastructure investments that form part of the Future No-Build Ridership Model. Specifically, it is important that – as part of the "no-build" –the future no-build condition represents only those projects that RIPTA, RIDOT, and other relevant entities are certain to be implemented. Projects with uncertainty – political, engineering feasibility, policy, or funding – should not be part of the no-build.

To develop the projects included in the future no-build model, the project team reviewed statewide and municipal transportation and capital improvement programs, held workshops with RIDOT, and sought feedback from MBTA and Amtrak. The plans and programs reviewed to glean the final confirmed list of projects include:

- Rhode Island's 2022-2031 State Transportation Improvement Program (STIP)
- Providence's 2024-2028 Capital Improvement Program
- Providence Safe Streets for All
- Providence Citywide Traffic Calming Study Implementation
- Greater Kennedy Plaza
- Providence Green/Complete Streets Grant Match
- USDOT Safe Streets for All
- Amtrak Northeast Corridor Capital Investment Plan (2019 and 2024)
- Amtrak's FY24-29 Five-Year Plans

Project List

The following pages summarize the projects selected for inclusion in the future no-build network. These projects have either been implemented or are planned and funded. The following section contains a summary table of these changes and service assumptions included in the Future No-Build Model.

RIDOT Projects

Project	Municipality	General Description	Project Status	Project Data Source
Bridge Group 96 – Route 146 Reconstruction	Lincoln, North Smithfield	Major rehabilitation, superstructure and/or total bridge replacement. Preservation to extend the useful service life of the structure. Resurfacing the roadway in both directions, signage, striping, safety, and drainage improvements throughout the corridor. RI-146 Southbound from RI-15 to I-95: Installation of bus-on-shoulder lane.	Under construction. Bus-on-shoulder lane expected to be in operation late 2025.	STIP
Bridge Group 57TB – Washington Bridge North	East Providence	Phase II work on Washington Bridge Westbound, this project includes repairs to bridge #070001 as well as restriping the approach to the bridge along I-195 Westbound. A new ramp connecting I-195 to Waterfront Drive in East Providence will also be constructed, and I-195 West will be resurfaced from Broadway in East Providence to the Providence River Bridge in Providence. This project is partially supported by a $25M grant from the BUILD program.	Funded	STIP

MBTA Projects

The following project was confirmed by MBTA planners.

Project	General Description	Project Status
Fleet Electrification	Bill S.2217 stated that the Providence/Stoughton line will be part of Phase I of the MBTA's Commuter Rail Fleet Electrification Work. The line is mostly electrified already along its shared Amtrak segments. This project will electrify the remaining small segments that are today unelectrified.	Funded

Amtrak Projects

The following project was confirmed by Amtrak planners.

Project	General Description	Project Status

Schedule Adjustments to Meet Demand	Within the next five years, service will expand with additional Acela trips on the North End (New York to Boston) of the Northeast Corridor that will be enabled by the growth in the Acela trainset fleet from 20 trainsets to 28 trainsets. Travel times will be reduced, since the new Acela trainsets can operate at up to 160 mph (up from 150 mph today). Service will also expand with additional Northeast Regional trips enabled by the growth in the Northeast Regional trainset fleet (and replacement of Amfleet trainsets with new Airo trainsets) With the introduction of the second-generation equipment, Acela seating capacity grows from 304 to 386 seats per train starting in 2025. With the introduction in 2026 over about 5 years, "Airo", the replacement for the existing NER Amfleet trains, seating capacity decreases from an average 494-566 seats per existing NER train to 479 seats per train. In the long-term future, 2035-2050, Amtrak's plan is to have an hourly higher-capacity NER (approximately 700 seats) round trip, and an hourly Acela round trip, so about 15 weekdays round trips each from New York Penn Station to Boston through PVD.	Under construction. New Acela trainsets expected in 2025. New Northeast Regional trainsets expected in 2027.

RIPTA

The following projects were confirmed by RIPTA and RIDOT planners.

Project	General Description
Additional bus service	Additional revenue vehicle hours based on increased population projection and existing RVH per capita.
New Transit Hubs	Providence: relocation of primary transit hub to new location to be determined Pawtucket/Central Falls: under construction

4 Next Steps

The Next Steps chapter outlines the forthcoming actions necessary to refine, evaluate, and implement high-capacity transit alternatives in Rhode Island. This chapter describes how the insights from this report will be used in further analysis, stakeholder engagement, and decision-making processes that will guide the selection of the most viable high-capacity transit solutions for Rhode Island.

Next Steps

Refining high-capacity transit alternatives will require a deeper analysis of projected demand and growth trends identified in the Future Conditions Report. Feasibility studies will be conducted for each proposed alternative, incorporating ridership forecasting, cost estimates, and operational considerations. Stakeholder feedback from transit agencies, municipal governments, and community organizations will play a crucial role in shaping the final service alignments, station locations, and multimodal connections.

To advance these alternatives, it is necessary to align them with funding opportunities and policy frameworks at the local, state, and federal levels. Identifying and securing financial resources will be crucial for project implementation, and coordination with agencies such as RIDOT and RIPTA will help ensure consistency with existing regional and statewide transportation initiatives. Additionally, transit alternatives must be developed in accordance with environmental and regulatory guidelines. Future evaluations will assess the potential environmental impacts of proposed projects in compliance with NEPA and state regulations. Land use compatibility and sustainability considerations will be analyzed to minimize disruption and maximize long-term benefits, while regulatory requirements related to zoning, permitting, and right-of-way acquisition will be addressed