IMAGINE 2050 Greater Bridgeport Valley

METROPOLITAN TRANSPORTATION PLAN 2023-2050

ENDORSED MARCH 30TH, 2023

Greater Bridgeport & Valley
Metropolitan Planning Organization

METROCOG NVCOG

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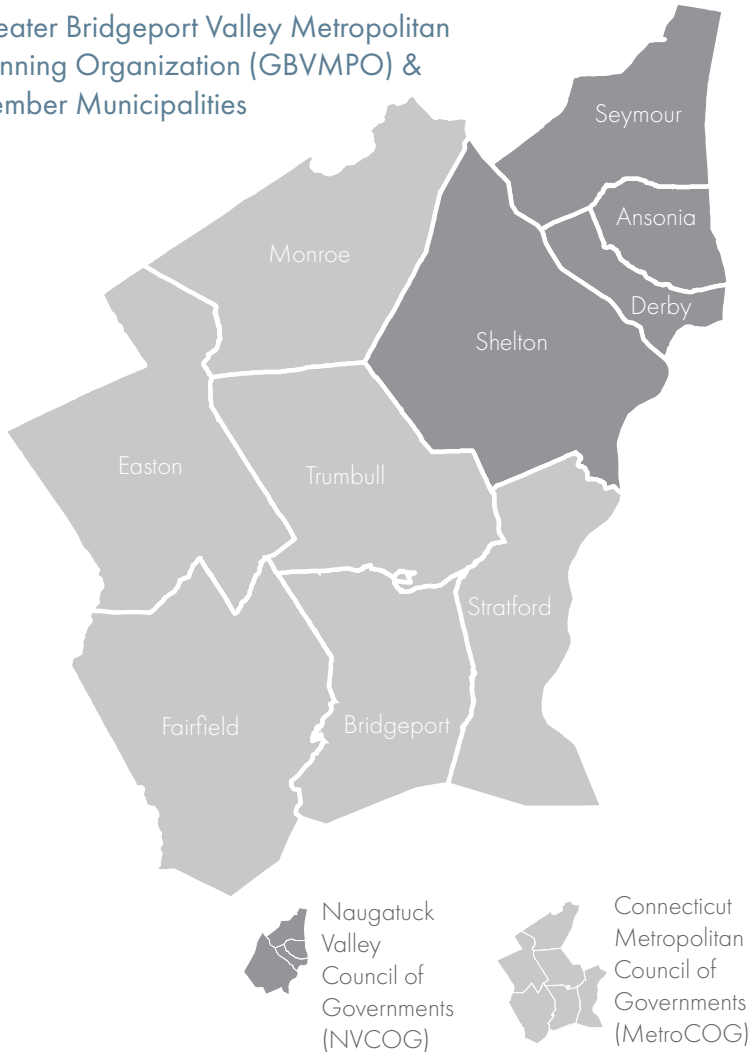
CONTENTS

Hyperlinks are indicated with bolded and underlined text.

Greater Bridgeport Valley Metropolitan Planning Organization (GBVMPO) & Member Municipalities



The Metropolitan Transportation Plan was prepared by the GBVMPO, MetroCOG and NVCOG, in cooperation with the Connecticut Department of Transportation and the U.S. Department of Transportation's Federal Highway Administration and the Federal Tranit Administration.

The MPO may revise the transportation plan at any time using the procedures in 23 CFR Part 450.324 without a requirement to extend the horizon year.

MetroCOG staff are entirely responsible for the design and format of this report. The opinions, findings and conclusions expressed in this publication are those of MetroCOG and do not necessarily reflect the official views or policies of the federal and state agencies through which MetroCOG is funded.

LIST OF TABLES

LIST OF FIGURES

1 | INTRODUCTION

Why is this Plan Important? What is the Purpose & Need?

The Metropolitan Transportation Plan (MTP) identifies opportunities to improve mobility for people throughout the Greater Bridgeport and Valley Region, from 2023 to 2050. The types of transportation we have access to plays a critical role in our lives and the choices we make. Based on public and stakeholder input and data analysis, this plan will inform future decisions about transportation system investments.

The MTP is a 25(+)-year vision for transportation system investments that includes a range of strategies to support a transportation system that safely, efficiently, and equitably moves people and goods – as well current and future issues that may impact these movements.

Eligibility for federal transportation funds requires that the Greater Bridgeport and Valley Region Metropolitan Planning Region have a MTP and that any transportation projects funded through the federal government must be identified in the MTP. These projects include improvements to roadways, bus, rail, bicycle and pedestrian routes, and connections between these modes to enhance the performance of the entire transportation system.

GREATER BRIDGEPORT VALLEY METROPOLITAN PLANNING ORGANIZATION (GBVMPO)

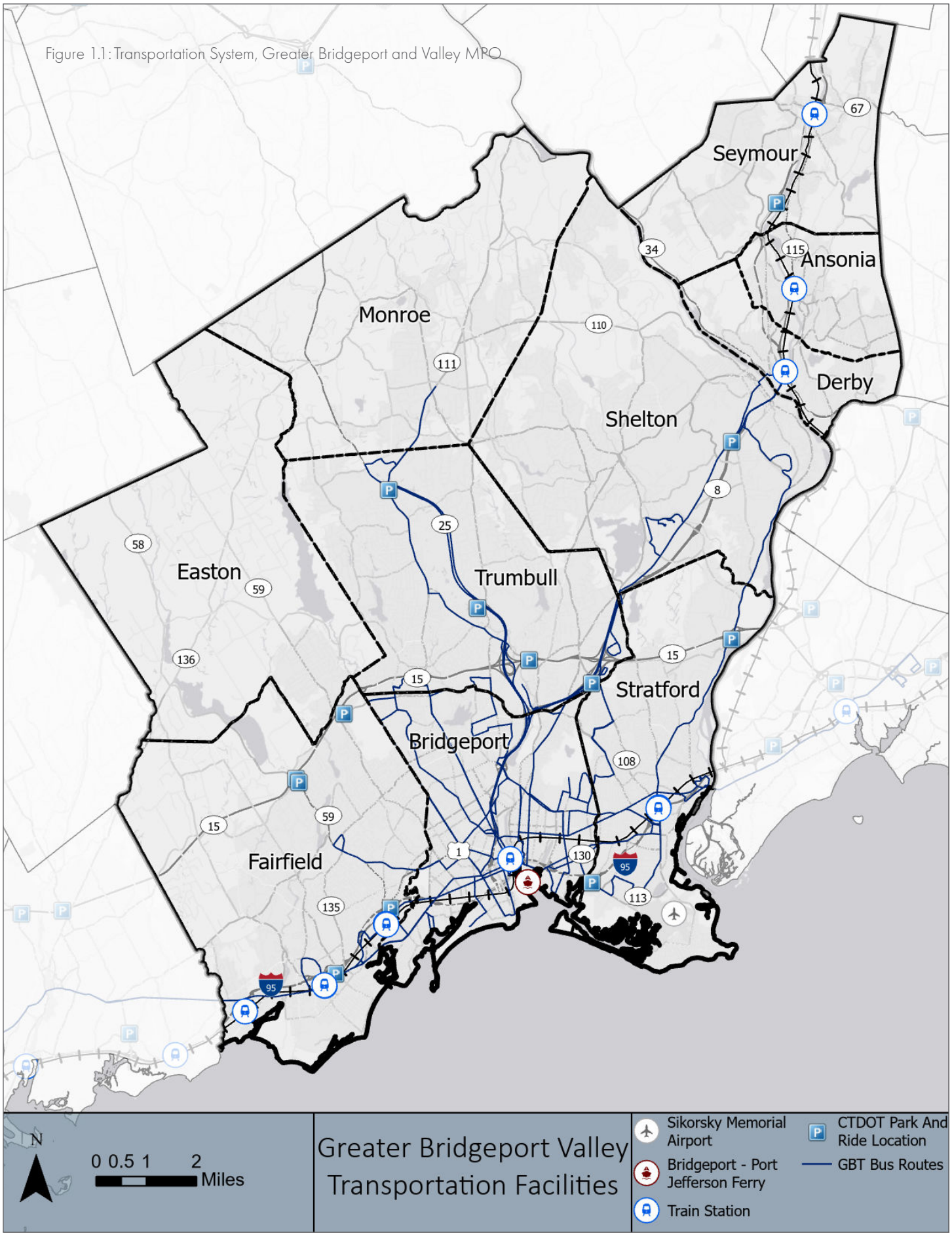
Structure: The GBVMPO is responsible for oversight of the metropolitan transportation planning process and capital improvement program for the Cities of Ansonia, Bridgeport, Derby and Shelton and the Towns of Easton, Fairfield, Monroe, Seymour, Stratford, and Trumbull (see map, figure 1.1). The membership of the GBVMPO consists of the Chief Elected Officials of the ten municipalities

SUMMARY OF MTP REQUIREMENTS

full text:: CFR 450§324(f)

- Current and projected transportation demand of persons and goods.
- Existing and proposed transportation facilities that should function as an integrated system, emphasizing facilities with important national and regional functions.
- Performance measures and performance targets used in assessing the transportation system.
- System performance report and updates evaluating the condition and performance of the transportation system.
- Operational and management strategies to improve performance in relieving congestion and maximizing the safety and mobility of people and goods.
- Consideration of the results of the congestion management process in Transportation Management Areas (TMAs), including single occupancy vehicle (SOV) projects.
- Assessment of capital investment and other strategies to preserve the transportation infrastructure, provide for multimodal capacity increases, and reduce vulnerability to natural disasters.
- Transportation and transit enhancement activities.
- Design concept and design scope descriptions of all existing and proposed transportation facilities in sufficient detail to develop cost estimates.
- Potential environmental mitigation activities and locations for activities.
- Financial plan that demonstrates how the plan can be implemented.
- Pedestrian walkway and bicycle transportation facilities

Figure 1.1: Transportation System, Greater Bridgeport and Valley MPO



and the chairpersons of the region's two transit districts: Greater Bridgeport Transit (GBT) and Valley Transit District (VTD). The Connecticut Metropolitan Council of Governments (MetroCOG) serves as the host agency for the Greater Bridgeport Valley Metropolitan Planning Organization (GBVMPO), of which Bridgeport, Easton, Fairfield, Monroe, Stratford and Trumbull are members. Ansonia, Derby, Seymour and Shelton are members of the Naugatuck Valley Council of Governments (NVCOG).

The MPO is federally authorized (23 United State Code § 134) and designated by the Governor to conduct transportation planning and policy-making and to endorse the Transportation Improvement Program (TIP) for the portion of the Bridgeport-Stamford Urbanized Area covered by the MPO. The Transportation Improvement Program is the four-year program of immediate transportation system investments. This is a fiscally constrained document that identifies transportation projects and strategies that can help to achieve the goals, priorities and performance targets detailed in the MTP. All projects receiving Federal funding must be in the **TIP**.

The MPO ensures that existing and future expenditures for transportation projects and programs are based on a continuing, cooperative, and comprehensive (3-C) planning process:

- A continuing process enables changes in the transportation systems to be monitored and reflected in a revised plan.
- A cooperative process involves local, state, and federal agencies, as well as the general public, in the development of plan alternatives, to solicit input, to achieve mutual support and to take community concerns into account.
- A comprehensive process ensures that all transportation modes are considered, that system impacts are assessed and that the recommended transportation projects relate to the surrounding environment.

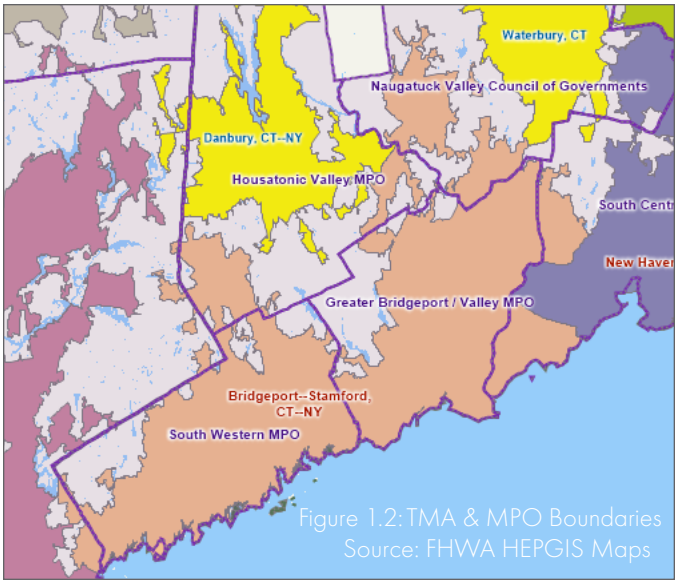


Figure 1.2: TMA & MPO Boundaries
Source: FHWA HEPGIS Maps

Oversight of the metropolitan transportation planning process is jointly provided by the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA). MPOs also cooperate with State and public transportation operators to set spending levels for federal funds that are meant for transportation projects.

The Greater Bridgeport & Valley Region: The Greater Bridgeport Valley Metropolitan Planning region is located in the southwestern part of Connecticut (Fairfield and New Haven counties - see Figure 1.2). With a population of about 414,638 people and a land area of about 196 square miles, the Region has a population density (approx. 2,109 persons per square mile) that is the highest of any region in the state (US Census, 2020). This high population density, coupled with intense development patterns, are reflected in the high proportion of the region that lies within the Census-defined Bridgeport-Stamford Urban Area. Over 95% of the population lives in the urban area and a significant percentage of the land area is located within designated federal-aid

KEY TRANSPORTATION FACILITIES

Interstate Route 95 – Governor John Davis Lodge Turnpike.

CT-15 – Merritt Parkway.

CT-8 and CT-25 Expressways.

Principal Arterials – US Route 1, CT-25, CT-34, CT-58, CT-113, CT-115, Main Street in Bridgeport and Pershing Drive in Ansonia.

Interconnected Minor Arterials and Collector Roads – CT-59, CT-67, CT-108, CT-110, CT-111, CT-113, CT-115, CT-127, CT-135, CT-188, CT-243, CT-313, CT-334, Bridgeport Avenue, Broadbridge Avenue, Constitution Boulevard, Daniels Farm Road, Fairfield Woods Road, Huntington Road, Huntington Street, Madison Avenue, and Park Avenue.

Greater Bridgeport Transit (GBT) & CTTransit - Local fixed-route bus services.

GBT & Valley Transit District (VTD) - Specialized paratransit services for the elderly and disabled.

Metro North Railroad Commuter Rail Service - New Haven Main Rail Line and Waterbury Branch Line

Amtrak -Intercity and interstate passenger rail.

Bridgeport-Port Jefferson Steamship Company - Passenger and Auto Ferry Service.

Bridgeport Harbor – Deepwater port.

Sikorsky Memorial Airport – General aviation/charter operations

Regional shared-use trails: Pequonnock River Trail, Naugatuck River Greenway, Derby Greenway, Ansonia Riverwalk and Shelton Riverwalk

Freight and goods movement – motor carriers, freight rail, waterborne shippers, air cargo and multi-modal shipments.

Commuter Parking Lots – Located along limited access highways.

urban boundaries. Key transportation facilities are indicated to the left, and included in the map (Figure 1.1).

Transportation Management Area: Over 860,000 people live in the Bridgeport-Stamford Urbanized Area (US Census, 2020). UZAs with populations exceeding 200,000 typically have more complex transportation systems and associated challenges than smaller regions. These large UZAs have additional planning responsibilities and are designated as Transportation Management Areas (TMAs), including a congestion management process (CMP). The CMP can be found in Appendix F, and is summarized in Section 12.

The 2020 US Census updated criteria for defining urban areas, which will also impact the boundaries of TMAs. These maps reflect the boundaries of the 2010 Census. Significant revisions to the BS Urban Area and/or TMA boundary are not anticipated.

Transportation Planning Process

The MTP must be prepared in accordance with federal regulations (23 CFR 450§324). The required content detailed in 23 CFR 450§324(f) are summarized in a following page. This MTP is a major update of the Metropolitan Transportation Plan for the **Greater Bridgeport and Valley Planning Region: 2019-2045** which was approved by the Greater Bridgeport Valley Metropolitan Planning Organization on March 28th, 2019. This update continues to incorporate FAST Act and MAP-21 requirements for a performance-based approach to evaluate progress in achieving national goals.

BIPARTISAN INFRASTRUCTURE LAW (BIL)

The Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law" or BIL) was signed into law on November 15, 2021. New BIL guidance most relevant to the MTP, MPOs and the Transportation Planning Process includes:

Fiscal constraint: Clarifies that the MTP's financial plan may consider any years beyond the 4-year transportation improvement plan (TIP) as outer years, as long as future funding sources are reasonably expected to support assumptions.

Data forecasting: For urbanized areas with more than 1 MPO, consistent data should be used across the UZA. The Bridgeport-Stamford UZA is made up of multiple MPOs: In addition to the GBVMPO, these include Housatonic Valley, Naugatuck Valley, South Central and Southwestern.

Complete streets: A complete street network equitably prioritizes safety, comfort and connectivity for all people who use the street network. The MTP should identify activities to increase safe and accessible options for multiple travel modes for people of all ages and abilities. Ensure a complete travel network for those without access to a single-occupancy vehicle, including in those communities who have historically experienced disinvestment.

Public participation: MPOs may use social media and other web-based tools to encourage public participation in the transportation planning process.

Housing coordination and planning: Encourages and promotes the safe and efficient management, operation, and development of transportation systems to better connect housing and employment. Encourages MPOs to consult officials responsible for housing and requires that affordable housing organizations are provided an opportunity to comment on the MTP. Requires the planning process to consider projects and strategies that promote consistency between transportation improvements and housing patterns (in addition to planned growth and economic development patterns). Recommends housing/population distribution as a component in scenario planning. In a TMA, permits the transportation planning process to address the integration of housing, transportation, and economic development strategies through a process that provides for effective integration, including by developing a housing coordination plan. The GBVMPO shares a TMA with the Southwestern MPO.

Environmental Justice, Equity and Justice 40: The MTP should advance racial equity and support underserved and disadvantaged communities. Policies should be evaluated against strategies including:

- improve infrastructure for non-motorized travel, public transportation access, and increased public transportation service in underserved communities;
- plan for the safety of all road users, particularly those on arterials, through infrastructure improvements and advanced speed management;
- reduce single-occupancy vehicle travel and associated air pollution in communities near high-volume corridors;
- offer reduced public transportation fares as appropriate;
- target demand-response service towards communities with higher concentrations of older

10 PLANNING FACTORS

full text: 23 USC 134(h)(1)

Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;

Increase the safety of the transportation system for motorized and nonmotorized users;

Increase the security of the transportation system for motorized and nonmotorized users;

Increase the accessibility and mobility of people and for freight;

Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;

Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;

Promote efficient system management and operation;

Emphasize the preservation of the existing transportation system;

Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; &

Enhance travel and tourism.

adults and those with poor access to essential services; and

- consider equitable and sustainable practices while developing transit-oriented development including affordable housing strategies and consideration of environmental justice populations.

Further, the transportation planning process must consider projects and strategies that support the ten planning factors from 23 USC §134(h)(1), listed in the box to the left. The full guidance provided to Connecticut MPOs, as well as requirements from 23 CFR 450.324 can be found in Appendix A.

ENVIRONMENTAL JUSTICE

Environmental Justice "is the fair treatment and meaningful involvement of all people, regardless of race, ethnicity, income, national origin, or educational level with respect to the development, implementation and enforcement of environmental laws, regulations and policies" (US DOT). The GBVMPO is committed to addressing Environmental Justice concerns and issues in all aspects of the transportation planning process, which includes the MTP. The intent of Environmental Justice is three-fold:

- To ensure full and fair participation of minority and low-income persons.
- To ensure no action prevents, prohibits or makes it difficult for minority or low-income persons from participating in the transportation planning process.
- To ensure transportation investments are made in minority and low-income areas and the improvements planned for these areas meet the needs of the residents, improve access to jobs and services, and increase overall mobility.

In addition to the above, the MTP is evaluated through the Environmental Justice process to answer the following questions:

- Are transportation investments being made in targeted or critical areas?
- Are the transportation improvement projects appropriate, that is, are they meeting the travel needs of the residents?

Figure 1.3: Ozone Area: Estimated NOx Emissions by Analysis Year & EPA Approved Budget

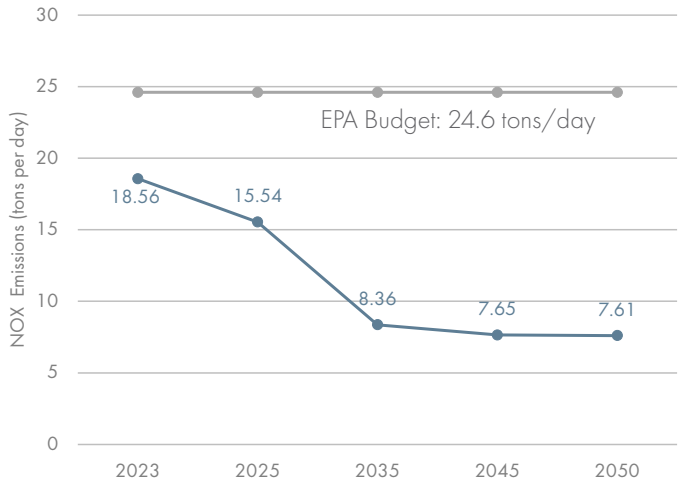


Figure 1.4: Ozone Area: Estimated VOC Emissions by Analysis Year & EPA Approved Budget

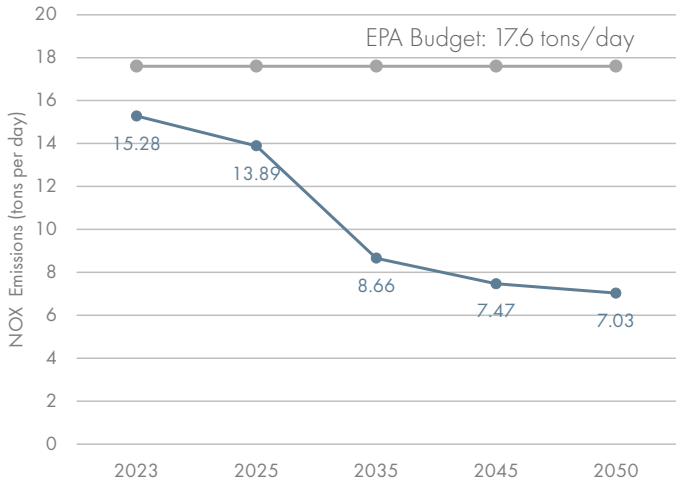


Figure 1.5: Estimated Direct PM2.5 Emissions by Analysis Year & Approved EPA Budget

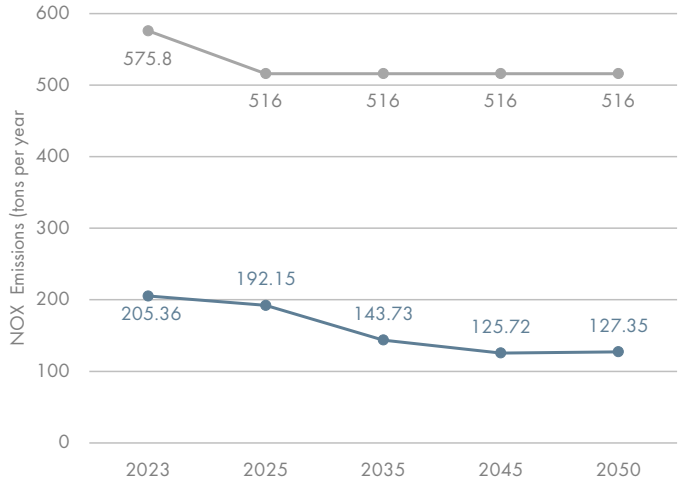
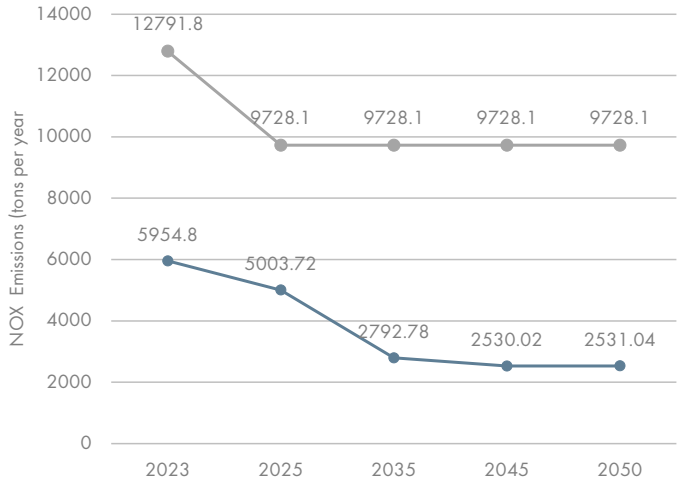


Figure 1.6: PM2.5 Area: Estimated NOx Emissions by Analysis Year & EPA Approved Budget



- Will the transportation improvements improve access and mobility?
- Will the transportation improvements cause adverse and disproportionately high impacts?

AIR QUALITY

The Federal Clean Air Act (CAA) requires the US Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) and designate areas of the country based on pollution levels. Three transportation-related pollutants are regulated: Ozone, Carbon Monoxide, and Particulate Matter. In areas that do not meet standards for air quality, projects contained in the MTPs and Transportation Improvement Plans (TIPs) must demonstrate consistency with air quality goals and that progress is being made towards achieving and maintaining Federal air quality standards.

The GBVMPO is located in the Connecticut portion of the New York-Northern New Jersey-Long Island eight-hour Ozone Moderate Nonattainment and PM2.5 Attainment/ Maintenance Area, which

includes New Haven and Fairfield Counties. The rest of the state makes up the Greater Connecticut area for analysis of these pollutants. Until 2013, the region was in nonattainment for PM2.5, but the designation was changed to maintenance/attainment after conformity with the PM2.5 standards was demonstrated. Continued compliance with the PM2.5 standards must be demonstrated through 2025.

Due to these designations, the CAA requires that Connecticut develop a State Implementation Plan for Air Quality (SIP), which specifies how the state plans to improve air quality and achieve the NAAQS. The Department of Energy and Environmental Protection (CTDEEP) is responsible for developing the SIP. CTDOT is responsible for conducting the regional emissions analysis, which compares the estimated emissions from all transportation sources to the EPA approved emissions budget. The MPO reviews the **analysis** and makes the information available for public review and comment. The approved budgets are listed in Table 1.1. Budgets and estimates are in Figures 1.3 through 1.6 on the previous page.

Ozone is an area-wide pollutant that forms from a chemical reaction of hydrocarbons, oxygen, and nitrogen oxides (or precursors) with sunlight. Particulate Matter is made up of small particles in the air formed by incomplete engine combustion, as well as dust and small particles from vehicle wear (tires, brake linings, etc). The finer the particulate matter, the greater the health risk. Carbon Monoxide is emitted from vehicles. Although it typically dissipates fairly quickly, it can become concentrated at spot locations, such as congested intersections. A discussion of actions that can mitigate the impacts of the transportation system on air quality and the natural environment can be found in Section X.

Table 1.1: EPA Approved Emissions Budgets

POLLUTANT	BUDGET (TONS)	
OZONE	2023-2050 (DAILY)	
Volatile Organic Compounds (VOC)	17.6	
Nitrogen Oxide (NOx)	24.6	
PARTICULATE MATTER (PM2.5)	2023 (YEARLY)	2025-2050
PM2.5	575.8	516
NOx	12791.8	9728.1

Goals and Priorities for the Transportation System

FEDERAL

After passage of MAP-21, and continuing with the FAST Act, states and MPOs are required to utilize a performance-based approach to transportation decision-making based on the following national goals for the transportation system (23 USC §150(b)):

Safety - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.

Infrastructure Condition - To maintain the highway infrastructure asset system in a state of good repair

Congestion Reduction - To achieve a significant reduction in congestion on the National Highway System

System Reliability - To improve the efficiency of the surface transportation system

Freight Movement and Economic Vitality - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.

Environmental Sustainability - To enhance the performance of the transportation system while protecting and enhancing the natural environment.

Reduced Project Delivery Delays - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices

The US DOT established a number of performance measures to evaluate progress in realizing the national goals. States and MPOs are required to set a target for each measure, and to program projects that will support attainment of their adopted targets. Measures and corresponding targets are detailed in Section X.

The MTP must evaluate the condition and performance of the transportation system relative to these targets. Through this requirement, the national goals for the transportation system are incorporated as goals in the MTP for this region.

STATE VISION FOR THE TRANSPORTATION SYSTEM

Connecticut's Statewide Long-Range Transportation Plan 2018-2050 provides a framework to guide CTDOT's near- and long-term transportation decision making process. The plan is a federal requirement (23 USC 135) for state DOTs. Through a broad public engagement process, the following vision for the state's transportation system was developed:

- The economy is strong because improved and sustained multimodal and intermodal transportation contribute to an environment in which businesses and people thrive.
- Travel is safe and high safety standards are sustained on all modes of transport.
- Transportation infrastructure is in a state of good repair.
- Transportation services provide efficient mobility for people and goods, both within and beyond state borders.
- Congestion is managed.
- The natural environment is protected, air quality is good, and energy is conserved.
- Urban, suburban, and rural centers are transformed into livable communities that provide opportunities for walking and bicycling and are enhanced by accessible transportation systems.

The MTP supports this vision. The goals, objectives, actions, and projects described throughout this plan will help the region and state to achieve this vision. Additional state plans and priorities that have a transportation component are discussed as relevant.

REGIONAL GOALS

The principle goal of the MTP is to continue efforts toward an efficient, effective and safe transportation network that accommodates a variety of modes. A critical component of the MTP development process was to provide opportunities for community members to inform the plan. A survey was developed as a coordinated effort between MetroCOG and NVCOG as a means for people

to share their thoughts on transportation in their communities and throughout the region. Over 500 stakeholders participated in the survey and responses were used to develop a list of mobility goals for the region. The survey summary and methodology can be found in Appendix E.

The updated goals below are generally consistent with national and state goals and will provide the framework for making future transportation investment decisions.

GOALS FOR THE GBVMPO REGION

1. Promote Safety Across all Aspects of the Transportation System.
   a. Work towards zero traffic deaths and serious injuries regionwide.
   b. Incorporate targeted safety countermeasures into the multimodal transportation system.
2. Bring all Regional Roads and Infrastructure to a State-of-Good-Repair.
   a. Build resilience into the system to lessen the impacts of roadway events.
   b. Evaluate and enhance how the right-of-way is utilized.
3. Increase the Efficiency and Reliability of all Transportation Modes.
   a. Improve implementation project delivery time by reducing project delays.
   b. Increase the frequency and reliability of public transit.
   c. Reduce vehicular congestion by implementing the Congestion Management Process (CMP).
   d. Facilitate the movement of goods and services through diverse transportation modes.
   e. Advance the use of data and technology throughout transportation infrastructure and systems.
4. Bolster Interconnected, Public Transportation across the Region and Strengthen Access to Economic Opportunity Centers.
   a. Foster an efficient, reliable, and inter-modal regional public transportation network.
   b. Identify opportunities for public transportation to support local economic development.
   c. Strengthen first- and last-mile connections and services
5. Ensure Data-Driven Transportation Investments with Equitable Benefits to all Users.
   a. Promote affordability and equitable access to public transportation in the region.
   b. Prioritize transportation investments in historically disadvantaged census tracts and areas of persistent poverty.
   c. Identify opportunities to mitigate transportation related adverse health outcomes.
6. Provide Shared/Active Transportation Initiatives that Strengthen First- and Last-Mile Connections.
   a. Expand, maintain, and improve accessible pedestrian infrastructure and amenities.
   b. Increase mobility choice and access to greenways, trails, and bike lanes.
   c. Support micro-mobility, shared transportation, and encourage flexibility as innovative services become available.
7. Promote Resilience and Environmental Sustainability within the Transportation System.
   a. Support reduced and zero-emissions transportation.
   b. Ensure transportation infrastructure is prepared to withstand the effects of climate change.

The MTP also incorporates the goals and objectives of **Reconnect One Region: A Comprehensive Plan for the MetroCOG Region**. This Plan was adopted by the MetroCOG board in December of 2015. The goal of the Transportation and Mobility section is to:

> "Maintain and modernize the Region's established regional transportation network while improving access to all modes of transportation including transit users, bicyclists and pedestrians."

Metropolitan Area Planning (MAP) Forum

In addition to aligning with national and state goals, the MTP considers transportation planning for the multi-state New York Metropolitan Area through the **MAP Forum**. The MAP Forum is a voluntary consortium of MPOs in New York, New Jersey, Connecticut, and Pennsylvania to coordinate transportation planning activities in the New York metropolitan area. Recent focus areas have been freight, resilience, and data-sharing. Planning products developed through this collaboration have informed the MTP. Current members of the MAP Forum include:

- New York Metropolitan Transportation Council (NYMTC)
- Orange County Transportation Council (OCTC)
- North Jersey Transportation Planning Authority (NJTPA)
- Western Connecticut Council of Governments (WestCOG)
- Connecticut Metropolitan Council of Governments (METROCOG)
- Naugatuck Valley Council of Governments (NVCOG)
- South Central Regional Council of Governments (SCRCOG)
- Lower Connecticut River Valley Council of Governments (RiverCOG)
- Lehigh Valley Planning Commission (LVPC), Pennsylvania

2 | EXISTING CONDITIONS & TRENDS

Regional Overview

The Greater Bridgeport and Valley Metropolitan Planning Organization Region, located in southwest Connecticut, consists of ten municipalities, the Cities of Ansonia, Bridgeport, Derby and Shelton and the Towns of Easton, Fairfield, Monroe, Seymour, Stratford, and Trumbull. The Region is a complex area, with the State of Connecticut's largest community, the City of Bridgeport, at its urban core. The Region's three coastal communities that lie along Interstate 95 and the Metro-North Mainline Rail Corridor are the most populated and account for approximately 63% of the GBVMPO population.

DEMOGRAPHICS

Population

Based on the 2020 Decennial Census and detailed in Table 2.1 the population of the region was 414,638 ,an approximate 6.7% increase since 2010, which had a population of 388,565. With a land area of 196.6 square miles, the combination of population and area results in a population density of ± 2,109.0 persons per square mile. This density is the highest of any region in the state and is reflected in the high proportion of the Region that lies within the Census-defined urbanized area. About 98% of the Region's residents live in areas designated as urban.

The largest municipality in the region remains the City of Bridgeport, with a population of 148,654. The city accounts for about 35.8% of the region's total population. The next largest communities are the Towns of Fairfield and Stratford, with populations of 61,512 and 52,355, respectively. The City of Shelton's population is 40,869, making it the fourth most populous community in the Region. The Towns of Easton, Monroe and Trumbull all experienced a slight increase in population since 2010. By contrast, the City of Ansonia and the Towns of Derby and Seymour saw populations stay the same or decline over the same timeframe. Fairfield had the highest increase in population since 2010, with a 3.4% gain in residents.

Based on the most recent population estimates developed by the University of Connecticut, the population of the region is expected grow slightly, over the next 25 years. This growth could potentially increase the demand on the Region's transportation system.

Table 2.1: Population

MUNICIPALITY	POPULATION	LAND MASS*	PEOPLE/ SQ MILE
Ansonia	18,918	6	3153.00
Bridgeport	148,654	16	9290.88
Derby	12,325	5	2465.00
Easton	7,605	27.4	277.55
Fairfield	61,512	30	2050.40
Monroe	18,825	26.1	721.26
Seymour	16,748	14.6	1147.12
Shelton	40,869	30.6	1335.59
Stratford	52,355	17.6	2974.72
Trumbull	36,827	23.3	1580.56
Total	414,638	196.6	2109.04

** Square miles Source: US Census 2020*

Figure 2.1: Trumbull Town Hall
Attribute: Peralta Design/Steve Cartagena

Age

Based on the 2016-2020 American Community Survey (ACS) 5-Year Estimates, there was an estimated 65,495persons who were 65 years of age and older, about 15.9% of the region's population. The City of Shelton had the highest proportion of its population in this age cohort at approximately 21.5%, while Bridgeport had the lowest, with only 11.7% Eligibility for senior services vary between towns, however, not all who are over 65 years old require special transportation services. Therefore, the number of people in this age bracket is not indicative of special transportation needs.

The municipalities in the region sponsor senior centers to provide activities and services to older residents. These programs typically include special transportation services to and from the center, shopping, and medical appointments.

Persons with a Disability

The Americans with Disabilities Act (ADA) requires operators of fixed-route bus services, such as Greater Bridgeport Transit (GBT), to provide supplemental paratransit service to those who, because of their disability, are not able to get to a bus stop or board or ride a fixed route bus. This service fills individual transit needs and promotes equality of mobility for all. A wide range of trip purposes are provided by the operator, including shopping, personal business and medical. In addition to the service offered by GBT, several social service organizations, including municipal, private, and non-profit, provide special transportation for clients. Trips are typically limited to a narrow range of trip purposes, based on the type of service provided by the agency.

The ACS asks respondents whether they or other members of the family had any long-lasting conditions (over six months) that made it difficult to perform certain activities. These include sensory (blind-

ness, deafness or other sight impairment), self-care, mental, employment, going outside-the-house, or physical (walking, climbing, carrying or lifting) disabilities. The data were tabulated for non-institutionalized persons five years of age or older. The data indicate about 11.89% of the region's non-institutionalized population had one or more disability, a total of 48,601 persons. In Bridgeport, 13.2% of the population, or 19,078 persons, had some type of disability (Table 2.2). As with the age data, the number of persons with disabilities is not a true indicator of paratransit need. The data do not provide a measure of the severity of the disability nor an indication of whether the disability prevents a person from using regular fixed-route bus service.

Table 2.2: Persons with a Disability

MUNICIPALITY	PERCENT
Ansonia	15.8%
Bridgeport	13.2%
Derby	12.7%
Easton	9.0%
Fairfield	7.5%
Monroe	9.5%
Seymour	13.6%
Shelton	10.0%
Stratford	12.7%
Trumbull	9.6%

Source: ACS 2020

Race & Ethnicity

According to the 2016-2020 ACS, 66.2% of the Region's population identify as white, 22.5% identify as Hispanic or Latino, 16.5% as Black or African American and 3.8% as Asian. Table 2.3 provides a breakdown of race and ethnicity by municipality.

Table 2.3: Race & Ethnicity

MUNICIPALITY	POPULATION	WHITE	BLACK OR AFRICAN-AMERICAN	ASIAN	HISPANIC/LATINO (OF ANY RACE)
Ansonia	18,918	72.4%	13.9%	1.6%	21.6%
Bridgeport	148,654	38.1%	34.4%	3.8%	42.0%
Derby	12,325	80.1%	10.1%	1.8%	21.2%
Easton	7,605	93.6%	0.0%	1.7%	2.7%
Fairfield	61,512	88.1%	1.9%	4.4%	7.5%
Monroe	18,825	84.6%	2.4%	6.2%	6.8%
Seymour	16,748	91.1%	1.8%	2.2%	10.2%
Shelton	40,869	87.2%	2.7%	4.8%	8.6%
Stratford	52,355	66.6%	19.5%	2.2%	19.5%
Trumbull	36,827	82.1%	3.4%	6.6%	9.4%
Total Percent	414,638	66.2%	16.6%	3.9%	22.5%

Source: ACS 2020

Table 2.4: Income

MUNICIPALITY	MEDIAN INCOME
Ansonia	$53,709
Bridgeport	$47,484
Derby	$58,534
Easton	$166,875
Fairfield	$140,308
Monroe	$121,847
Seymour	$80,396
Shelton	$98,873
Stratford	$82,286
Trumbull	$129,239

Source: ACS 2020

Income

The Average Medium Household Income in the Region is $97,955, however household incomes vary significantly by municipality. The Town of Easton has the highest median household income, $166,875. In contrast, the City of Bridgeport's median household income is $47,484. (Table 2.4 provides a breakdown of Income by Municipality.)

Land Use, Development, Tourism, Housing & Employment

LAND USE & ZONING

The land use and development patterns of the region are diverse and are reflected in the distribution of its population and urban character. Much of the region is already developed with most of the undeveloped land located in the northern communities. Development is more intense along the coast while the northern reaches are more characteristic of rural patterns.

Future development patterns are likely to follow current configurations with in-filling occurring in more intensely developed areas and low-density developments locating in the suburban and rural areas. The majority of population growth is expected in the Region's three coastal communities of Fairfield, Bridgeport and Stratford (along Interstate 95 and Metro North's New Haven Line) and in Ansonia and Derby (along Route 8 and Metro North's Waterbury Line).

REGIONAL CORE

The region's core is Bridgeport, a traditional manufacturing city, with areas of intense development radiating from the downtown area. Although there has been an increase in commercial development in the suburban areas, Bridgeport remains the regional center for offices, banking, government, education, medical, and associated activities. In addition, there is a substantial amount of unused and underused industrially and commercially zoned land that is primed for revitalization. In recent years, several former commercial properties in Bridgeport have been converted to residential uses and new construction has also taken place. With access to the deep-water of Long Island Sound, Interstate 95, and the Metro North New Haven Rail Line, along with a series of vacant and underutilized land parcels, Bridgeport is ripe for substantial growth in residential, commercial and manufacturing activity. Bridgeport is also the transportation focal point for the region and serves as a transfer center between local and intercity bus, commuter rail, passenger ferry, and an interstate highway.

Figure 2.2: Easton, Farm Market
Attribute: Peralta Design / Steve Cartagena

REGIONAL ACTIVITY CENTERS

Aside from Bridgeport, higher density development is also located along the southern portions of Fairfield and Stratford, as well as in Ansonia, Derby and Shelton. These areas represent the most intense development and most integrated mix of uses within the Greater Bridgeport and Valley Region and are home to a majority of the Region's major employers and institutions. Community activity centers for shopping, professional services, local government, and various other functions are found in all towns. These activity centers are generally located near a limited access highway or a major state route, such as Route 1, Route 25, Route 34, Route 58 or, Route 110 and Route 111.

Most of the region's open areas, recreation uses and farmlands are in Easton, northern Fairfield, Monroe, Seymour, Shelton and Trumbull. The transportation system will continue to play a significant role in the development of the agricultural economy.

AREA AMENITIES, TOURISM & EDUCATION

The Region's transportation network is utilized by both residents and visitors for the array of civic, educational, cultural, entertainment, and recreational establishments. The Region is home to approximately 13,000 undergraduate students who attend three of the Region's higher education institutions: the University of Bridgeport, Fairfield University and Sacred Heart University. Approximately 3,500 students are enrolled at Housatonic Community College (HCC; Connecticut State Colleges and Universities, 2022).

Coastal Recreation

Along the coast, Fairfield, Bridgeport, and Stratford offer access to Long Island Sound, including Jennings & Penfield Beaches in Fairfield, Short Beach in Stratford and the 325-acre, Frederick Law Olmsted-designed Seaside Park in Bridgeport. All of these are ideal places for biking, running, or

walking as well as boating, canoeing, kayaking, and fishing. The beaches and parks each have their own amenities, including numerous baseball and soccer fields, basketball courts, playgrounds, beach volleyball courts, grilling and picnicking facilities, all of which provide abundant active and passive recreational opportunities for the entire Region and beyond.

Entertainment

The Region is also home to the newly created Hartford Healthcare Amphitheater

The Total Mortgage Arena "hosts over 150 world-class events each year" and provides seating configurations that vary from 2,000 to 10,000. The Arena is home to the American Hockey League's (AHL) Bridgeport Sound Tigers hockey team, an affiliate of the NHL's New York Islanders and the Fairfield University Stags NCAA Men's and Women's Basketball teams. The arena hosts "community and private events and world-class concerts and entertainment events throughout the year."

The Hartford Healthcare Amphitheater opened in 2021. Renovated from the Ballpark at Harbor Yard, this boutique concert venue seats 5,700 and hosts a variety of concerts and performers throughout the year.

Beardsley Zoo & Cultural Institutions

Aside from educational, recreation and entertainment offerings, the Region is also home to the Beardsley Zoo, which is Connecticut's only accredited Zoo and a member of the Association of Zoos and Aquariums (AZA). The Zoo is committed to the preservation of endangered animals and is actively developing strategies that protect endangered species and their habitats. The Zoo offers education, conservation, research, and recreation opportunities to the approximately 250,000 visitors per year. The Fairfield Theater Company, the Downtown Cabaret Theatre, the Housatonic Museum of Art, the City Lights Gallery and the Barnum Museum are a few of the several arts and cultural institutions located in the Region.

HOUSING

The total number of housing units (occupied and vacant) in the region is 148,112, of which 34.9% are in the City of Bridgeport. The growth in the number of housing units mirrored population trends. The average number of persons per housing unit is 2.68 persons per housing unit. The larger household sizes are found in Trumbull (3.34), Monroe (3.41) and Easton (3.0).

EMPLOYMENT

Industry Sectors & Major Employers

The Region's Labor Force is 332,448, of which 201,242 (60.5%) are employed. The largest industries for the employed include: management, business, science, and art occupations (40.6%), sales and office occupations, (22.09%) and service occupations (19.2%). According to 2022 data provided by Data Axle, through ESRI's Business Analyst, the largest concentrations of the jobs in the Region are found in Bridgeport (55,254 jobs, or 30.4%), with Stratford (28,554 or 15.7%), Fairfield (28,224 or 15.5%) and Shelton (26,480 or 14.6%) the next highest.

Commuter Travel Patterns

Of the labor force within the Greater Bridgeport and Valley Region, approximately 94.31 % work in Connecticut. Of the commuters, approximately 4.5% commute by public transit and 8.09% by carpool, all of which exceed the State of Connecticut averages. The primary mode to work in the region

is the single occupancy vehicle, of which 85.17% of commuters use as their primary mode of transportation (Table 2.5). The average travel time to work is 30.59 minutes (Table 2.6). 2.36% of workers 16 years and over (in households) do not have a vehicle available.

Ongoing, planned, and unanticipated developments throughout the region may have a substantial impact on future commuting patterns. For example, in Bridgeport, one large scale mixed-use retail and entertainment district redevelopment project - Bridgeport Landing (Steel Pointe) is ongoing. In addition, the Lake Success Business Park is being considered – it would create manufacturing, office and retail jobs that are well beyond those estimated by CTDOT and their Travel Demand Model. Similarly, large office/corporate and mixed-use developments have been proposed throughout the Region. This development would generate both jobs and trips that are not accounted for in current CTDOT forecasts. Projects in Shelton, such as the Constitution Boulevard extension and downtown housing expansion are also likely to have significant long term impacts. Potential impacts from future development projects on a more localized level will be assessed on a site-specific basis as the projects become more defined.

Table 2.6: Commute Time

MUNICIPALITY	MEAN TRAVEL TIME TO WORK*
Ansonia	25.6
Bridgeport	29.6
Derby	26.9
Easton	34.6
Fairfield	36.3
Monroe	33.8
Seymour	28
Shelton	27.6
Stratford	29.9
Trumbull	33.6
Average	30.59

*In minutes Source: ACS 2020

Table 2.5: Transportation Mode to Work

MUNICIPALITY	WORKERS 16+ YRS*	DROVE ALONE	CAR POOL	PUBLIC TRANSIT**	WALK	BICYCLE	CAB/MOTOR CYCLE/OTHER	WORK FROM HOME
Ansonia	8,793	82.7%	7.6%	3.2%	1.1%	0.0%	1%	4%
Bridgeport	66,296	68.1%	13.4%	10.4%	3.3%	0.1%	2%	3%
Derby	6,436	77.9%	11.2%	0.1%	3.3%	0.0%	1%	7%
Easton	3,621	75.4%	6.5%	3.8%	0.7%	0.0%	1%	13%
Fairfield	28,942	66.0%	4.4%	12.8%	3.0%	0.2%	1%	13%
Monroe	9,872	82.0%	5.7%	2.7%	0.2%	0.0%	0%	9%
Seymour	9,007	80.6%	9.6%	1.1%	0.7%	0.0%	0%	8%
Shelton	21,372	82.6%	7.2%	1.6%	0.3%	0.0%	1%	8%
Stratford	25,895	80.1%	7.5%	4.8%	1.2%	0.0%	1%	6%
Trumbull	17,282	75.4%	7.8%	4.5%	0.5%	0.0%	2%	10%

*Workers 16 years and older **Excludes Cabs Source: ACS 2020

3 | HIGHWAYS, ROADS & BRIDGES

The GBVMPO region's highway and roadway network is critical to the movement of passenger vehicles, motorcycles, transit and freight. Although restricted from limited access highways, bicyclists and pedestrians also utilize the region's roadway system. A well-balanced transportation system supports safety for all users, the efficient movement of vehicles, and equitable accommodations for bicyclists and pedestrians.

Regional Facility Types & Descriptions

Most travel involves movement through a network of roads that range from limited access high-volume, high-speed interstates to low volume collector and residential streets. To better understand how travelers move throughout the transportation network, highways and roads are classified into the following categories:

Principal Arterials: Roads & streets that connect principal urbanized areas, cities, & industrial centers.

PRINCIPAL ARTERIALS

Arterials are roads and streets that connect principal urbanized areas, cities, and industrial centers. Examples, detailed below, include interstates, freeways and expressways, multilane highways and other important roadways that supplement the Interstate System.

Interstates: Interstates receive official designation from the US Secretary of Transportation and are primarily designed for long-distance travel. Also known as limited access, divided highways, these facilities provide faster travel over long distances and often link major urban areas. They typically do not provide access to adjacent land uses.

Other freeways and expressways: Like interstates, this category of roadway provides high volume vehicle movement and does not directly serve adjacent land uses. Physical barriers like medians usually separates the directional travel lanes. Access and egress points are often limited to on- and off-ramp locations or a very limited number of at-grade intersections.

Other Principal Arterials: Serve major metropolitan centers and provide a high degree of mobility, including through rural areas. Abutting land uses can be served directly, such as access via driveways to specific parcels and at-grade intersections with other roadways. Multiple arterials typically serve a single urban area while a similarly sized rural area would be served by one arterial.

MINOR ARTERIALS

Minor Arterials serve trips of moderate length and offer connectivity to Principal Arterials. Characteristics of Minor Arterials may differ between urban and rural areas as detailed below.

In urban areas, they interconnect and augment the principal arterial system, provide intra-community continuity, and may carry local bus routes.

In rural areas, minor arterials are typically spaced at intervals consistent with population density, so that developed areas are within a reason-

Minor Arterials: Serve trips of moderate length & offer connectivity to Principal Arterials.

able distance of an arterial. Minor arterials in rural areas are typically designed to provide relatively high overall travel speeds with minimum interference to through movement.

Major & Minor Collectors:
Gather & funnel traffic from local roads to Arterials.

MAJOR & MINOR COLLECTORS

Major and Minor Collectors gather and funnel traffic from local roads to Arterials. In urban areas, Major Collectors serve land access and traffic circulation in higher density residential, and commercial/industrial areas, while Minor Collectors serve these same purposes in lower density areas.

Major Collectors: Often penetrate significant distances of residential neighborhoods and distribute trips between local roads and arterials. Operating characteristics include higher speeds and more signalized intersections. In rural areas, major collectors serve larger towns not directly served by the arterial system and provide links to other important traffic generators and/or Arterial routes.

Minor Collectors: Only penetrate residential neighborhoods for a short distance and distribute trips between local roads and arterials. Operating characteristics include lower speeds and fewer signalized intersections. In rural areas, minor collectors are spaced at intervals, consistent with population density, to collect traffic from local roads and bring all developed areas within reasonable distance of a Collector. They provide service to smaller communities not served by a higher-class facility and link locally important traffic generators to less developed rural areas.

LOCAL ROADS

Local Roads:
Account for the largest percentage of all roadways (in terms of mileage).

Local Roads account for the largest percentage of all roadways (in terms of mileage). Characteristics of Local Roads include:

- Not intended for use in long distance travel, except at the origin or destination end of the trip.
- Provide direct access to abutting land.
- Bus routes generally do not operate on Local Roads.
- Often designed to discourage through traffic.

OVERSIGHT OF ROADS

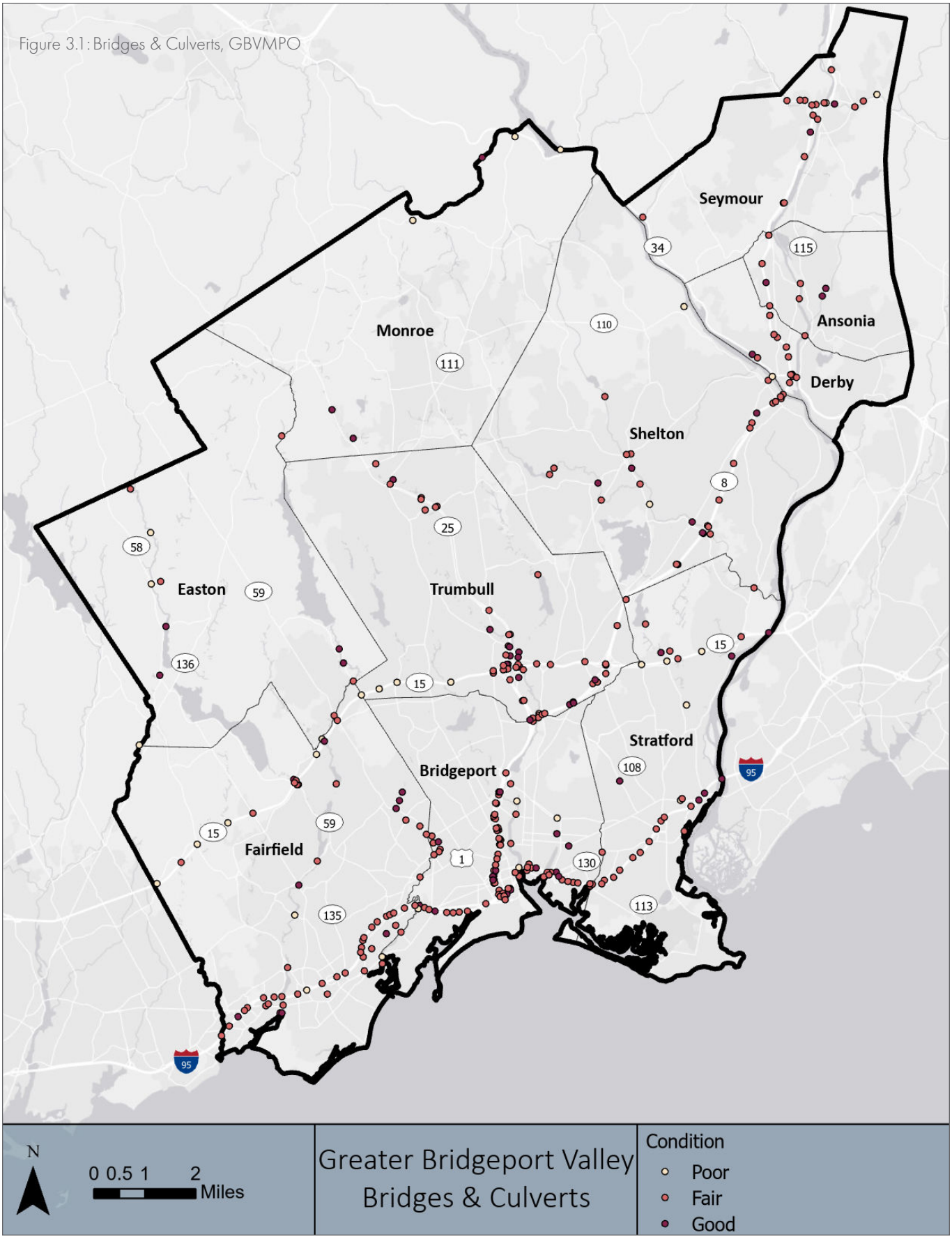
The National Highway System (NHS) includes the Interstate Highway System as well as other roads important to the Nation's economy, defense, and mobility. Roads that provide access from the NHS to intermodal facilities (such as Bus, Rail or Ferry) are part of the system as well.

While the majority of road miles are municipally-owned, roads with the highest number of miles traveled are State-owned. The Federal-Aid Highway Program supports the NHS and other State highway systems by providing financial assistance for the construction, maintenance and operations of Arterials, Urban Collectors and Major Rural Collectors. These funds are administered by State and regional entities.

Bridges

Bridges provide road network connectivity, spanning water bodies and other natural features, rail lines, and roadways. CTDOT is responsible for the

Figure 3.1: Bridges & Culverts, GBVMPO



maintenance and operation of 4,106 roadway bridges and inspects an additional 1,290 bridges that are locally owned and maintained. 1,785 of these bridges are on the National Highway System.

To be on the FHWA's National Bridge Inventory (NBI), the bridge structure must be at least 20 feet in length. CTDOT inspects these bridges biannually. The inspection follows FHWA NBI standards: each structural component, such as the deck, superstructure and substructure are assessed and rated on a scale from zero (failed) to nine (excellent). If any component receives a rating of four or less, the bridge is considered to be structurally deficient and requires maintenance, rehabilitation or replacement.

BRIDGE CONDITION

The GBVMPO has 10 bridges in poor condition, according to the 2022 National Bridge Inventory, as shown below. A map of bridges and culverts in the region, and condition, can be found in Figure 3.1 Asset management and performance targets for bridges are discussed in Section 11.

Table 3.1: NBI Bridges in Poor Condition; Includes Culvert

BRIDGE	FACILITY	CROSSING	MUNICIPALITY	RATINGS		
				Deck	Superstucture	Substructure
MUNICIPALLY OWNED						
04225	Commerce Dr	Ash Creek	Bridgeport	3 - Poor	5 - Fair	4 - Poor
04227	Island Brook Ave	Pequonnock River	Bridgeport	4 - Poor	5 - Fair	5 - Fair
04934	Valley Rd	Aspetuck River	Easton	4 - Poor	5 - Fair	7 - Good
05220	Silver Hill Rd	Aspetuck River	Easton	5 - Fair	4 - Poor	6 - Satisfactory
04196	Congress St	Mill River	Fairfield	7 - Good	4 - Poor	5 - Fair
04953	Duck Farm Rd	Mill River	Fairfield	5 - Fair	4 - Poor	5 - Fair
05402	Old Town Rd	Pequonnock Trail	Trumbull	6 - Satisfactory	4 - Poor	6 - Satisfactory
STATE OWNED						
02475	CT-130	Pequonnock River	Bridgeport	6 - Satisfactory	4 - Poor	4 - Poor
00326	US-1	MNRR	Stratford	4 - Poor	6 - Satisfactory	5 - Fair
PRIVATELY OWNED						
01843	CT-34	Housatonic River	Monroe	6 - Satisfactory	4 - Poor	4 - Poor
CULVERT, MUNICIPALLY OWNED						
04961	Judges Hollow Rd	Aspetuck River	Fairfield	4 - Poor		

More information about FHWA's bridge resources can be accessed at the following link: https://www.fhwa.dot.gov/bridge/bripro.cfm

Roads in the Greater Bridgeport & Valley Region

Major facilities are listed in Table 3.2 and are descriptions are provided in the next few pages. A map of roads in the region, with functional classification indicated, can be found in Figure 3.2.

PRINCIPAL ARTERIALS: INTERSTATE 95

I-95 runs east-west through three municipalities in the Greater Bridgeport and Valley Region: Stratford, Bridgeport and Fairfield. Within Connecticut, I-95 links the region with Stamford and Norwalk in southwestern Fairfield County. Traveling east, I-95 provides access to New Haven and major cities throughout New England, such as Boston and Providence. Critical to the economy of the Region is the connection that I-95 provides to the New York Metropolitan area, and the eastern seaboard from Maine to Florida.

Along most of the 12+ miles that run the through Region, I-95 is made up of three lanes running in each direction. I-95 widens to four travel lanes in one or both directions between exits 25 and 29 which include the Fairfield-Bridgeport line, Downtown Bridgeport, and the Exit 27A interchange to Route 8/25.

PRINCIPAL ARTERIALS: OTHER FREEWAYS & EXPRESSWAYS

CT Route 15/Merritt Parkway

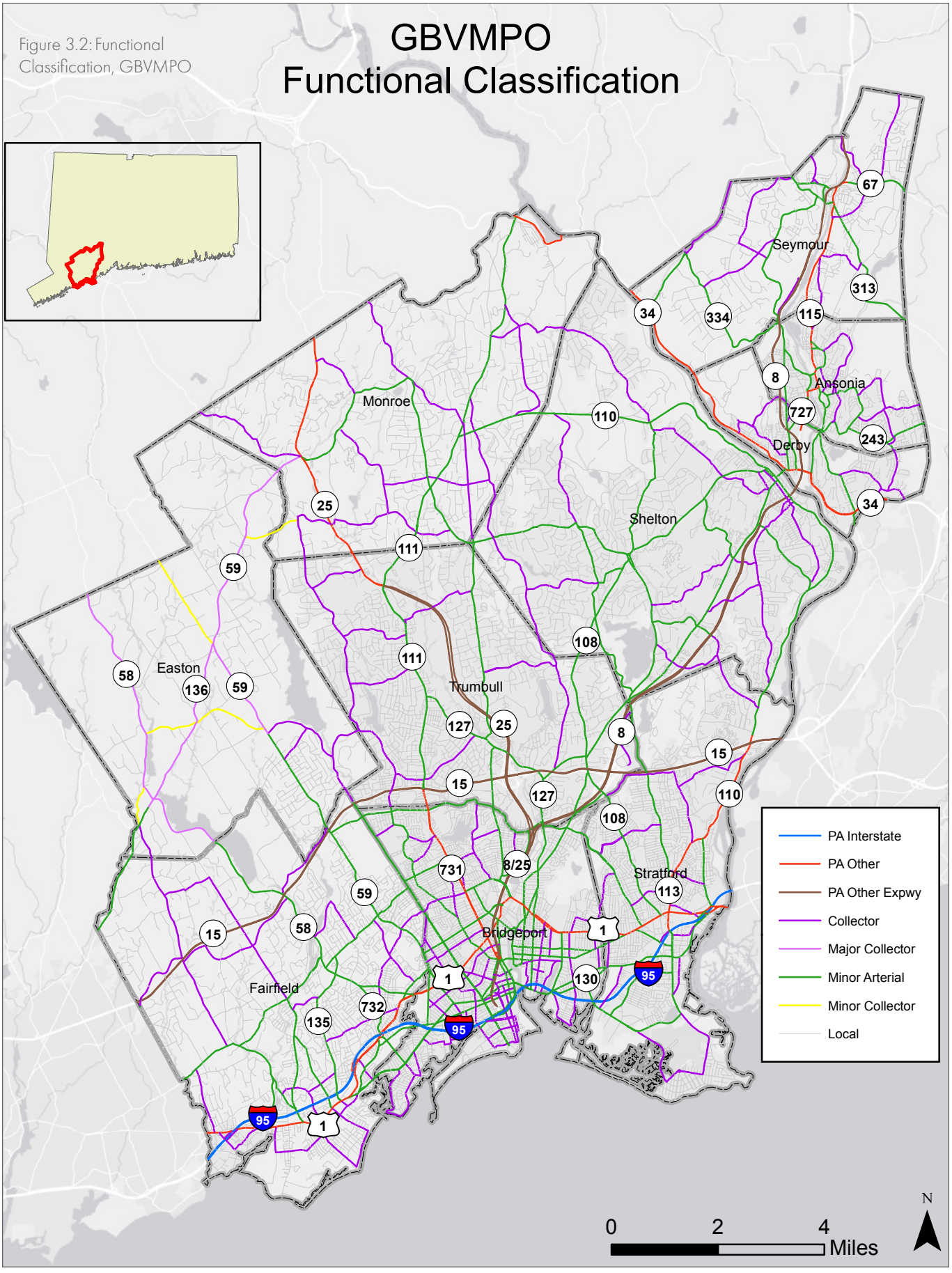
Route 15, or the Merritt Parkway is a limited access, principal expressway that runs 14 miles east-west through Stratford, Trumbull and Fairfield with two lanes in each direction. Like I-95, the Merritt provides a critical link to western Fairfield County and New York. East of the Housatonic River (in

Table 3.2: Major Roads, GBVMPO

FACILITY	MUNICIPALITY(S)
INTERSTATE	
I-95	Fairfield, Bridgeport, Stratford
OTHER NHS ROUTES	
CT-8	Bridgeport, Trumbull, Shelton, Derby, Ansonia, Seymour
CT-25	Bridgeport, Trumbull, Monroe
CT-8/25	Bridgeport
CT-15	Fairfield, Trumbull, Stratford
CT-34	Derby
MAP-21 NHS PRINCIPAL ARTERIALS	
US Route 1	Fairfield, Bridgeport, Stratford
CT-34	Derby, Seymour
CT-58	Fairfield
CT-67	Seymour
CT-110	Stratford
CT-113	Stratford
CT-115	Ansonia, Seymour
CT-727	Ansonia, Derby
CT-731	Bridgeport
CT-732	Fairfield
BRIDGEPORT INTERMODAL CONNECTORS*	
South Ave. & North Frontage Rd between Broad St. & CT-8/25.	
South Frontage Rd between Broad St. & CT-8/25.	
Broad St. between North Frontage Rd. & Railroad Ave.	
Railroad Ave. between Broad St. & Main St.	
Interchange 27A (from I-95)	

**Road sections for access to the Water Street Dock ferry terminal*

Figure 3.2: Functional Classification, GBVMPO



Stratford/Milford), Route 15 continues as the Wilbur Cross Parkway and the Berlin Turnpike, which provides access to central Connecticut, Hartford, and I-91.

The Merritt Parkway is one of the oldest scenic parkways in the United States. It is listed on the National Registry of Historic Places and has been designated as both a national scenic byway and a state scenic highway. The Merritt Parkway's natural scenery and unique structural features are integral to its historic value.

As a transportation facility designed in the 1930s, a number of the Parkway's historic features limit its utility in the 21st century. Each bridge on the Parkway has a unique, Art Deco design. However, commercial and oversized vehicles are prohibited from the Parkway due to the low clearances of these bridges. Tight curves and limited sight lines supports a maximum speed of 55 miles per hour. Two travel lanes in each direction are often insufficient to address the volume of traffic. Recent projects have utilized a context sensitive approach that balances historic preservation and enhancement with improving safety and mitigating congestion. These efforts should continue.

PRINCIPAL ARTERIALS: OTHER/NHS

US Route 1: Route 1 is a principal arterial that runs about 12 miles east-west through the region's three coastal municipalities: Stratford, Bridgeport, and Fairfield. Route 1 runs roughly parallel to much of I-95 and like I-95, it is a critical link along the eastern seaboard from Maine to Florida. In Connecticut, Route 1 functions as a west-east commercial corridor that links the shoreline communities of Long Island Sound.

Figure 3.3: Trumbull, CT-15 interchange at Park Avenue
Attribute: Lindsay Naughton

In the Greater Bridgeport Valley Region, Route 1 alternates between one or two travel lanes for each direction of traffic. Turn lanes are not consistently provided at signalized intersections. In addition, unsignalized intersections and numerous driveways cause further congestion.

In Fairfield, two Metro North rail stations are located along Route 1: in Fairfield Center and Southport. Route 1 crosses the Housatonic River on the Stratford/Milford line via the Washington (Devon) Bridge, a movable bridge.

CT Route 8 & Route 8/25: Route 8 is the region's north-south limited access expressway and runs north through Bridgeport (as 8/25), Trumbull, Stratford, Shelton, Derby, Ansonia and Seymour, a total of approximately 20 miles. At its southern termination in Bridgeport, Route 8-25 connects to I-95. In northern Bridgeport, Route 8-25 splits into Route 8 (northeast toward Trumbull, Stratford, Shelton, Derby, Ansonia and Seymour) with access to Route 15 north and Route 25 (northwest to Trumbull and Monroe) with access to Route 15 south. Farther north, Route 8 links to Route 34 in Derby. Outside of the Region, Route 8 intersects I-84 in Waterbury and continues north with access to Torrington, Litchfield County, and Massachusetts.

As Route 8-25, primarily three or four travel lanes are provided in each direction. After the Route 8/ Route 25 split, Route 8 is composed of two travel lanes in each direction.

CT Route 25: After splitting with Route 8, Route 25 continues northbound as a limited-access expressway through Trumbull for 6.7 miles. North of the Route 111 intersection, Route 25 functions as a principal arterial that provides access to commercial, office and industrial developments in Monroe (4.5 miles). Route 25 also serves as a connection to I-84 in Newtown.

The limited access portion of Route 25 provides three travel lanes in each direction. North of Route 111, the road narrows to a single lane of travel in each direction. Although turn lanes are provided at several signalized intersections, the two travel lanes often do not provide sufficient capacity for the volume of traffic on Route 25.

CT Route 34: Route 34 is a principal arterial that runs east-west from I-84 in Newtown to New Haven. In the Greater Bridgeport and Valley Region, Route 34 runs through the northern tip of Monroe and across the Housatonic River via the Stevenson Dam Bridge (to Oxford). Route 34 follows the Housatonic south-east into Seymour and continues into downtown Derby. In Derby, Route 34 intersects Route 8. West of Route 8, Route 34 is made up of a total of two travel lanes. East of 8, Route 34 is made up of two travel lanes in each direction.

CT Route 58

Route 58 functions as a minor arterial for a mile east-west between Route 1 (at the Bridgeport border) and Route 732 . Between its intersection with Route 732 and Route 15, Route 58 (Black Rock Turnpike) functions as a principal arterial that connects multiple shopping centers in a busy commercial corridor and runs approximately 2.4 miles east to northwest. After its intersection with Route 15, Route 58 becomes a minor arterial for 1.75 miles into Easton. In Easton, Route 58 is a designated scenic road and functions as a major rural collector that runs between 5 and 6 miles south-north to the border with the Town of Redding.

CT Route 67: Route 67 is only designated as a principal arterial for slightly less than a ¼ mile, from its intersection with Route 115, west to the Route 8 Interchange 22 northbound on-ramp.

CT Route 110: CT Route 110 runs south to north through Stratford and Shelton then east to west through Shelton and Monroe as a minor and principal arterial. The south-north portion of Route 110 roughly follows the Housatonic River. Route 110 begins at Route 1 in Stratford as a minor arterial. Between its intersection with Route 113 and Route 15, the road functions as a principal arterial and provides access to offices, retailers and a major regional employer. Route 110 continues north into Shelton as a minor arterial and intersects Route 8. In the vicinity of Indian Wells State Park, the road begins to run east-west toward Monroe. Route 110 ends at its intersection with Route 111 in Monroe.

CT Route 113

A small portion of Route 113 begins in Bridgeport as a minor arterial with access to I-95 southbound. Continuing south and east into Stratford, Route 113 functions as a major collector and runs adjacent to the Sikorsky Memorial Airport in Stratford's Lordship Neighborhood. Route 113 continues as a minor arterial and heads north through several commercial and industrial areas into Downtown Stratford. In Downtown Stratford (Stratford Center), Route 113/Main Street is classified as

Figure 3.4: Stratford Center, CT-113
Attribute: Peralta Design/Steve Cartagena

a principal arterial and provides access to the Metro-North rail station, Route 1 and several neighborhood and commercial centers. Route 113 terminates at Route 110.

CT Route 727: Route 727 is a principal arterial that runs from Route 8 Interchange 16 north along Pershing Drive. At Bridge Street, in Ansonia, SR 727 turns east before terminating at the intersection with Route 115 (Main Street). Pershing Drive is a major commercial corridor, connecting Downtown Ansonia with Route 8.

CT Route 731: Route 731 is a principal arterial that runs south-north from Downtown Bridgeport to the Trumbull intersection with Route 15 (as Main Street in both municipalities). Route 731 provides access to Route 8/25 in Bridgeport and Route 15 in Trumbull (where it becomes Route 111). Route 731 connects numerous commercial centers in Bridgeport. A regional shopping center (the Trumbull mall) is also located along Route 731 in Trumbull, in close proximity to the Bridgeport line.

CT Route 732: Route 732 is a principal arterial located in Fairfield that runs south-north from Route 1/King's Highway to Route 58/Black Rock Turnpike. The road provides connections to I-95 and commercial areas in the eastern half of the town.

MINOR ARTERIALS

CT Route 59: A minor north-south arterial that begins in Bridgeport on the Fairfield border and runs north through Fairfield into Easton. In the rural portion of Easton, Route 59 is classified as a rural major collector. Running northeast into Monroe, Route 59 is classified as an urban major collector until it terminates at its intersection with Route 25.

CT Route 67: CT 67 runs diagonally from Woodbridge in the suburbs of New Haven to New Milford in the Litchfield Hills. It begins at Amity Road (CT 63) in Woodbridge and runs west to Seymour, where it crosses the Naugatuck River and has an interchange with the CT 8 expressway. It then runs northwest through Southbury to New Milford where it ends at US 7.

Figure 3.5: CT-111 & CT-110, Monroe
Attribute: Peralta Design/Steve Cartagena

CT Route 108: Route 108 begins at Barnum Avenue or US Route 1 in Stratford and proceeds north, intersecting Route 8 and the Merritt Parkway in Trumbull. Continuing northward, Route 108 intersects with Isinglass Road as it makes its way into the village of Huntington in Shelton where it bisects the historic Huntington green. Route 108 turns eastward past the Huntington green and terminates at Route 110 in downtown Shelton. Route 108 is a two-lane road that widens to four lanes with turning lanes and traffic lights at the intersections with Route 8 and Route 15 in Trumbull.

CT Route 110: After intersecting with Route 15 in Stratford, Route 110 becomes a minor arterial. Continuing into Shelton, the road runs north along the Housatonic, intersects Route 8, then turns northwest through the center of town and west to Monroe. In Monroe, Route 110 continues west to end at an intersection with Route 111.

CT Route 111: Route 111 is an 11.7-mile minor arterial that runs south-north from Trumbull into Monroe. The road intersects with Route 15 and Route 25 in Trumbull and connects several neighborhood and commercial centers in the Town. In Monroe, Route 111 provides similar access to several neighborhood and commercial centers. In close proximity to Monroe's Town Center, Route 111 connects with the end point of Route 110 via a roundabout. Route 111 terminates at Route 34 in Monroe.

CT Route 115: Route 115 begins as Derby Avenue in Derby where it proceeds north from Route 34 to the city of Ansonia. In Ansonia, Route 115 becomes Main Street until an interchange with Route 334, where it continues north as North Main Street. In Seymour, it becomes South Main Street, meeting and briefly overlapping Route 313 before ending at an intersection with Route 67. The entire length of Route 115 is also designated as Veterans Memorial Highway

CT Route 127: Route 127 is a minor arterial that runs south-north from Bridgeport to Trumbull. Route

127 begins at Route 130 in Downtown Bridgeport/Steele Pointe. As East Main Street, Route 127 is primarily a business/retail corridor and intersects with I-95 and Route 1. In northern Bridgeport, the road becomes more residential. At the Bridgeport/Trumbull border, Route 127/White Plains Road intersects with Route 8. Continuing into Trumbull as a residential corridor, Route 127 intersects with Route 15 and Route 25. North of Route 25, Route 127 connects several commercial centers and Trumbull's municipal center (Church Hill Road). Route 127 terminates at Route 111/Main Street.

CT Route 130/CT Route 700: Route 130 generally runs west-east from eastern Fairfield to Stratford as a minor arterial. In Fairfield, Route 130 begins at the Route 1/Post Road traffic circle.

Crossing Ash Creek into Bridgeport, Route 130 runs northeast and provides access to neighborhood retailers and businesses in the Black Rock neighborhood (as Fairfield Avenue) and I-95. At its intersection with Commerce Drive/State Street, Route 130 becomes a one-way, eastbound thoroughfare (State Street). Route 700/Fairfield Avenue facilitates westbound travel into Downtown Bridgeport and access to Route 8/25. In Downtown Bridgeport, Route 700 ends at the Housatonic Avenue/Water Avenue intersection.

Route 130 begins to operate as a two-way thoroughfare (Water Street) at the Bridgeport train station. Crossing the Pequonnock River and the Yellow Mill Channel (via two movable bridges) as Stratford Avenue, Route 130 provides access to Steele Pointe (a regional commercial center that is partially developed) and I-95. At the Seaview Avenue intersection, Route 130 becomes a two-way couplet: Stratford Avenue for eastbound traffic and Connecticut Avenue for westbound traffic. Stratford Avenue is primarily an office/retail corridor for Bridgeport's East End neighborhood while Connecticut Avenue is a mix of residential, office/retail and industrial properties.

At the Stratford border, Route 130 again becomes two-way and continues as a commercial/industrial corridor with periodic access to I-95. Route 130 terminates at its intersection with Route 1 and I-95 in eastern Stratford, in close proximity to the Housatonic River and border with Milford.

CT Route 135: Route 135 (North Benson Road) is a 2.58-mile-long north-south route in Fairfield that begins at Post Road (US-1) and ends at Black Rock Turnpike (CT-58). Route 135 is a two-lane undivided road for its entire length.

CT Route 136: Route 136 is a minor east-west arterial that begins in Darien at an intersection with US-1 and runs through Norwalk, Westport, and the northwest corner of Fairfield to Easton, where the route ends at an intersection with Route 59. The entire length (20.46-miles) of Route 136 a two-lane undivided road, except for the bridge carrying it over the Norwalk River, which has four lanes.

CT Route 188: CT 188 begins at Roosevelt Drive (CT 34) in Seymour and ends in Middlebury at an interchange with Route 63. In Seymour CT 118 runs northeast before crossing into Oxford along Squantuck Road, Rockhouse Hill Road, and Quaker Farms Road.

CT Route 313: Route 313 begins at an intersection with Route 67 in Seymour. It passes underneath Route 8 and traverses the Naugatuck River before running coincident to Route115 and passing underneath the WBL. The road then continues southeast to the southeast to Woodbridge where it ends at an intersection with Route 243.

CT Route 334: Begins at an intersection with Route 188. Near the Seymour-Oxford town it winds 4.4 miles south and east and intersects Route 8 at Interchange 19, before crossing into Ansonia. In Ansonia Route 334 runs coincident to, Franklin Avenue, traversing a residential neighborhood and serving as the primary link between downtown Ansonia and Route 8. It then crosses the Naugatuck River before terminating at an intersection with Route 115.

CT Route 712: Route 712 (Bridge Street) is an east-west route, which crosses the Housatonic River between Shelton and Derby. It connects Howe Avenue (CT 110) in Shelton to Main Street (CT 34) in Derby and serves as a local alternative to the CT 8 expressway.

CT Route 714: Route 714 begins at Huntington Street in Shelton and runs along Bridgeport Avenue and Center Street until its terminus at the Route 108 interchange in Shelton.

BIPARTISAN INFRASTRUCTURE LAW (BIL) PROGRAMS

Several BIL programs target federal investment in Highways, Bridges & Roads. Detailed descriptions of BIL programs and funding can be found in Appendix B– Funding.

- Highway Safety Improvement Program
- Complete Streets
- Railroad-Highway Crossings
- Safe Streets and Roads for All
- National Culvert Removal, Replacement & Restoration
- Bridge Formula Program (BFP)
- Bridge Investment Program (BIP)
- Tribal Transportation (TTP) – Bridge Program

CT Routes 730 & 711 & 743: Routes 730 (East Main Street to Route 8 in Bridgeport), 711 (Route 8 to Route 108 in Trumbull), and 743 (Penny Avenue from Intervale Road to Route 108 – Nichols Avenue) are unsigned state roads that did not become part of Route 108 when the former Huntington Turnpike (a toll road built by the Huntington Turnpike Company) was redesignated in 1932.

CT Route 722: Route 722 (Chopsey Hill Road) is a .37-mile route which runs from US-1 in Bridgeport to Route 8 in Bridgeport.

Federal & State Policy, Planning & Programs

In total, the Bipartisan Infrastructure Law invests FHWA $350 billion in FHWA highway programs through September 30, 2026. The BIL also created more than a dozen new highway programs focusing on key infrastructure priorities including rehabilitating bridges in critical need of repair, reducing carbon emissions, increasing system resilience, removing barriers to connecting communities, and improving mobility and access to economic opportunity. Detailed descriptions of BIL programs and funding can be found in Appendix B– Funding.

Recent State Plans

Statewide plans developed by CTDOT are summarized. Section 9, Operations provides details about statewide safety plans.

STRATEGIC IMPLEMENTATION PLAN, I-95 WEST CORRIDOR

The **Strategic Implementation Plan for the I-95 West Corridor** (April 2019), which passes through Fairfield and New Haven Counties, was preceded by a 2012 FHWA Value Pricing Pilot Program

(VPPP) study, which evaluated the corridor and assessed alternatives for managing congestion. The Strategic Implementation Plan (2019) utilized a "targeted bottleneck strategy," or "selective highway widening and interchange improvements that are targeted to remove or reduce major travel bottlenecks." The Plan analyzed and built on previous studies and data to identify projects and spot improvements that could improve safety, travel times and speeds in advance of a full-length corridor widening project.

The Strategic Implementation Plan was also preceded by the 2018 CTDOT Study I-95 Improvements—Feasibility Evaluation Study (Greenwich to New Haven) which evaluated the feasibility of adding one additional travel lane in each direction along I-95 between the CT/NY state line and Bridgeport and various safety and operational spot improvements on I-95 between Bridgeport and New Haven. The Strategic Implementation Plan identified the most impactful spot improvements for the two distinct segments identified by prior studies—the New York state line to Bridgeport and Bridgeport to New Haven. The Study identified Short-, Mid-, and Long-Range Improvements for the I-95 West Corridor (Figure 3.6).

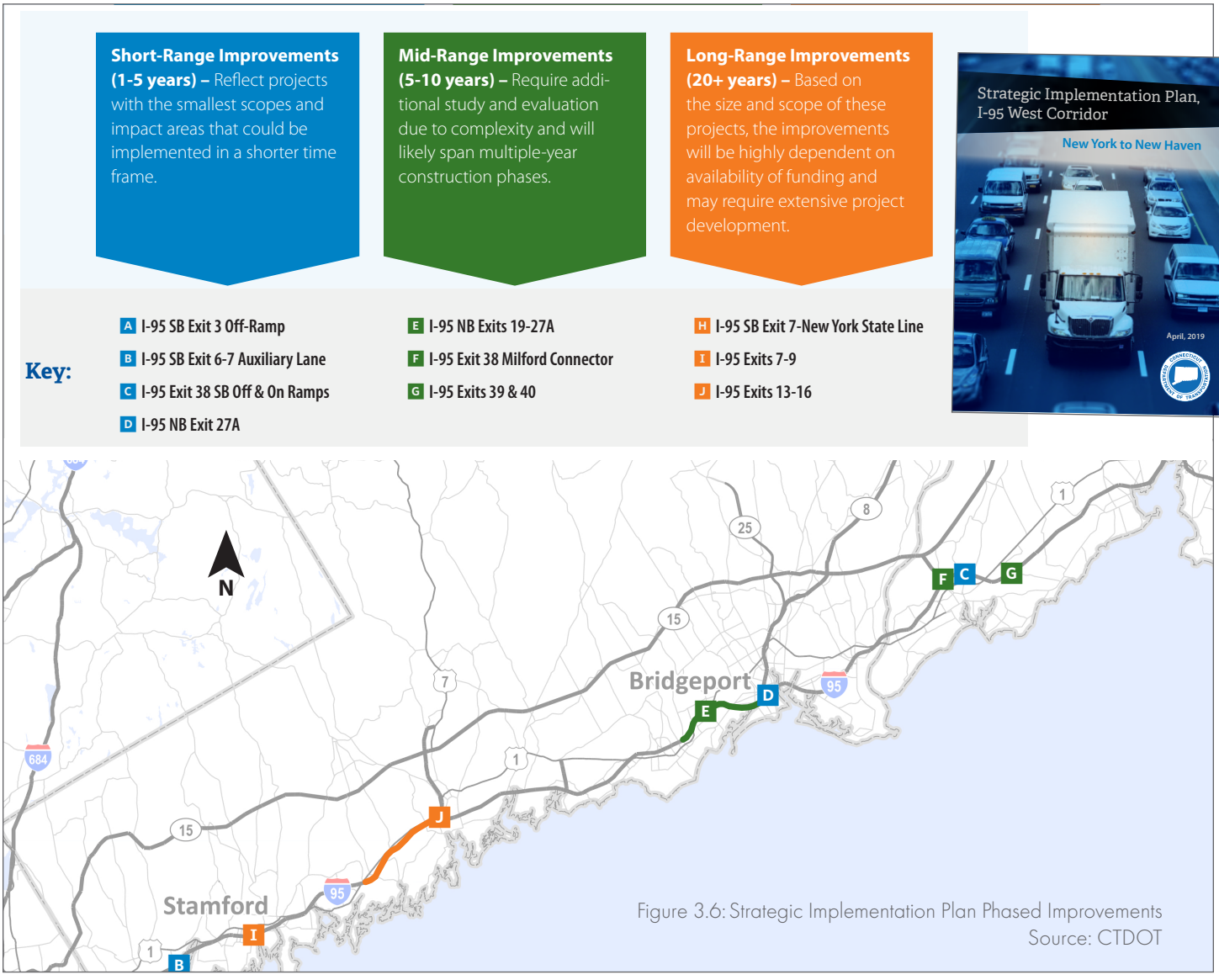
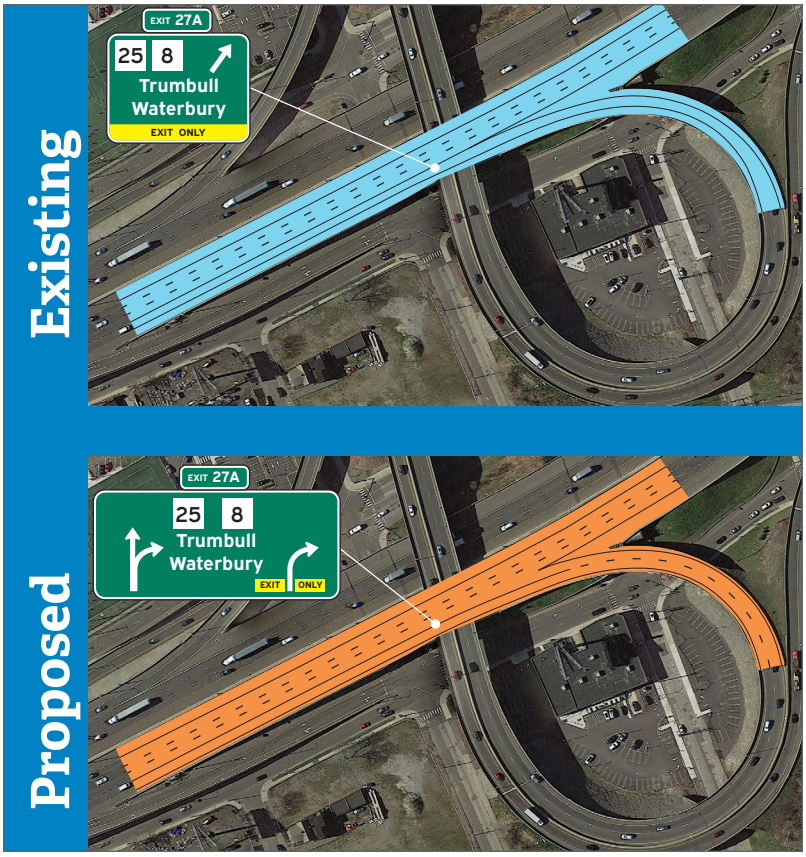
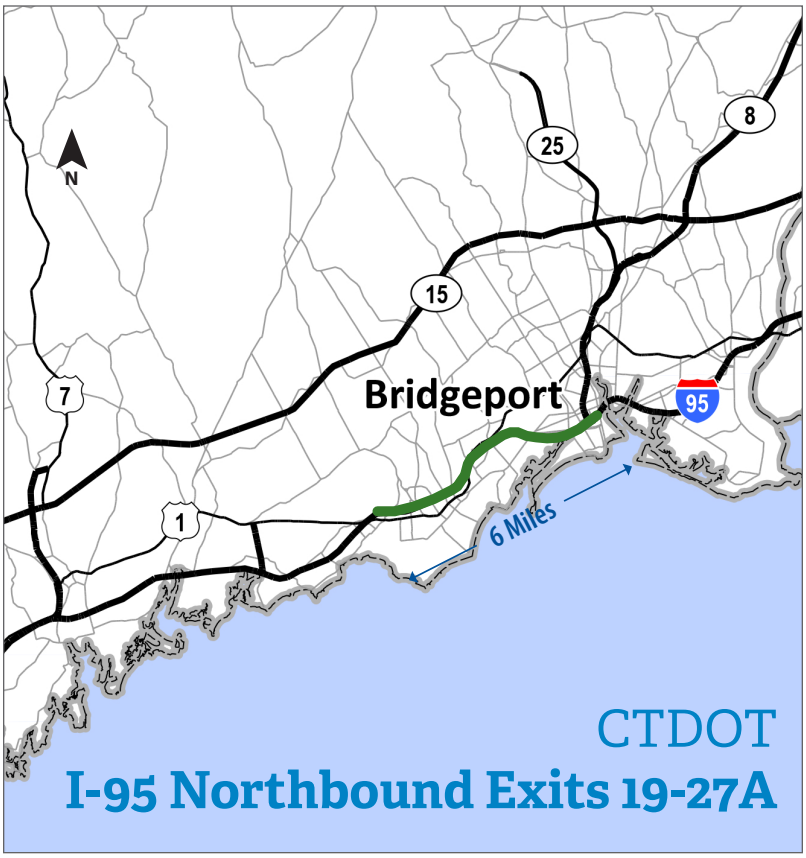


Figure 3.6: Strategic Implementation Plan Phased Improvements
Source: CTDOT





From top to bottom:
Figure 3.7: Strategic Implementation Plan: Short-Range
Figure 3.8: Strategic Implementation Plan: Mid-Range
Source: CTDOT

Short-Range

I-95 NB Exit 27A; I-95/Route 8-25 Interchange. The existing ramp design restricts sightlines and cannot accommodate two lanes. Traffic volumes exiting northbound via Routes 8 and 25 are higher than can be accommodated in a single-lane, which causes a queue to develop in the right northbound lane of I-95. The Plan proposed creating a two-lane off-ramp on I-95 northbound to allow two lanes to exit to Routes 8 and 25 to reduce congestion and queuing on I-95. This project is currently in-construction. The existing and proposed alignment is illustrated in Figure 3.7 (CTDOT Project 015-382; bridges 03532 & 00107).

Mid-Range

I-95 northbound in the northbound direction between exits 19 and 27A develops queues which cause significant congestion during the PM peak period. Adding a fourth lane along I-95 along this 6-mile stretch (Figure 3.8) of the I-95 northbound corridor could improve travel time and reduce congestion.

Long-Range

Conceptual improvements include widening and complementary projects for three segments with significant congestion: Greenwich Southbound Exit 7 to the New York State Line, Stamford Exits 7-9 (both directions), and Norwalk Exits 13-16 (both directions). These Long-Range improvements will further improve I-95 travel time for the entire I-95 West Corridor by reducing bottlenecks that develop south and cause queuing and congestion that extends over long stretches of the highway.

PLANNING & ENVIRONMENTAL LINKAGES STUDY (PEL)

In 2022, CTDOT received $4 million dollars to conduct a Planning and Environmental Linkages (PEL) study for I-95 Exits 19-27A. The PEL will examine alternatives to reduce overall congestion on this section of I-95, serve existing and future needs, and improve traffic operations, travel time, and safety. Root causes of congestion will be identified through analysis of current and projected traffic in relation to current facility deficiencies. Estimated completion for the PEL Study is 2025. Click here for the **Scope of Work**.

TRANSIT ASSET MANAGEMENT PLAN (TAMP)

Connecticut's 2022 Transit Asset Management Plan (TAMP) outlines a 10-year strategy for managing the state's pavements and bridges, as required by federal law. The strategy includes setting goals and objectives, reporting the current conditions of assets, and projecting conditions 10 years into the future. As part of the TAMP, FHWA requires states establish a performance gap analysis to meet minimum condition levels for NHS bridges and pavements. These are detailed in Section 11, Performance.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

The State of Connecticut is required to develop a **Statewide Transportation Improvement Program** (STIP) covering a period of at least four years (49 U.S.C. 5304(g)). The STIP is a staged, multi-year, statewide intermodal program of transportation projects, consistent with the statewide transportation plan and planning processes as well as Metropolitan Transportation Plans (MTPs), Transportation Improvement Programs (TIPs), and planning processes. The STIP must be developed in cooperation with the metropolitan planning organizations (MPOs) and public transit providers,) in the state, and must be compatible with the TIPs for the state's metropolitan areas.

Transportation Demand Management

Transportation Demand Management (TDM) is a range of congestion management strategies that reduce or modify the demand for transportation, rather than increasing the capacity of the transportation system. Examples of TDM include staggered or flexible work hours to reduce peak demand, employer incentives to use transit and ridesharing services and telecommuting.

CTRIDES

Most of the state's voluntary TDM programs and initiatives are coordinated through CTrides. A free service of CTDOT, CTrides provides both residents and businesses with information on commuting options. Services include work-site informational sessions, carpool & vanpool events, customer service consultants available via phone, email and on-line chat, a comprehensive website with information on local and express buses, vanpool providers, information on rail, walk, bike and Teleworking as well as a commuter reward program.

PARK & RIDE LOTS

Park and ride lots provide commuters who carpool or utilize a vanpool service with a place to park. Programmed projects to improve Park & Ride lots can be found in Appendix C, Table C.10.

Several park and ride lots are located in the Region and are listed in Table 3.3.

Table 3.3: Park & Ride Lots, GBVMPO

ROAD(S)	EXIT(S)
FAIRFIELD	
I-95 @ Roundhill Road	22
I-95 @ Johnson Drive	24
CT-15 @ CT-58 (E & W)	44
CT-15 @ CT-59	46
SEYMOUR	
CT-8 @ Lower Derby Avenue	20 & 21
SHELTON	
CT-8 @ Bridgeport Avenue	13
STRATFORD	
I-95 @ CT-113	30
CT-15 @ CT-110	53
TRUMBULL	
CT-8 @ CT-108 (Penny Lane)	9
CT-15 @ CT-127	50
CT-25 @ CT-111	NA
CT-25 @ Daniels Farm Road	9

Signals

Traffic signals regulate the movement of traffic at intersections by efficiently managing the flow and distribution of green time for vehicles, pedestrians, and bicycles at signalized intersections on arterial, collector and local roads. When properly timed, traffic signals increase vehicle and pedestrian capacity through an intersection and improve general safety and operations for all users. Signals help to reduce the risk of conflicts by allowing all road users exclusive access through the intersection in a clear and predictable manner, thus reducing conflicts between all road users. Improvements to traffic signals reduce vehicle idling times, fuel consumption and emissions. Computer controlled signal systems and embedded roadway sensors that actively control the system can further improve the efficiency of the transportation system.

TRAFFIC SIGNAL EVALUATION & MANAGEMENT (TSEM)

CTDOT regularly provides opportunities for municipalities to increase their understanding and experience with traffic control devices such as signals. CTDOT and the **UCONN Transportation Training and Assistance Center** (T2 Center) deliver technical assistance to municipal engineering, planning, public works, and police departments – as the operations and maintenance of signals require interdepartmental coordination. The T2 Center, through its Safety Circuit Rider and Traffic Circuit Rider program offers sessions to these departments where they can discuss the maintenance and operations of signals. During these training sessions, traffic signal technicians and engineers discuss and contextualize signal operations as they relate to moving vehicular traffic, bicyclists, pedestrians, and other road users. These sessions also enable opportunities to troubleshoot local issues. Attendees during the training participate in-field reviews of signals identified as problem areas and develop preliminary solutions that could inform the municipality's Traffic Signal Maintenance, and Operations Plan.

STATEWIDE, REGIONAL & MUNICIPAL SIGNAL UPGRADES:

In 2022, CTDOT initiated two statewide projects to identify municipally owned and maintained traffic control signals and to develop potential upgrades to these signals for installation by the State. CTDOT will develop a comprehensive list of eligible signals and will identify which signals require equipment or operations-related upgrades. Improvements may include:

- Removal of programmed flash operations.
- Installation of dilemma zone vehicle detection.
- Installation of retroreflective yellow borders on signal back plates.
- Replacement of incandescent signal lenses with LEDs.
- Installation of detectable warning pads.
- Replacement or rehabilitation of support structures.
- Pedestrian countdown signals with APS and LPI installation.

This effort will evaluate and recalculate yellow and red change intervals of existing signals and provide new timing tables to be implemented by a qualified state contractor at no-cost to municipalities. All signal improvements will be delivered consistent with the Manual on Uniform Traffic Control Devices (MUTCD).

City of Bridgeport

The City of Bridgeport has been proactive in upgrading the signal systems on several roadways. On Park Avenue, modernization of the system will improve traffic flow, reduce delays, and alleviate congestion. These efforts are anticipated to continue throughout the GBVMPO region.

To continue modernizing traffic signals in Bridgeport, MetroCOG and the City partnered on state and federal opportunities to fund upgrades. In 2022, the City of Bridgeport was awarded $4 million dollars from FHWA's Congestion Mitigation and Air Quality (CMAQ) Program for signal improvements along Park Avenue. This project will continue previous CMAQ-funded efforts to improve traffic flow, reduce delay, and alleviate congestion along Park Avenue.

An explanation of Level of Service (LOS), a measure of congestion is provided in Table 3.4.

Table 3.4: Level of Service (LOS) Criteria

CONDITION DESCRIPTION	LOS	INTERSECTION CONTROL DELAY	
		Signalized	Unsignalized
DELAY MEETS STANDARDS			
Few delays at intersection	A	<10	<10
Slight level of delay	B	>10 and < 20	>10 and < 15
Fair level of delay	C	>20 and < 35	>15 and < 25
Noticeable delay	D	>35 and < 55	>25 and < 35
DELAY EXCEEDS STANDARDS			
Signal cycles frequently fail	E	>55 and < 80	>35 and < 50
Over capacity	F	>80	>50

**Level of Service Source: East End Streets Existing Conditions Report (2022)/2010 Highway Capacity Manual (Special Report 209)*

Access Management & Efficiency

Significant commercial development along arterial roads may cause impediments in the flow of traffic, resulting in congested roadways and increased crash frequencies. Commercial developments include large office buildings, shopping plazas with several businesses (such as departments stores or restaurants, apartment complexes, hotels, medical facilities, gas stations and other high turnover land uses). Vehicles entering the roadway from these developments travel at slower speeds, which impedes traffic and affects roadway travel speeds. A vehicle waiting to turn into a driveway may block traffic as well. As the number of driveways and curb cuts increases, the demand for access increases, reducing the level of service and increasing the likelihood of vehicular conflicts (or crashes).

In contrast to roadways with frequent driveways, roadways that utilize access management strategies have fewer accidents and operate at better levels of service. Access management improves vehicle operations and traffic flow while maintaining efficient access to adjacent properties. A successful implementation of access management strategies will make access to commercial properties safer and easier, even though the closure or reduction in access points may appear to be inconvenient. These strategies should be locally developed and implemented, with commitment, and cooperation by both the municipality and the affected property and business owners.

ACCESS MANAGEMENT STRATEGIES

- Close and/relocate driveways;
- Consolidate driveways;
- Narrow driveway openings and better define entrance and exit points;
- Limit allowable movements such as right-turn only entrances and exits;
- Reduce curb radii; and
- Provide shared access for adjacent properties.

GBVMPO Projects

BRIDGES, CULVERTS & PEDESTRIAN BRIDGES

Bridge and Culvert projects improve the safety, efficiency, and reliability of the movement of people and freight over bridges.

Bridgeport

CT-130 Bridge Rehabilitation (Project 0015-0339): This project will rehabilitate the existing multi-span steel and concrete beam approach structure. Improvements consist of concrete deck

MAJOR PROJECTS

Project details can be found in Appendix C, Table C.8. Locations are mapped in Figure 3.9.

Ansonia: Franklin Street (CT-334) Improvements

Bridgeport/Fairfield: I-95 Capacity & Safety Improvements

Derby, Ansonia & Seymour: CT-8 Road & Bridge Improvements (Project 0036-0203)

Monroe/Oxford: CT-34/Stevenson Dam Bridge Replacement, See Figure 3.10 (Project 0084-0114)

Stratford: MetroNorth Railroad & US-1 Bridge Replacement (Project 0138-0245)

Statewide

- Noise Wall Replacement Program (TAM)
- Culvert Replacement Program (TAM)
- Retaining Wall Program (TAM)

Figure 3.9: Major Projects, GBVMPO

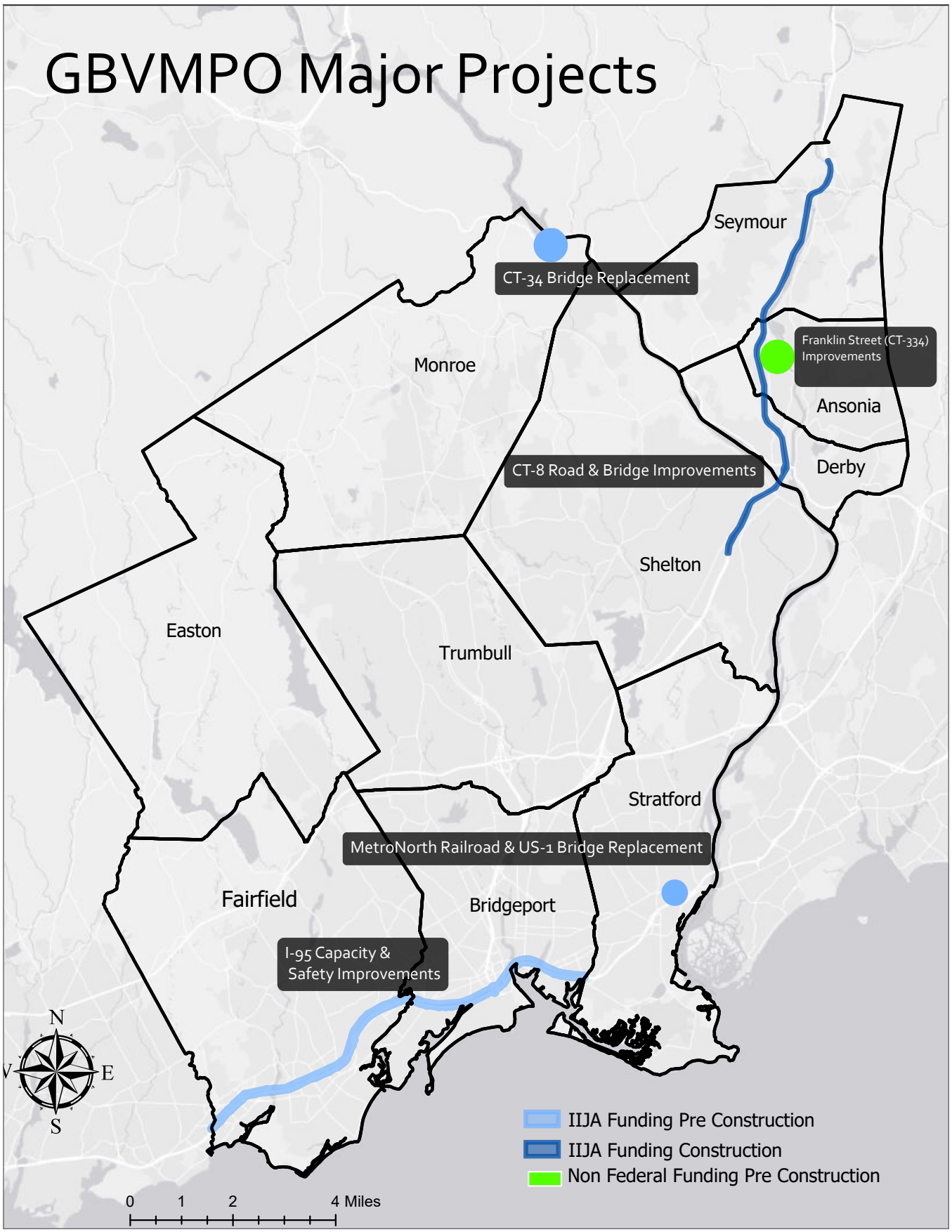


Figure 3.10: Stevenson Dam bridge, Monroe
Attribute: Peralta Design/Steve Cartagena

patching, concrete beam repairs, steel superstructure repairs and painting, substructure repairs, replacement of the pier protection fender system, replacement of the lift cables for the lift span, mechanical and electrical systems upgrades and repairs, repurposing of the exiting control house, and construction of a new control house.

US Route 1 Bridge Rehabilitation over Yellow Mill Channel (0015-0248): This project will rehabilitate Bridge 00325 carrying Route 1 over Yellow Mill Channel and a rail spur line in Bridgeport. Project completion is expected in Summer 2022.

ROADS

Highway

CT Route 34 Roadway Improvements (Derby): This project includes improvements to Route 34 (Main Street) from the vicinity of Ausonio Drive to Bridge Street, a distance of about 3,300 feet. Improvements include the reconstruction and widening of Main Street to 4 travel lanes. This project is currently under construction and is expected to be completed in summer 2024.

CT 8-25 Highway Lane Improvements (Bridgeport): This project includes travel lane improvements to the Route 8 and 25 split. Currently, three travel lanes carry CT-25 northbound, while only 2 travel lanes carry CT-8 Northbound which results in congestion during peak hours. Improvements will add additional travel lanes to Route 8 split until the on ramp to Route 15.

Intersections, Roadways, & Roundabouts

CT-67 & CT-113 Spot Improvements (Seymour): This project includes several improvements to traffic signals, road widening, intersection realignment, access control and safety improvements for pedestrians/cyclists. Semi-final design plans are currently under review, with final design plans to be expected in Spring 2023.

Complete Streets & Multimodal

Complete Streets is an approach to transportation design focused on equitable and safe access for all road users.

Lafayette Circle Realignment (Bridgeport): Lafayette Circle intersects Fairfield Avenue/Route 700 and serves as the gateway to Downtown Bridgeport from Route 8/25. Built in the 1960s as part of a larger urban renewal project, the Lafayette Circle area does not convey a sense of entry into a vibrant downtown. Due to the existing configuration of the circle, traffic patterns are confusing and compromise both vehicular and pedestrian circulation. To enhance the movement of traffic to and from Route 8/25 and improve access to Downtown Bridgeport, Lafayette Boulevard will be reconfigured as a traditional boulevard and will intersect directly with Fairfield Avenue/Route 700. Complete streets elements will include street trees, wide sidewalks and pedestrian amenities.

Road Safety

The national, state, and regional goal of a safe, multi-modal transportation system across all modes and abilities is a crucial element of the Metropolitan Transportation Plan. MetroCOG and NVCOG recently completed Regional Transportation Safety Plans (2020 and 2021, respectively) and have made a commitment to Vision Zero. More information about safety, including detailed descriptions of MetroCOG and NVCOG's Safety Action Plans can be found in Section 9 – Safety, Operations, and Emerging Technologies.

Safety projects are a priority as they will prevent fatal and serious injury crashes involving all road users. Safety engineering solutions may involve roadway configurations, signals, signs, and pavement markings in addition to policies, standards, guidelines, and practices related to highway safety.

Division Street and Pershing Drive Improvements (Ansonia): This project will improve the intersection by creating truck aprons at Corner, resulting in a smaller, safer intersection

CT-8 Spot Improvements (Project 0036-0203, Derby, Ansonia, Seymour): This project will include roadway resurfacing, bridge rehabilitation and safety improvements in Derby, Ansonia and Seymour.

CT-111 and Pequonnock River Trail: In Trumbull, the Pequonnock River Trail crosses Route 111 at grade and high vehicular speeds pose a safety issue to bicyclists and pedestrians This project will install a traffic signal at the driveway of a commercial development which will include a protected pedestrian phase. PRT trail users will have a safer and easier crossing.

CT-313 Roundabout (Seymour): This project will upgrade the intersection at Clinton Road with a modern roundabout to replace an existing, dangerous Y-configuration, resulting in increased capacity, and vehicular and pedestrian safety.

CT-8, Exit-22 Ramp Improvements (Seymour): This project will improve sightlines for traffic entering CT-67 via the southbound ramp.

PLANNING & CORRIDOR STUDIES

CT-Route 110 Engineering & Planning Study (Stratford)

The Route 110 Engineering Planning Study was conducted to develop a comprehensive transportation improvement plan for the Route 110 corridor study area. The goals and objectives of the study were to develop cost effective transportation solutions that improve vehicular operations and

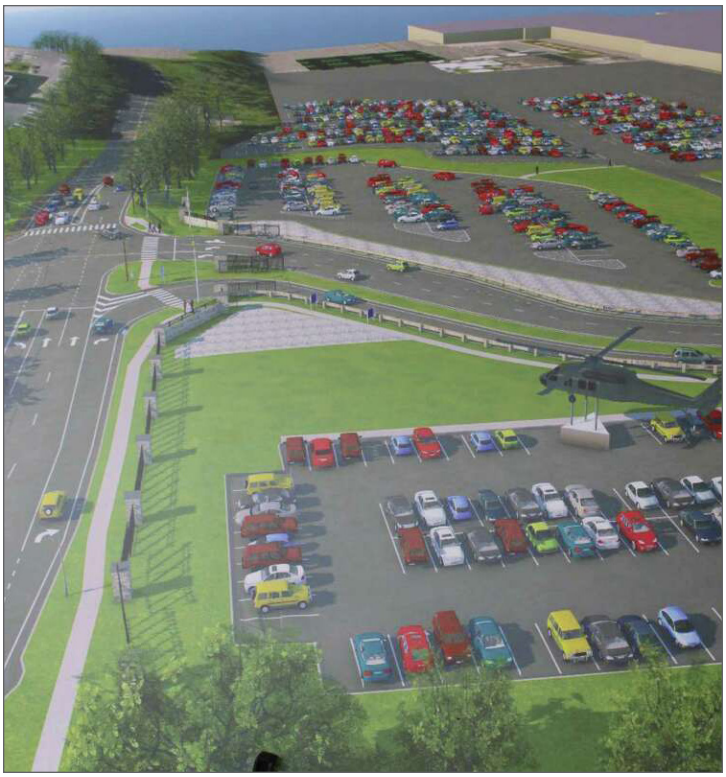


Figure 3.11: CT-110 & Sikorsky driveway, Stratford
Attribute: CTPost

mitigate congestion, improve mobility for alternative travel modes and infrastructure for cyclists and pedestrians, and develop a transportation improvement plan with prioritization and implementation time frames to meet current and future corridor needs. This Engineering Study was conducted and completed in early 2017. The initial concept for the Sikorsky driveway realignment projects was a result of the Route 110 Corridor Study (see Appendix G for a description of the project and Figure 3.10 for a visual). Further project and funding information can be found in Appendix C, Table C.6 – CT-110 Study, Stratford

CT Route 25 & CT Route 111 Engineering Planning Study (Monroe & Trumbull)

Completed in 2019, this Engineering and Planning Study identified strategies to improve traffic operations along the Route 25 and 111 corridors in northern Trumbull and the southern half of Monroe, especially during peak commuting hours. Routes 25 and 111 are regionally significant corridors that serve local businesses, employers, schools, medical facilities and retailers. These corridors provide connections to the Merritt Parkway, the Route 8/25 Expressway, Route 34, Interstate 84 and intersecting local and collector roads. In addition to traffic congestion, the study also identified strategies to address safety issues and measures to mitigate deficiencies, develop appropriate accommodations for bicyclists, pedestrians and transit users, mitigate potential impacts to environmental resources, develop future development potential along both corridors, and provide solutions for access to businesses, employers & services. The Route 111 signal and PRT crossing was a recommendation of the study.

Further project information and funding can be found in Appendix C, Table C.5 – CT-25 & CT-111 Study, Monroe & Trumbull..

Black Rock Turnpike Safety Study (Fairfield)

Completed in 2019, the Black Rock Turnpike Safety Study was the first step in improving conditions for all users of the corridor. The final document identified strategies to reduce congestion, create a safe and attractive pedestrian environment, and develop linkages between residential areas and the shops, businesses and restaurants along Black Rock Turnpike. Through the study, alternatives for road, bicycle/pedestrian, and safety improvements were analyzed. An extensive public engagement process guided the progress of the study and included a variety of opportunities for stakeholders to provide feedback on the most feasible and impactful alternatives.

.Further project information and funding can be found in Appendix C, Table C.3 – Black Rock Turnpike Safety Study, Fairfield.

Figure 3.12: Post Road Circle concept, Fairfield
Source: FHI/Tighe & Bond

Post Road Circle Study (Fairfield)

The Post Road Circle is extremely difficult to navigate, especially for drivers not familiar with the road network. High traffic speeds and volumes are exacerbated by layout issues, turning movement conflicts, lane reductions, and other problems. Numerous driveways and parking lots create approximately 50 curb cuts in the study area. Limited pedestrian crossings, a lack of sidewalks in some areas, minimum handicap accessibility, and limited transit amenities leave pedestrians underserved. Traffic Engineering and design criteria for Post Road (US 1/CT 130) were developed in the 1950s and very little reconstruction or redesign has taken place since. While area land uses have changed and development persists, the increasing demands of the roadway network are felt by all road users who travel through and around the project area.

Through this study, the Town of Fairfield and MetroCOG developed comprehensive planning document that identified improvements to address vehicular safety, bicycle/pedestrian safety, and congestion. Both near- and long-term strategies, at various funding levels have been identified.

Further project information and funding can be found in Appendix C, Table C.4 Post Road Circle Study.

East End Streets (Bridgeport)

This Study will identify feasible improvements for the Connecticut Avenue and Stratford Avenue Corridor in the East End of the City of Bridgeport. The goal of this study is to increase safety for all modes, reduce traffic congestion and accommodate bicyclists, pedestrians and transit users.

Made up of two one-way streets or couplets, the corridor is part of the state highway system, CT Route 130. Over 14,000 vehicles are estimated to use the corridor daily, split relatively evenly between Stratford and Connecticut Avenues. Posted

speed limits of 25 and 35 mph vary along both corridors, motorists regularly exceed the posted speed limits.

The study will provide the City of Bridgeport, MetroCOG and CTDOT with a comprehensive planning document to guide future development, identify needed roadway and intersection improvements, address capacity and solve traffic safety issues along the corridor. The study will also analyze and select preferred alternatives with input from local, municipal and state stakeholders. Input from stakeholders continues to be collected through advisory committee and public meetings.

The study area is concentrated on the Connecticut Avenue and Stratford Avenue Corridor as it extends from the paired origin of the two roadways at Seaview Avenue (west) to their terminating convergence at the Bridgeport/Stratford border (east). The study's core focus is on the Stratford Avenue/ Connecticut Avenue corridor with consideration of the major north-south routes — Seaview, Central and Bishop Avenues — as well as of the lesser north-south routes – Newfield, Bunnell, Union, and Hollister Avenues – along with the important east-west routes of Beardsley and Orange.

More information, final reports, and conceptual transportation solutions for each of the planning and corridor studies above can be found **here**.

RECENTLY COMPLETED PROJECTS

Project details can be found in Appendix G

State Roads

Fairfield: King's Highway (US-1) Pedestrian Improvements, Phase II

Monroe: Modern Roundabout at CT-110 & CT-111

Stratford:

I-95, Full Interchange at 33

CT-110 & Sikorsky Gate 1

Local Roads

Bridgeport: Seaview Streetscape Improvements

Derby/Shelton: Rehabilitate Bridge over the Housatonic River

Easton: South Park Avenue Bridge Reconstruction & Replacements

Trumbull: Moose Hill Road Reconstruction & Improvements

4 | ACTIVE TRANSPORTATION

Active transportation is a term used to describe human-powered means of travel, namely bicycling and walking. Sometimes referred to as "non-motorized," active transportation promotes healthy and sustainable lifestyles, while offering a low-cost alternative to other travel modes.

Holistically integrating safe and accessible, and efficient facilities for vulnerable road users such as pedestrians and cyclists—as part of the road and transit network and as stand-alone infrastructure—is critical for creating a multi-modal transportation system. Safe and convenient active transportation expands access to the public transportation network for people without cars. Improving the appeal of physically active travel can also spur investment in infrastructure to increase the comfort of the on-road experience, which improves the appeal of non-motorized travel for all people.

Infrastructure Oriented to People

Because the transportation system in Connecticut developed oriented to the automobile, traditionally driving is considered the safest and most convenient method of travel in the state. Many of the transportation improvements and infrastructure investments that occurred throughout the 20th century prioritized the efficient flow of vehicular traffic. Overbuilt roadways, multiple lanes of travel, exclusive turn lanes, and traffic signal phasing are just some examples of how traditional transportation planning favors vehicles. As a result, much of the

REGIONAL GOALS: ACTIVE TRANSPORTATION

The GBVMPO is committed to providing a shared/active transportation system that will accommodate a diversity of different users, skills, and abilities. This section of the MTP identifies projects that:

1. Promote Safety Across all Aspects of the Transportation System.
   a. Work towards zero traffic deaths and serious injuries regionwide.
   b. Incorporate targeted safety countermeasures into the multimodal transportation system.

4. Bolster Interconnected, Public Transportation across the Region and Strengthen Access to Economic Opportunity Centers.
   a. Foster an efficient, reliable, and inter-modal regional public transportation network.
   b. Identify opportunities for public transportation to support local economic development.
   c. Strengthen first- and last-mile connections and services

6. Provide Shared/Active Transportation Initiatives that Strengthen First- and Last-Mile Connections.
   a. Expand, maintain, and improve accessible pedestrian infrastructure and amenities.
   b. Increase mobility choice and access to greenways, trails, and bike lanes.
   c. Support micro-mobility, shared transportation, and encourage flexibility as innovative services become available.

Figure 4.1: Trumbull Mall Transit Stop
Source: GBT

existing infrastructure in the region encourages high vehicle speeds, leaving few safe and accessible accommodations for other travel modes, including bicyclists and pedestrians.

Vehicle congestion and scarcity of sidewalks, crosswalks, and bicycle facilities are road characteristics that limit walking and cycling trips due to safety and accessibility concerns. Improving these elements encourages active transportation such as children biking to school or employees walking to work.

Federal & Statewide Active Transportation Policies & Programs

Federal transportation acts provide dedicated funding for active transportation projects and several new Connecticut policies and programs now require transportation projects to consider the needs of bicyclists, pedestrians, and other vulnerable road users (e.g. those with mobility impairments).

Specific changes to state policies and how transportation projects consider the needs of pedestrians, bicyclists, and vulnerable road users include:

Connecticut Bicycle & Pedestrian Advisory Board

The Board was established in 2009 by Public Act 09-154 and codified in the General Statutes as Section 13b-13a. Its primary duties are to examine the need for pedestrian and bicycle transportation, promote pedestrian and bicycle programs and advise state agencies on policies, programs and facilities for bicyclists and pedestrians. CTDOT

is required to assist the Board in carrying out its responsibilities.

Complete Streets Policy

In accordance with state General Statute Section 13a-153f (a)(d), CTDOT prepared and executed a policy statement to consider users of all abilities and ages in the planning, programming, design and construction of all road projects. The policy was signed in October 2014.

Bicycle & Pedestrian Travel Needs Assessment Form

This form is used to promote and assure the needs of all users are considered in the planning, design and construction of all roadway improvement projects. In accordance with the Complete Streets Policy, CTDOT requires the completion of this form.

Share the Road CT

Effective October, 2008, Connecticut requires motorists to allow at least three feet of separation when overtaking and passing cyclists. Failure to do so could cause motorists to receive a fine under the motor vehicle code "failure to grant the right of way to a bicycle" (14-242). The Share the Road program strives to improve the knowledge of all roadway users and promote safe travel and minimize the likelihood of crashes.

Bicycle Safety Bill

This law, enacted as Public Act 15-41, requires bicyclists to ride as close to the right side of the road "as is safe, as judged by the cyclist." This supersedes the previous law that required cyclists to ride as far right "as practicable", which could have included instances where a bicyclist is preparing to make a left turn at an intersection or onto a private road. Drivers are also allowed to cross double yellow lines to pass slower moving bicyclists when it's safe to do so. Additionally, this law allows two-way bicycle lanes, buffered bike lanes, and cycle tracks to be designed in Connecticut.

Community Connectivity Program

As part of the Let's Go CT! Program, CTDOT initiated the Community Connectivity Program. It focuses on improving pedestrian and bicyclist safety by implementing various low-cost road, sidewalk and intersection improvement projects. This process begins with evaluating and conducting Road Safety Audits (RSA) that identify problems and develop low- and high-cost actions to address safety deficiencies. Statewide, 93 RSAs have been completed thus far – 8 conducted in the GBVMPO and 4 within the MetroCOG region. Subsequently, funding was provided to construct projects ranging in cost between $75,000 and $400,000, with funding provided to 104 cities and towns across the state.

Pedestrian Safety Zones & Municipal Roadway Speed Limits

Public Act 21-28 provides additional safety legislation that allows Local Traffic Authority (LTA) control to designate Pedestrian Safety Zones in clearly defined downtown districts or community centers, frequented by pedestrians, along municipally owned roadways. Furthermore, municipal LTA's may also choose to establish/modify speed limits on all municipally owned roadways. PA 21-28 also brought additional safety measures for vulnerable users relevant to fines, violations, etc. which can be reviewed **here**.

Active Transportation SPAN Grant

In 2019, the Connecticut Department of Public Health initiated a program to be administered by the Capital Region Council of Governments (CRCOG) known as the State Physical Activity and

Nutrition Program (SPAN). The SPAN grant is a statewide effort that provides projects and training to municipalities through the eight COGs to educate and improve community health outcomes and increase physical activity. The program offers a diversity of solutions focused around supporting and enhancing physical activity through several transportation related strategies. The program offers bicycle safety trainings, community information pop ups, Complete Streets design charette and implementation workshops, Tactical Urbanism projects, small area/land use planning, policy plannings and writing, funded municipal bicycle rack distribution, Walking School Bus trainings, and more. The program will enter its fifth funding year in 2023, further providing opportunities for municipalities to improve their knowledge on active transportation best practices, infrastructure, and implementation. The GBVMPO region received several of the program offerings mentioned above in the previous four program years.

TRANSPORTATION ALTERNATIVES SET-ASIDE PROGRAM

Transportation Alternatives is a competitive federally designated, state administered transportation program by the Federal Highway Administration and the Connecticut Department of Transportation. Transportation Alternatives (TA) provides funding for smaller scale transportation projects such as on- and off-road pedestrian and bicycle facilities, multi-use trail projects, and Safe Route to School projects. This program provides funding for project costs of $500,000 or greater. The TA funding is sub-allocated by Urbanized Area (UZA), where the Bridgeport/Stamford UZA, having a population greater than 200,000, receives roughly $2.1 million dollars annually. Funding is set to increase yearly through 2026 via the federal IIJA Transportation Authorization Bill. The 2019 solicitation of projects by the CTDOT allowed cross regional collaboration of planning agencies in the UZA. MetroCOG, NVCOG, and WestCOG selected and prioritized a list of transportation projects and a MetroCOG region project was ranked as the top prioritized project. A reprioritization was done in 2022, as additional program funding was made available by the FHWA.

SAFE ROUTES TO SCHOOL PROGRAM

Previously a standalone program, the federal Safe Routes to School Program (SRTS) now falls under the Transportation Alternatives Program. The focus of SRTS is on the school environment and the travel paths of students from home to school. The SRTS program is local and targeted to an individual schools. It requires the active participation and commitment of parents, teachers, and school administrators, as well as a local transportation/traffic engineer. Since improvements should reflect the issues, concerns and needs of the students walking and bicycling to a specific school, the SRTS team must have a complete understanding of existing conditions in the school's vicinity. Possible SRTS physical improvements encompass a wide range of pedestrian enhancements and traffic calming actions as well as education and encouragement programs. As the SRTS program is led by a specific school community, the projects detailed in this section were not developed through the SRTS process. However, these projects take into account the safety and access needs of all users, including students on their way to school.

Vision Zero

Vision Zero is a strategy to eliminate traffic fatalities and severe injuries among all road users, and to ensure safe, healthy, equitable mobility for all (https://visionzeronetwork.org/). The Safety Action Plan is an important step towards MetroCOG's goal of reaching zero traffic-related deaths region-wide by the year 2050. The MetroCOG Regional Safety Action Plan identifies a shared challenge—safety for motorists, pedestrians, cyclists, transit users, micro-mobility, and other vulnerable road users in all the Region's municipalities. Key to developing the plan and identifying appropriate countermeasures, strategies and projects was the High Injury Network (HIN) analysis. This analysis identified the region's roadways where a disproportionately high amount of traffic deaths and serious injuries occur. Through this analysis, all stakeholders are better able to focus limited resources on the most problematic locations and issues. Core components of the action plan regional and municipal HIN analyses, project selection and prioritization, an equity impact assessment, public engagement, policy strategies and how to measure progress in the future. Policies, process changes, and strategies utilized Safe Systems Approach. The Safety Action Plan informed many of the projects in the MTP and is integrated into this document. **Click here for the Safety Action Plan**.

A key component of the Safety Action Plan is a shared commitment among varying stakeholders, including but not limited to transportation officials, municipal staff/leaders, state DOTs, Metropolitan Planning Organizations, residents, advocacy groups and organizations. MetroCOG established the Safety Planning Subcommittee (TTAC) in Fall 2022 to carry out the objectives of the Safety Action Plan, including annual progress updates.

MetroCOG's Safety Planning Subcommittee (TTAC): Established in Fall 2022, the Safety Planning subcommittee (SPSC) of MetroCOG's Transportation Technical Advisory Committee (TTAC), is responsible for oversight of the Action Plan. The diverse membership of the Subcommittee will help to achieve a holistic, community-wide approach to realizing Vision Zero in the region.

NVCOG REGIONAL SAFETY ACTION PLAN & 2022 ADDENDUM

Both Region's Regional Transportation Safety Plans (RTSP) were intended to be updated every five years. A mid-term addendum was compiled to support the region's Vision Zero policy and goal. The addendum adds an expanded project list, based both on data and on the input from municipal leaders and the public. An expanded public engagement strategy was developed for this update and is detailed in this section as well. Updated crash data for the region, looking at the three full years of 2019, 2020, and 2021, were analyzed. Finally, a more thorough equity analysis was completed, ensuring that the 2022 project listing update programmed a fair amount into the Environmental Justice and Equity areas of concern within the region. Regional Transportation Safety Plan (MetroCOG, 2020 & NVCOG, 2021)

The purpose of the RTSP is to reduce crashes that result in serious or fatal injuries on state and local roads that are not limited access highways. Both MetroCOG and NVCOG's RTSPs align with the State Highway Safety Plan. The plans serve as strategic road maps to assist the MPO and municipalities in collaborating with the state to reduce the most serious crashes. The plan uses a similar methodology as the SHSP but is with a local and

regional focus that reflects the needs of individual communities. The plan was developed involving local stakeholders from the four E's of transportation safety: engineering, enforcement, education, and emergency response. Each municipal report includes local crash data and incorporates stakeholder input to develop proactive goals and countermeasures that can potentially mitigate fatal and injury crashes. To inform this process, data from the UConn Crash Data Repository was analyzed, and municipal representatives were consulted to identify priority locations to reduce severe crashes.

The RTSPs were developed through a traditional approach to transportation safety based on the 4 Es: engineering, enforcement, education, and emergency response. MetroCOG's Safety Action Plan and NVCOG's Addendum utilized a more comprehensive and multi-disciplinary approach to safety planning and equity considerations were utilized to guide the analysis, project prioritization and policy recommendation.

The Regional Transportation Safety Plan was also informed by the safety issues and safety improvement projects that were documented in the 2019 MTP.

Connecticut Vision Zero Council: This council is an ad hoc interagency working group that is tasked with supporting and developing statewide policies to eliminate transportation related fatalities and severe injuries involving pedestrians, bicyclists, transit users, motorists, and passengers. This Council is further charged with supporting and advancing the goals of the Vision Zero Network and its initiatives throughout Connecticut's roadways and transportation systems. The Council's inception was part of a multitude of bicycle, pedestrian, and vulnerable road user safety legislation enacted by the Connecticut Legislative Assembly under Public Act No. 21-28, June 2021.

Complete Streets, Traffic Calming & Cycling Infrastructure

COMPLETE STREETS

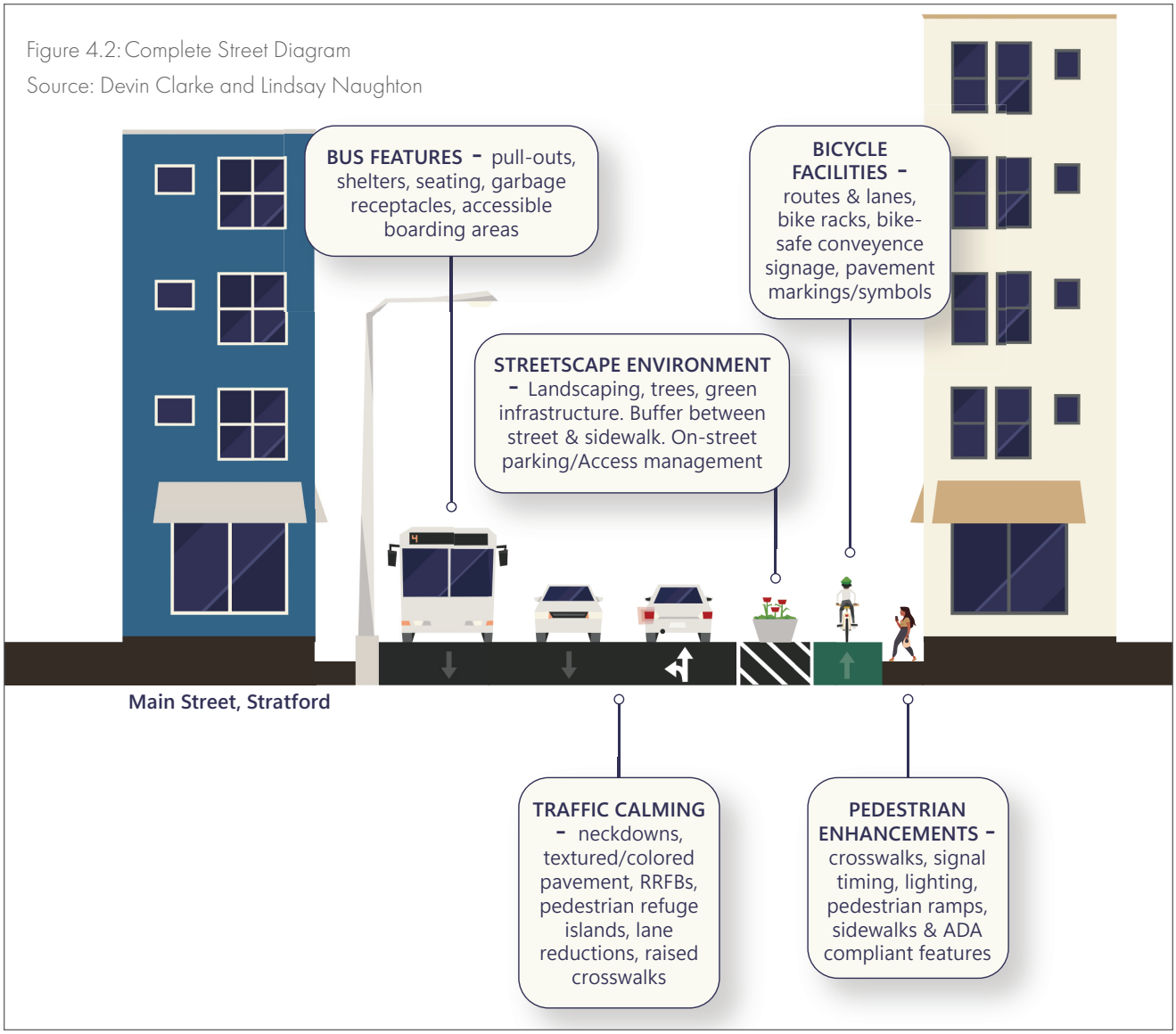
A complete street is designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Integrating the Complete Streets model into the transportation system requires changes to how the street environment is planned, designed and built, as well as how it is used.

In addition to sidewalks, a Complete Street implementation extends beyond the pavement to include space along the roadway. Wide streets with little or no landscaping induce drivers to travel quickly through the area and provide no sense of place. A well-designed roadway, with Complete Street elements, has the effect of "visually" narrowing the road increasing the equity for all roadway users, and improving the street environment. Each design element of a Complete Street is unique and utilizes a context sensitive approach.

Complete streets elements typically include:

- Bicycle facilities: bicycle routes and lanes, signage, bicycle racks, bicycle safe storm water grates, and appropriate pavement markings and symbols.
- Bus features and amenities: bus pull-outs, shelters, seating, garbage receptacles, and clear and accessible paths.
- Pedestrian enhancements: crosswalks, signal and timing enhancements, lighting, curb ramps, and sidewalks.
- Traffic calming actions: textured pavement material, intersection bump-outs, lane reduc-

Figure 4.2: Complete Street Diagram
Source: Devin Clarke and Lindsay Naughton



tions, curb extensions, center refuge islands, Rectangular Rapid Flashing Beacons (RRFB), and raised intersection tables.

- Streetscape environment: appropriate trees, landscaping, bio-swales and rain gardens, permeable paving material, and buffers between the street and sidewalk.
- ADA compliant features: curb ramps, audible pedestrian signals, detectable tactile cues and warnings, accessible pedestrian signals, and longer walk intervals.
- On-street parking treatments: delineated parking spaces and curb/sidewalk bump-outs.
- Access management: driveway consolidations, modifications and closures.

TRAFFIC CALMING

Traffic Calming actions utilize a proven safety countermeasures to slow traffic speeds and/or divert traffic. Traffic problems are perceived differently depending on the location and function of the road. Motorists want efficient operations with the ability to travel at a consistent rate-of-speed. Often, these objectives conflict with the quality-of-life residential neighborhoods and non-motorized users' desire. In residential areas for example, reducing travel time and congestion for drivers may

Figure 4.3: Shared street, Pratt Street, Hartford
Source: prattst.com

be less important than maintaining quieter streets with slower speeds and fewer cars.

Traffic-calming projects necessitate site-specific solutions that address local concerns. Often, physical devices are installed in the roadway to induce changes in driver behavior and improve the conditions for non-motorized street users. Projects should only be implemented after a thorough investigation.

Key Elements of Traffic Calming

- Volume control measures that divert some or all of the traffic in a different direction: street closures, diverters, median barriers and forced turn islands.
- Vertical speed control measures that force traffic to slow down: speed humps, speed tables, raised crosswalks, raised intersections and textured pavement, variable speed signs.
- Horizontal speed control measures that deflect the movement of traffic: mini traffic circles, chicanes, lateral shifts and realigned intersections.
- Road narrowing speed control measures that affect the driver's perception of road width: neckdowns, center islands, and chokers.
- Modern roundabouts calm traffic and improve safety through their geometric design. This includes slipper islands, pedestrian refuge locations, signage, etc. while efficiently moving traffic through the intersection.
- Reallocation of roadway width to convert one-way streets to two-way and create "gateways" with newly installed bicycle lanes.

CYCLING INFRASTRUCTURE

Sidewalks are designed accommodate pedestrians, with considerations for their speed, comfort,

and maneuverability. Sidewalks should not be considered acceptable for use by bicyclists and designating a sidewalk as a bicycle path is not a satisfactory policy. The higher speeds of bicycles cannot be safely accommodated on sidewalks. The commingling of pedestrians and bicyclists result in user conflicts. Sudden changes in direction by pedestrians leave bicyclists little time to react and pedestrian are sometimes uncertain where on-coming bicyclists are going.

To a varying extent, bicycles should be ridden on all facilities where they are permitted. Therefore, the most common bikeway is a shared roadway facility. All roads open to bicyclists should incorporate design treatments that will enhance bicycle riding qualities and should be maintained and upgraded to ensure bicycle travel can occur safely and conveniently. Bicycle accommodations also depend on the type of road and characteristics of traffic. On low volume, residential streets, bicyclists can easily integrate with the few vehicles on the road and may not require any separation. A road is a public right-of-way to be considered a shared space used by vehicles, bicyclists and pedestrians. Conversely, special treatments are necessary and greater separation is required to accommodate bicyclists on higher-volume, higher-speed arterials.

Design Considerations for Equitable Cycling Infrastructure

Considerations for cycling equity are multi-faceted, including decisions about pricing and affordability, location of bike share stations and/or bike racks, and shifting resident perception about barriers to riding a bicycle. Low-income neighborhoods are much more likely to contain major arterial roads with high speeds and traffic volumes—and much less likely to have street design to encourage slower speeds such as marked crosswalks and sidewalks Smart Growth America 2017). Dangerous Street Design disproportionately impacts underserved populations, including but not limited to racial/ethnic minorities, people of color, older adults, women, low-income users, and tribal and rural populations. Historically, disadvantaged groups have been left out of transportation planning conversations, leading to unsafe conditions where people walking and cycling in low-income

Bikeway Type	Example Picture
Shared Lane (Not a bikeway)	 © Toole Design
Bike Lane (parking on curb side of bikeway)	 © Toole Design
One-Way Separated Bike Lane (parking on street side of bikeway)	 © Toole Design
Two-Way Separated Bike Lane	 © Toole Design

Figure 4.4: Bike lane types
Source: FHWA

Figure 4.5: Conventional Bike Lanes
Source: NACTO

neighborhoods are struck and killed at much higher rates (Smart Growth America 2017).

Safety in public space is experienced differently for people of color. Communities of color also face the highest traffic fatality risks while cycling. A study analyzing race/ethnicity differences in travel using national traffic fatality and household travel data found that white Americans biked at almost four times the distance per capita as Black Americans, but Black Americans died at more than 4 times the rate (4.5) per mile cycling than white Americans (Raifman and Choma 2017).

Fears of crime (e.g. robbery and assault), being stranded, police profiling, traffic collisions, and overall traffic safety (e.g. pavement condition, lack of bike lanes and secure bicycle parking) are the biggest obstacles to biking among people of color and low income communities (Brown et al. 2016). Providing safe, physically separated bicycling infrastructure (trails, bike paths, protected bike lanes) is a measure that can be taken to increase perceived safety and comfortability for all bikers. Improving street connectivity, access to bikes, and availability of bicycle parking are measures that can be taken to remove physical barriers preventing many minority groups and low-income residents from biking. However, engaging with historically marginalized communities is critical for identifying and addressing social and cultural barriers to bicycling. Meaningful engagement with environmental justice (EJ) communities and disadvantaged communities can help unpack concerns about gentrification, develop context-sensitive programs to encourage cycling for transportation and recreation, and identify community partners for helping with culturally-relevant bicycle education and trainings (People for Bikes 2021).

Basic bicyclists (the average adult rider) and children are generally not confident of their ability riding a bike in traffic. While advanced riders may feel comfortable cycling on existing roads, basic riders, children, and women may feel unsafe cycling on roads with higher volumes and speeds. As basic cyclists and children share a preference for roads with lower volumes and speeds and/or protected bike routes (designated bicycle lanes or paths with well-defined separation from motorized

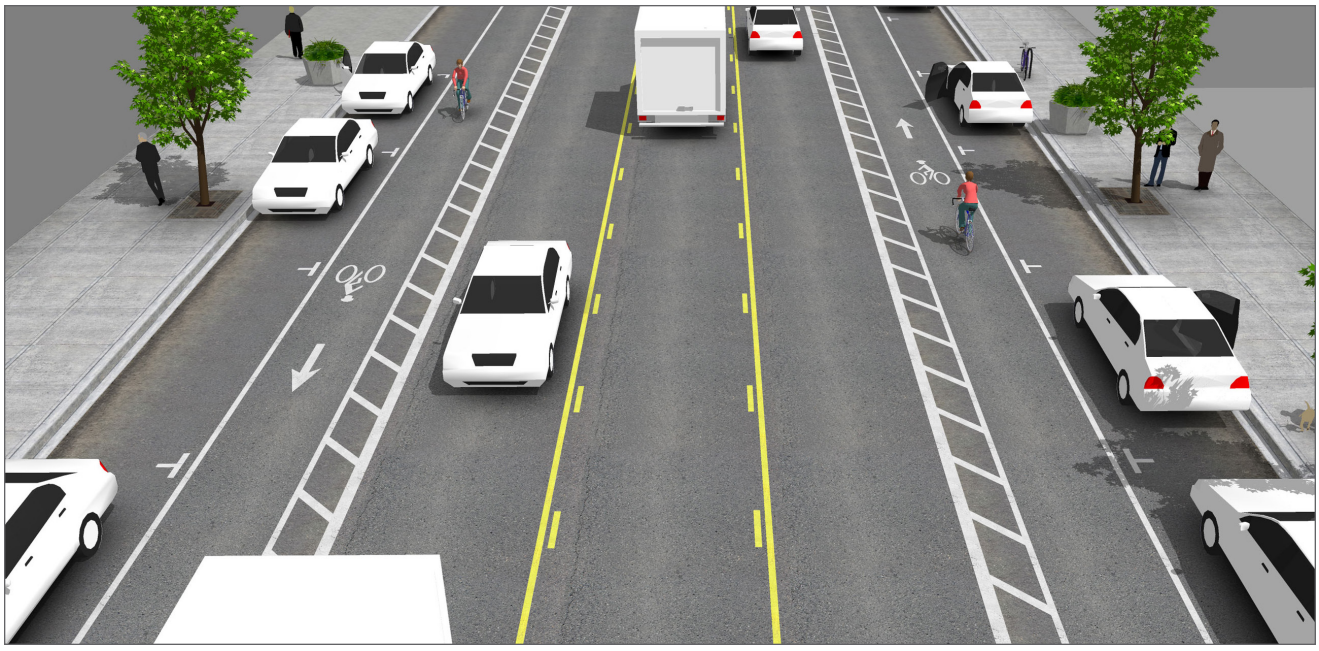


Figure 4.6: Buffered Bike Lanes (aerial view)
Source: NACTO

vehicles), similar design treatments can be used to accommodate both groups. Basic riders and young cyclists are often best served by a network of neighborhood streets and designated bicycle facilities. Generally, the higher the traffic volume and speed, the greater need to implement more extensive design treatments to accommodate basic bicyclists. Children and young bicyclists should be taught to avoid roads without safe cycling facilities for their abilities alltogether.

Bicycle Facilities

Shared roadway facilities and bicycle lanes are located on-the-road and either share space with motorized vehicles or occupy an exclusive space along the edge of the road. Shared use paths are specialized, off-road facilities on a separate right-of-way that accommodate multiple users. The types of shared-road bicycle facilities include:

Bicycle Route: Provides the minimum level of route designation and separation from motorized vehicles. Bicyclists share the road with motorized traffic and are carried in the same direction of traffic. No special treatments are made at intersections or where there is on-street parking. These facilities are most often designated with a standard bicycle route sign along both sides of the road and need to be at least four feet wide. A five-foot width is necessary if a guard rail is present.

Shared Roadway: A bicyclist uses the same lane as motorized vehicles and are acceptable in low volume, low speed neighborhoods. These generally do not require special signing unless the road is used to connect special bicycle facilities.

Wide Shoulder Lane: A bicyclist uses the curb edge of an outside travel lane that is sufficiently wide (at least 14 feet) to accommodate both motorized vehicles and bicycles.

Shoulder Bikeway: A bicyclist uses the paved portion of the road to the right of the edge line. The shoulder lane provides some level of separation between traffic and bicycles because of the edge line.

Bicycle lane: Defined as the portion of the roadway specifically designated by striping and signing

Figure 4.7: Buffered Bike Lanes
Source: NACTO

for preferential or exclusive use by bicycles. Bicycle lanes are typically one-way facilities and carry bicycles in the same direction as adjacent traffic lanes. Parking within the bike lane is prohibited. Where on-street parking is designated, the parking lane can be located to the right of the bicycle lane with the bicycle lane between the travel and parking lanes. The minimum width of a bicycle lane is five feet, including the buffered area. At intersections, the striping and signing must encourage positioning bicyclists in the proper lane whether to go straight, turn left or turn right.

Shared Lane Pavement Marking: When the lane is not wide enough to accommodate another type of on-road bicycle facility as described above, a Shared Lane Marking may be used to assist bicyclists with lateral positioning. This utilized in a shared lane scenario that is too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane. The marking also alerts users the roadway is shared, and emphasizes bicyclists and motorists share the traveled way, encourages safe passing of bicyclists by motorists, and reduces the incidence of wrong-way bicycling. This treatment is commonly referred to as a "sharrow." The MUTCD provides guidance on the appropriate use of the shared lane markings. A sharrow should not be placed on roadways that have travel lanes at least fourteen feet wide or where the speed limit is above 35 mph. It is also not recommended to be used on shoulders or designated bicycle facilities or bike lanes.

Regional Data & Research Tools to Support Active Transportation Projects

METROSHARE – REGIONAL BIKE SHARE FEASIBILITY STUDY

From 2018 through 2020, MetroCOG and the Greater Bridgeport Transit partnered to assist municipalities with implementing a regional bike share system. This process involved a robust collaborative effort to research industry best practices and models and reviewed local ordinances and policies in order to develop a framework to locally implement a shared active transportation system with municipally specific flexibility and scalability. Through-

out the process MetroCOG and GBT created a Model Ordinance for Shared Mobility, developed a spreadsheet of municipal specific considerations, released a Request for Information to rideshare providers and mobility managers, hosted information sharing sessions with shared mobility experts and rideshare/mobility providers, and participated in GBT's Human Services Transportation Coordination Project. Regional Shared mobility remains an interest of the municipalities in the MetroCOG region, and MetroCOG and GBT continues to research and disseminate opportunities for municipal or regional shared mobility ventures. Through the work of this program, the City of Bridgeport and Town of Fairfield have initiated successful electric scooter share pilot programs in 2020 and 2022, respectively.

SIDEWALK INVENTORY

MetroCOG's GIS transportation viewer includes a layer of digitized sidewalks and crosswalks that improves the understanding of the region's existing pedestrian facilities. The creation of this resource creates opportunities for the development and improvement of the entire pedestrian network. Utilizing aerial imagery and planimetric data developed through a 2013 Regional Performance Incentive Program (RPIP) grant, sidewalk and crosswalk polygons were used to develop the network. This work increased the understanding of pedestrian movement throughout the region and has been a significant resource in corridor planning studies, and project identification for areas in need of network/facility improvements.

Specifically, centerlines were created from sidewalk/crosswalk polygons, manually connected, and assigned a type (either sidewalk, crosswalk, curb ramp, stairs). Similar to determining sidewalk type, the sidewalk material was assigned through aerial image interpretation. These methods allowed MetroCOG to develop a sidewalk inventory for each municipality within the region.

Traditional methods of determining pedestrian walksheds used ¼ and ½ mile buffers as surrogates to model walksheds and the accessibly of low-income populations to transit. This crude approach often produces poor results. To further enhance the usefulness of this resource, GBT bus routes and Metro-North rail lines were included with the sidewalk inventory, as it illustrates movement with mass transit. This data resource is a robust tool that can model pedestrians only movements, pedestrians using mass transit, and vehicular travel.

The sidewalk inventory will be used to inform short term and long-term planning efforts for pedestrian connectivity, safety, and mobility. Potential uses for the network may include assessing access to mass transit, economic development, projects that improve walkability, transit efficiency upgrades, and filling gaps in first and last mile connects.

Active Transportation Projects

The following projects, policies and plans improve the roadway system to enable safe, convenient, and comfortable travel and access for users of all ages and abilities regardless of their transportation mode.

BRIDGEPORT

MetroCOG assisted the City of Bridgeport with a **Complete Streets Policy and Plan** in 2012. Several corridors were evaluated for the feasibility of installing bicycle lanes and the practicality of using permeable paving material instead of non-pervious asphalt. The plan recommended

several immediate actions to serve as demonstration projects for the effectiveness of implementing complete streets city-wide.

In 2020, the City of Bridgeport continued efforts to improve safety and the diversity transportation mobility through further development of a Complete Streets Design Guide. This design guide is a manual that prescribes roadway specific treatments based on street typology, land use context, and multi-modal priorities. In addition to the Design Guide, City staff have drafted municipal Complete Streets ordinance and policies to enable the improvement and implementation of the Guide in any and all roadway improvements. MetroCOG participated in the development process of this plan as a Complete Streets Technical Advisory Committee member.

Ash Creek Pedestrian Bridge (between the Black Rock Neighborhood & Fairfield Metro Station, L015-0001): Ash Creek separates the City of Bridgeport's Black Rock neighborhood from the Fairfield Metro Rail Station. The station is located in the Town of Fairfield and residents of the Black Rock neighborhood do not have safe and direct pedestrian access. Currently, the most convenient route to the station has heavy vehicular traffic and narrow sidewalks. Those with mobility impairments are especially challenged by these conditions and face additional difficulties due to obstructions along sidewalks. A pedestrian bridge over Ash Creek will connect Black Rock with the Fairfield Metro station and Metro North's New Haven line.

This LOTCIP funded project will construct a pedestrian bridge from Fox Street in Bridgeport, across Ash Creek and to an existing trail in Fairfield which leads to the Fairfield Metro station. Complete streets will be implemented on Fox Street to provide accessible travel from Fairfield Avenue to the bridge. The project is based on concepts developed through the Ash Creek Bridge Feasibility Study, which was completed in 2014.

EASTON

Route 59 & Center Road: In 2021, CTDOT, MetroCOG, and the Town staff participated in a Road Safety Audit for Route 59 and Center Road corridors. Through the RSA, several strategies were highlighted including short-, medium-, and long-term recommendations to enhance vehicular operations and vulnerable road user safety. The RSA Findings and Recommendations Report highlights several Complete Streets implementation strategies at the Town Center (Center Road) which includes pedestrian enhancements, bicycle facilities, streetscapes, ADA compliant features and traffic calming measures. The MetroCOG and the Town are continuing to investigate funding sources for implementation enhancements.

Route 136 & Center Road: As part of the 2021 Route 59 and Center Road RSA Findings and Recommendations Report, Route 136 and Center Road intersection was highlighted as a target area in need of pedestrian safety enhancements. This intersection is proximate to several businesses that draw residents townwide, a few of which include a coffee shop & market, gas station, Post Office, church, and residential dwelling units. The Town was awarded a Community Connectivity Grant of $139,200 in 2022 for Pedestrian Safety Improvements at this location.

FAIRFIELD

The Fairfield Complete Streets Policy was endorsed in 2018. The policy covers all users of the streets in town to ensure that each has a safe, efficient, and comfortable passage. The

policy recognizes that users include children, seniors, people of all abilities, people of all incomes, commercial vehicles, emergency responders, and freight. The policy addresses the entire transportation system and accompanying amenities including streets and other travel ways, bridges, lighting, trails and sidewalks. In addition to project prioritization, the policy covers new construction within the town's roadways, maintenance, and reconstruction of transportation infrastructure.

The Policy was influenced by the Fairfield Bicycle and Pedestrian Plan. Endorsed by the Town in 2013, MetroCOG (as GBRPA) assisted the town's bicycle and pedestrian advisory committee in developing a town-wide plan to install, enhance and provide bicycle and pedestrian facilities. The planning effort was expanded to include complete streets concepts and principles. The committee sponsored an opinion survey of town residents on their concerns regarding biking and walking in town, the need to improve facilities and willingness to support construction of new facilities. Public charettes were conducted to identify critical target areas and develop near-term demonstration projects.

Endorsement of the Complete Streets Policy took place in 2018,. Fairfield is proactive with implementation of Complete Streets design elements and the Town continues to implement recommendations from the 2013 Bicycle and Pedestrian Plan.

Bicycle, Pedestrian, and Complete Streets Improvement Projects: Fairfield has made it a precedent to improve safety for all roadway users on all transportation facilities townwide, especially that of vulnerable road users. This includes enhancements to municipal and state-owned roadways, sidewalks, multi-use facilities, crosswalks, pedestrian crossing signals & amenities, signage, bus stops, and landscaping, etc. The town regularly pursues state and federal funding opportunities for design and construction of projects, promotes safety initiatives at the local level, and encourages opportunities for interagency and intergovernmental collaboration for project initiation, advancement, and delivery. There are several identified projects, current and future, that have included specific bicycle, pedestrian, and complete streets components within their planning, design, and implementation. These projects include:

Improvements along King's Highway have been jointly funded through LOTCIP (L050-0001) and federal (0050-0218) funds. Located within 3/4 of a mile of the Fairfield Metro Rail Station, provided improvements to the poor sidewalk facilities along Kings Highway East. These pedestrian improvements span both sides of Kings Highway East, from Brentwood Avenue north to Fairchild Avenue and Villa Avenue which included sidewalk replacement, new concrete curbing and ADA ramps, enhancement of center medians, pedestrian signal improvements and street and bicycle amenities. An extension of enhancements is planned for Villa Avenue to the Bridgeport city line.

Southport, Route 1, Westport line to Rennell Drive: This project includes pedestrian safety improvements, through a phased approach, which combines confusing traffic islands that eliminates some access lanes, realigns intersections, reduces excessive pavement width, adds green infrastructure, provides transit improvements. Funding was made possible through the state awarded Community Connectivity Grant program, which to provide the improvements identified in the 2017 Road Safety Audit.

Grasmere neighborhood, Route 130, from the Route 1 rotary to the Bridgeport city line:

The 2017 RSA identified several improvements – approved to be funded through LOTCIP. These improvements will include pedestrian/bicycle access, safety and streetscape enhancements along Post Road, Grasmere Avenue, Kings Highway East and the Post Road "jughandle."

Black Rock Turnpike Safety & Post Road Circle Studies: Key components of these studies are to improve the safety of pedestrians, transit users and bicyclists along heavily traveled corridor – Black Rock Turnpike and the Post Road. Although bicycling and pedestrian use is relatively light along both corridor, non-motorized activity is present and would likely be higher if conditions to improve the comfort and safety of those travel modes were made.

The concepts developed through the engineering and study process include additional pedestrian crossings with protected signal phases and pedestrian refuge islands. By reducing the number of travel lanes and slowing traffic speeds with modern roundabouts and other traffic calming features, pedestrians can more confidently and comfortably walk along and cross both corridors. The Plans for these studies are highlighted in the Highways section.

MONROE

Maple Drive to Wolf Park PRT Connection In 2017, the town of Monroe began planning and designing a project in order to fill a gap in the Pequonnock River Trail network. This section of the PRT is located in the northern section of the town. Currently, the trail outlets onto Maple Drive without dedicated connections to the remainder of the trail into Wolf Park. Funding for improvements were programmed through LOTCIP for $2 million. This project will fill the gap in the PRT network by connecting to completed sections of the trail onto Maple Drive, across Purdy Hill Road and into Wolfe Park. Currently, users connect to the trail via local roads and the park entrance/exit drive, which can be dangerous and confusing as the lack of wayfinding, bicycle, and pedestrian amenities are nonexistent. Plans of this project will include a RRFB to alert drivers of users crossing the roadway and ADA amenities for users with mobility impairments. The total length of this trail section is approximately 4,500 feet.

STRATFORD

Stratford's Complete Streets Policy was endorsed in 2017. The Town continues to utilize this policy to design, construct, maintain, and operate streets to provide for a comprehensive and integrated street network of facilities. The goals of the policy are intended to improve the quality of life for residents by innovatively improving existing road infrastructure and design, enhancing neighborhood diversity and character, all while promoting and maintaining the future safety of all users.

The Policy was developed from a recommendation of the **Stratford Complete Streets Plan**, which identified strategies to connect residential and commercial areas, support multiple modes of transportation, increase safety and accessibility, and foster healthy lifestyles. The Complete Streets Plan primary focus area originally included all streets within a one-half mile radius of the Stratford Rail Station. In order to address connectivity between Stratford Center and neighboring residential and commercial areas, the study area extended north along Main Street to Paradise Green and northwest along Nichols Avenue to Lincoln Street. Site-specific analysis and design recommendations focused on nine key street corridors, all of which provide connectivity between local and regional destinations. The plan was finalized in 2017.

The plan has identified several conceptual improvement projects that will proceed through the planning and design phase, and ultimately advance to construction. Main Street (Route 113) from Harvey Place to Barnum Avenue, known as Stratford Complete Streets Phase I, completed its project design in 2022, with construction expected in 2023 – utilizing $2 million in programmed funds secured through LOTCIP. The project will strategically reduce the number of travel lanes on Main Street, repair and expand sidewalks, increase the landscaped buffer, improve transit stops and add buffered bike lanes. Green infrastructure and other traffic calming elements will be installed, as well as ADA compliant crossings and bicycle/pedestrian safety enhancements. A continuation of Main Street improvements will continue with the design of Stratford Complete Streets Phase II, on Main Street (Route 113) from Barnum Avenue to Wilcoxson Avenue. The design for this second phase will commence in 2023, utilizing programed funds from LOTCIP to fund its construction. As projects from the plan are designed and constructed, Stratford will pursue funding opportunities to complete all conceptual projects identified in the plan.

TRUMBULL

Although not having a traditional town center, the town of Trumbull continues to implement strategic improvements townwide to enhance safety for bicyclist and pedestrians. In order to advance Complete Streets design elements, the Town works to realize problem areas and explore opportunities to develop and construct projects with Complete Street elements. Trumbull has several planned and already completed projects that have improved the sidewalk and bicycle facilities throughout town. These projects have not only provided enhancements to the pedestrian and cycling network, but they have also included benefits for vehicular operations. The Town has targeted projects along many municipal roads and state routes, especially locations where the Pequonnock River Trail crosses major roads. The locations where vehicular traffic and bike and pedestrian traffic meet often present significant safety concerns.

Pequonnock River Trail & Route 111: The Pequonnock River Trail meets state Route 111 adjacent to Old Mine Road in the northern section of the Town. At this location, trail users must cross 4 lanes of traffic in order to continue on the multi-use trail. Funds to improve safety at this location were programmed through LOTCIP. Upgrades are expected to shift the trail crossing just north to align with a new traffic signal at the shopping plaza entrance. Improvements include new traffic signals with pedestrian actuated push buttons, crosswalks, and expansion of the trail pavement network that accounts for several types of trail users, especially those with mobility impairments through ADA enhancements.

Spring Hill Road: The trail also crosses Spring Hill Road at the entrance driveway to the town's school bus depot and in the vicinity of the municipal transfer station. This crossing location has geometric and sightline issues that impact trail user safety, in addition to the vehicular queue from the transfer station and entering/exiting school buses. Transit stops are also located proximate to the trail crossing without proper bus stop signage and amenities for transit riders. Enhancements to this location will be coupled with the operational improvement project for the transfer. A RRFB is included within the design and is intended to improve visibility of crossing trail users. This project began design in 2021 and will utilize programmed LOTCIP funds for construction.

Long Hill Green & Village District Enhancement Plan: Located along Route 111,

Long Hill Green is a neighborhood commercial center in Trumbull which currently does not provide suitable access for bicyclists and pedestrians. Excessive curb cuts, a narrow sidewalk network with intermittent gaps, and no crosswalks are exacerbated by periods of high traffic congestion. The area also lacks bike lanes. Recent developments have created an opportunity to realize a distinct village destination and community gathering area (the Village Green) which can accommodate all modes of transportation.

A continuous network of sidewalks with connections to the PRT, installation of traffic signals, exclusive left turn lane and crosswalks would further improve pedestrian safety and comfort while reducing traffic congestion.

REGIONAL PROJECTS

Bridgeport, Fairfield, Stratford & Trumbull, Old Town Road: Old Town Road is on the border of Trumbull and Bridgeport and is a major east/west corridor alongside the Merritt Parkway connecting major developments, such as Sacred Heart University and the Trumbull Mall. In Fairfield, Old Town Road becomes Jefferson Street and intersects Route 59. The upcoming Sacred Heart University expansion is anticipated to have a major impact on use of the roadway, sidewalk and transit. By reconstructing Old Town Road to a "Complete Street," bicyclists and pedestrians from the four communities would be better connected to several regionally significant developments.

Monroe & Trumbull, Route 25 & Route 111: Sidewalk construction and ADA improvements. Currently, there are gaps in the sidewalks along the two commercial corridors. Complete street concepts will be implemented along Route 111 to connect major businesses in Trumbull and Monroe and provide additional access to the PRT.

ALL MUNICIPALITIES

Provide appropriate accommodations for bicyclists and pedestrians of all ages and ability. These improvements should include traffic calming, complete streets implementation and ADA accessibility. Over the long term, the entire streetscape should be comprehensively evaluated for active transportation facilities. Identifying priority locations for both short- and long-term pedestrian improvement actions, and opportunities for intermodal connectivity can be supported through MetroCOG's GIS transportation layer, which includes sidewalks and crosswalks. This application is further described in Section 10.

REGIONAL SHARED-USE TRAIL NETWORK

A shared-use trail or path is physically separated from the road and follows an independent right-of-way. Two-way flow is provided and a range of users, including bicyclists, walkers, skaters, wheelchairs and strollers are accommodated. Although these trails provide a low stress and safe area separated from motorized vehicles, the diversity of users and varying skill levels often creates a challenging environment. Care and attention should be given to the design, and user rules should be established and enforced.

Design Considerations: Shared use paths require special design considerations. The guidelines developed by the American Association of State Highway Transportation Officials (Guide for the Development of Bicycle Facilities) should be used and followed when designing and building these facilities. However, sound engineering judgment is also important to provide flexibility in design when the guidelines cannot be met. The basic design guidelines include a minimum trail width

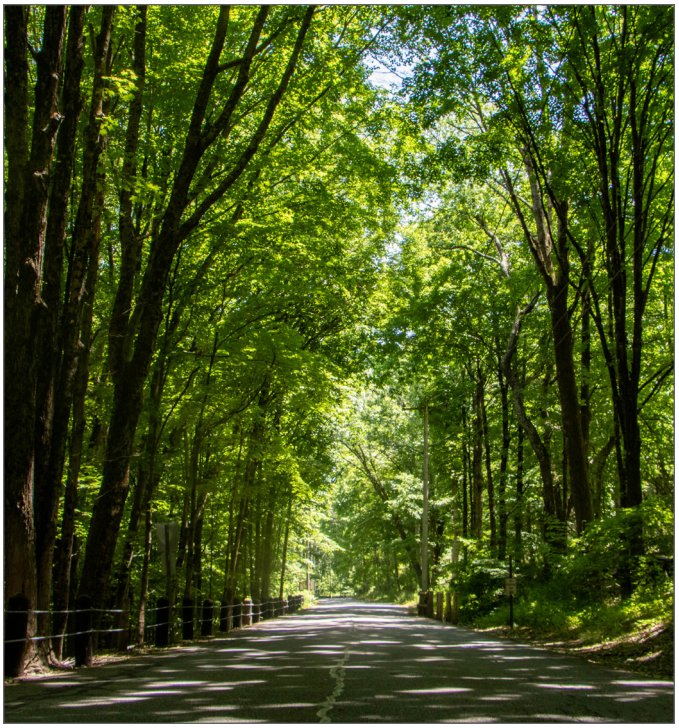


Figure 4.8: Pequonnock River Trail, Monroe
Attribute: Peralta Design/Steve Cartagena

of ten feet with adequate shoulders and clear zones, good separation from a roadway (at least five feet or an acceptable barrier), minimal grades (maximum of 3%-to-5%), horizontal alignment to provide adequate stopping sight distances, a minimum eight-foot vertical clearance, and special treatments at intersections to slow bicyclists down and prevent incursion onto the trail by motorized vehicles.

To ensure maximum use of the trail system, various amenities need to be installed, including directional and informational signs, rules and regulations, trail maps and guides, and benches and other rest areas at periodic intervals. Adequate parking at convenient locations is also essential. Regulatory, warning and information signs, as well as pavement markings must conform with the Manual on Uniform Traffic Control Devices (MUTCD).

The following projects are intended to complement the on-road bicycle route system and provide high quality facilities for non-motorized users. Past, current and future designs adhere to the design approach discussed above and meet minimum AASHTO guidelines as much as practical.

Pequonnock River Trail (PRT): The PRT will ultimately provide a 16-mile, continuous shared-use trail from Long Island Sound in Bridgeport, through Trumbull to the Monroe-Newtown town line. Much of the trail is aligned along the Pequonnock River and the path of the abandoned Housatonic Railroad line that extended from Bridgeport to Newtown.

Currently, the trail provides connectivity to commercial centers and passive recreation areas. In Bridgeport, the PRT runs through Beardsley Zoo and Beardsley Park. In Trumbull, the trail connects to the Pequonnock River Valley and in Monroe, the trail runs through Wolfe Park to the Newtown border.

Improvements to both wayfinding and the overall connectivity of the trail should be considered as part of both short term and long term projects. Future opportunities to realize a connected, off-road trail in Bridgeport should also be pursued over the long-term.

Pequonnock River Initiative: Development of the PRT has been informed by the Pequonnock River Initiative (a regional collaboration between Bridgeport, Monroe and Trumbull) and the Pequonnock River Watershed Based Plan (2011). The water quality in approximately 80% of the Pequonnock River currently does not meet minimum standards for recreation or habitat for fish, other aquatic life, and wildlife. Flooding is also common along the Pequonnock River and many of its tributaries. The primary objective of the plan was to identify specific, measurable actions to address

water quality impairments in the Pequonnock River and Bridgeport Harbor. The plan supports the continued development of the greenway network within the watershed, without adversely impacting water quality and natural resources.

Housatonic River Greenway: A roughly five-mile paved asphalt section of this multi-use trail has been constructed along the Housatonic River in Stratford, in the vicinity of DeLuca Field. Metro-COG (as GBRPA) has provided past assistance to the Town in developing a plan (endorsed in 2008) for a 16-mile pathway that would run along the Housatonic River from the south end of town at Long Beach to Roosevelt Forest in the north end. The greenway would include off-road sections and on-road bicycle routes, with connections to Stratford Center, Roosevelt Forest, the East Coast Greenway, the Sikorsky Memorial Bridge (which carries the Merritt Parkway over the Housatonic River) and other local points of interest.

The vision for the Housatonic River Greenway also provides opportunities to integrate resiliency and flood control components into future sections that are proximate to the Long Island Sound and the Housatonic River. The Greenway has several planned improvements that provide significant storm water flood protection through a phased approach. Planned enhancements include the extension and elevation of the Greenway by providing inland protection – similar to that of a berm or levee. The Town of Stratford's **Coastal Community Resilience Plan (2016)** identified the following sections:

- Stratford Point to Short Beach: A 1.16 mile long multi-use trail will connect Stratford Point to the Marine Basin. The section would be constructed as close to the Housatonic waterfront as possible and a large portion of the trail would run through Short Beach park.
- Stratford Point to Long Beach: Over 4 miles of multi-use boardwalk and bicycle routes will provide connections from Stratford Point to Long Beach. A walkway from Short Beach would connect with bicycle routes along Riverdale Drive, Prospect Street and Oak Bluff Avenue, and then connect to an off-road trail along Long Beach.
- Short Beach to Birdseye Street Boat Launch: A 1.56 mile multi-use trail to provide access to the Housatonic waterfront. The section would extend from Short Beach Park through the Stratford Army Engine Plant (SAEP) property, the Hunter Haven parcel and the Water Pollution Control Facility (WPCF), and then connect to the Birdseye Dock. The Stratford Army Engine Plant Redevelopment berm elevation increase could be designed as a joint project with the greenway. The northern end of the trail would connect to the planted revetment with earth berm, and extend to the WPCF to the south.

Naugatuck River Greenway Trail: When complete, the Naugatuck River Greenway (NRG) Trail will follow the Naugatuck River for approximately 44 miles and will link 11 municipalities. The trail will help to reclaim the Naugatuck River for recreation, provide an alternate mode of transportation, support tourism and economic development in the region, and improve the quality of life of valley residents. The NRG will start in Torrington and follow the river south through Litchfield, Harwinton, Thomaston, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia and Derby. As of 2022, there are eight sections of NRG Trail open to the public in Torrington, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia and Derby representing approximately 18% of the total length of planned trail.

Additional sections are in various phases of design with plans for construction.

Conservation & Recreation

Long dismissed as a polluted and dead river due to a legacy of industrial abuse, the Naugatuck River has made a remarkable comeback over the last several decades, and is increasingly a destination for anglers, paddlers and sightseers. The NRG Trail will reconnect communities to the river, with waterfront promenades, overlooks, boat launches, and fishing access points all figuring into greenway plans. The multiuse trail will provide a high quality and attractive corridor that will accommodate both walkers and cyclists safely.

The NRG Trail will give area residents a place closer to home to use for active transportation rather than traveling to trails elsewhere. Convenient access to the trail will encourage more use and will help improve the health and quality of life of those who use it. Since many of the communities along the planned route are in close proximity to each other, the trail will provide a viable safe and convenient non-motorized alternative for commuting for those who cannot or would rather not use a personal motor vehicle or public transit. These benefits have already been borne out on open sections of NRG, as the trail has become a popular destination and meeting place among residents and non-residents alike, and as a means for transportation. These economic and quality of life benefits will increase as more trail sections are built.

Trail Data Collection

Automated trail user counts conducted by NVCOG and the **CT Trail Census**, a collaborative statewide volunteer data collection program administered by UConn, have calculated annual estimated trips taken at several trail locations on the greenway. In 2022, the Census counted more than 200,000 trips in Derby near the Division Street trailhead, making it the busiest NRG section and the second busiest multiuse trail in the state.

Planning, Design & Construction

Design and construction of the NRG Trail is being undertaken at the local level, with oversight and guidance by the NRG Steering Committee (NRGSC). Hosted by the Naugatuck Valley Council of Governments (NVCOG), the NRGSC is a volunteer group that consists of members from the eleven NRG host communities, along with regional, state and federal representatives and stakeholders. In 2015, the NRGSC commissioned a study to investigate the economic benefits that the completion of the trail would have on the host communities. The study, conducted in partnership with UConn Extension and the UConn Center for Economic Analysis (CCEA), concluded with the publication of "Pathway to Revitalization: Economic Impacts of the Phased Completion of the Naugatuck River Greenway" in March 2017. The study detailed the substantial economic, health and quality of life benefits of constructing the NRG Trail, and that the cost of constructing the trail would be outweighed by benefits.

Since much of the planning and construction will be implemented at the local level, the materials, feel and look of the trail may undoubtedly vary from town-to-town based on local needs and desires. Regardless of these differences, it is important to emphasize that the NRG is a single entity that will traverse 11 communities. The NVCOG is working with communities to implement trail standards as they design and construct new sections of trail. In 2022 the NVCOG published the NRG Trail Design and Management Guide that provides guidance to trail communities on trail design considerations, trail maintenance, and rules and regulations, and presents a visual design guide of

features along sections of trail. With support and assistance from the NRGSC, a uniform signage and wayfinding design manual was also developed ("Naugatuck River Greenway Uniform Signage and Wayfinding Design Manual," November 2016). The manual includes templates for a wide range trail head, route designation, directional, and informational signs. The family of signs is based on and is consistent with MUTCD standards and guidelines.

The goal of the MTP is to complete the construction of the entire length of the NRG. In 2021, the NRGSC endorsed priorities for future construction. Regional NRG priorities are trail sections that have demonstrable local support, connect two complete or soon to be complete sections of trail, connect a complete or soon to be complete section of trail with an important destination or population center, or require little investment or effort to complete. The following active projects are located in the municipalities of the GBVMPO:

Derby-Shelton: Renovation of the Derby-Shelton Bridge.

The project will implement bicycle and pedestrian enhancements along the bridge and make a connection between the Shelton RiverWalk and the Derby Greenway. Construction is underway and expected to continue through the 2023 construction season.

REFERENCES

Brown, C., Blickstein, S., Yang, S., Jain, A., & Sinclair, J., 2021. Where do we go from here? Breaking Down Barriers to Bicycling in the U.S. People for Bikes. https://prismic-io.s3.amazonaws.com/peopleforbikes/6b4cc95b-295d-4947-88fb-839702944c97_PFB-Final-Barriers+to+Biking+REPORT.pdf.

Raifman MA, Choma EF. Disparities in Activity and Traffic Fatalities by Race/Ethnicity. Am J Prev Med. 2022 Aug;63(2):160-167. doi: 10.1016/j.amepre.2022.03.012. Epub 2022 Jun 7. PMID: 35868815.

S. G. America. 2017. Dangerous by design. Smart Growth America (Jan. 2017)

C. Brown, E. Harvey, J. Sinclair, 2016. Understanding barriers to bicycle access & use in Black and Hispanic communities in New Jersey. Alan M, Voorhees Transportation Center, Rutgers. https://njbikeped.org/wp-content/uploads/2022/09/Minority-Report-Draft_FINAL.pdf

5 | BUS TRANSIT

Introduction

This section of the Metropolitan Transportation Plan (MTP) details the public bus transit services provided in the Greater Bridgeport and Valley Region, with some discussion of statewide transit. It provides a brief background of current services, an overview of the Transit District model of bus service delivery in Connecticut, details bus operating entities, sources of transit investment – both operating and capital, compliance efforts, and planning initiatives performed in the recent past or currently underway. The section concludes with a presentation of planning principles and proposals for short- and long-range service expansion and improvements, based on a planning horizon ranging from five to twenty years. As transit services were significantly impacted by the COVID-19 pandemic an analysis of Greater Bridgeport Transit (GBT)'s services and ridership during the pandemic and continuing recovery (March 2020-Present) is also provided in this section.

Transit in the Greater Bridgeport & Valley Region

The majority of bus transit services in the Region are provided by the Greater Bridgeport Transit Authority (GBT), with ADA/demand response provided by the Valley Transit District in Ansonia, Derby, Seymour and Shelton. Other bus operators connect with GBT and offer some level of service in the Region. These include the Milford Transit District (MTD), and the Norwalk Transit District (NTD). The types of service operated by these providers include fixed route, complementary paratransit services, under the requirements of the Americans with Disabilities Act (ADA), and other various forms of demand response service, such as door-to-door services for seniors. Both NTD and MTD jointly operate the Coastal Link (CL) service with GBT, one of the highest volume bus services in Connecticut.

Figure 5.1: Zero Emission Bus from the GBT fleet
Attribute: Susan Rubinsky

Bus Service Delivery Models

FIXED ROUTE BUS SERVICE

The most common public bus service delivery model in the Region is fixed route. Fixed route is made up of repetitive, route and scheduled based services with designated stops for boarding and alighting riders throughout the service day. GBT provides fixed route service to the core municipalities of Bridgeport, Fairfield, Stratford, and Trumbull, with extended services to Derby, Milford, Monroe, Norwalk, Shelton, and Westport.

The New Haven division of CTtransit provides service to Ansonia, Derby, Seymour, and Shelton.

Elements important to a successful fixed route service include – safety, equity, frequency, sustainability, service span (the span between the start and end of the service day), reliability, geographic coverage and legibility (the ease with which riders can understand and make the most of the services.

Additionally, information systems, amenities, and fare structure influence ridership. These have been the chief considerations in the design of the Region's current bus systems and the principles which inform the future services and programs recommended in this Plan.

SERVICE UNDER THE AMERICANS WITH DISABILITIES ACT (ADA)

A critical component of the Region's bus system is service for riders with disabilities. The Americans with Disabilities Act (ADA) requires all federally-funded operators of fixed route services to ensure that riders who, because of a disability cannot access the fixed route service, have access to public transportation. Complementary paratransit service provides mobility for riders with disabilities and mirrors the fixed route services in geographic coverage, service days, and service span (as well as additional criteria). GBT provides this service within three quarters of a mile of all the fixed routes in the region. The Valley Transit District (VTD) provides ADA service within three-quarters of a mile of CTtransit Route 255, serving the towns of Ansonia, Derby, Seymour, and Shelton.

DEMAND RESPONSE SERVICES

Demand response services provide mobility options for senior citizens and are in addition to fixed route and ADA services. The goal of demand response services is to ensure seniors have meaningful access to community resources including healthcare, shopping, and social activities. All municipalities in the region offer some form of transportation for seniors. In Bridgeport, Fairfield, Stratford and Trumbull, GBT supplements local services with a coordinated senior door-to-door transportation program which provides access to a larger part of the region. Through this program, GBT provided approximately 9,800 door-to-door trips in 2019. The Towns of Easton and Monroe operate local demand response service independently.

The VTD operates a dial-a-ride service Monday through Friday, 6:00 am to 5:30 pm. The program is operated independently from the complementary ADA service, because the two programs have different funding sources. This service is available for both the general public and elderly and disabled riders. However, the fare for the general public is $4.50 per trip. ADA-eligible riders and those using the service to commute to work or to travel to a medical appointment pay $3.50 per trip. Reservations must be made one day in advance.

During 2019, prior to the pandemic, GBT, VTD, MTD and NTD combined, provided approximately 309,000 trips to riders with disabilities under their ADA Paratransit programs.

National Transit Database Agency Profiles 2019

OTHER MODELS FOR SERVICE DELIVERY, MOBILITY AS A SERVICE, MICRO TRANSIT, & MICRO-MOBILITY

New models for the provision of bus service have emerged over the past several years, partly due to the expansion of Transportation Network Companies (TNCs) such as Uber and Lyft. These services tend to focus on mobility gaps which do not have transit supportive densities and cannot efficiently be filled with traditional fixed route services. Mobility as a Service is an electronic platform which allows riders to select and book personal trips from a variety of modes. Microtransit is a form of demand response service that offers flexible routing and scheduling of a minibus or smaller vehicles that is shared with other passengers. Microtransit providers build routes ad-hoc specifically to match demand.

The bus industry standard regarding the length of a walk that a typical rider will make to a bus stop or station is approximately 1,300 feet. Today, bus systems around the world are turning to e-scooters and bicycle use to expand service area coverage and provide better access to existing systems. These have come to be known as Micro-Mobility options. Several municipalities in the region have begun to deploy "scooter shares" during warmer months.

A recent mobility gap analysis conducted by GBT, with the assistance of MetroCOG and CTDOT found many mobility gaps in the region that are likely better met using these new service delivery models. Gaps include same day services for seniors and riders with disabilities, service outside of the traditional ADA service area, late night services for employment purposes, and first and last mile connectivity

One measure of efficiency of bus services is cost per hour. In 2019, the average cost per hour for fixed route services by Transit Districts was $94.06 while the national average was $142.42

Nation al Transit Database - Report Year 2019

The Transit District Model

There are several models for the provision of bus transit. In Connecticut many regions depend on their respective Transit Districts as the coordinated regional authority to oversee the provision of various transit services.

The importance of these bus services should not be overlooked and are a critical part of the State's multi-modal mobility infrastructure. By regional and national standards, Transit Districts are efficient and effective. The districts closely work with the municipalities they serve to provide safe, flexible, and innovative mobility options and to develop new models to fill mobility gaps across the state. They are conduits for federal capital investment and largely responsible for all bus infrastructure outside of big cities.

In Connecticut, Transit Districts are the exclusive providers of door-to-door services for riders with disabilities (under the Americans with Disabilities Act) and services to seniors under the Municipal Grant Program. Unique to this network is that they receive a portion of their operating investment directly from their member municipalities. The local investment reduces the demand for State investment in their service areas.

Greater Bridgeport Transit District

GBT is a Transit District established under Section 7-273b[1]. of the Connecticut General Statutes. Member municipalities currently include Bridgeport, Fairfield, Stratford, and Trumbull. GBT is governed by a Board of Commissioners, appointed by the respective Chief Elected Official of each member municipality.

Valley Transit District

The Valley Transit District (VTD) is one of the few transit districts in the state that was incorporated by a special act (SA 71.71). It is comprised of four communities: Ansonia, Derby, Seymour, and Shelton. The special act grants the VTD all the same powers afforded under Chapter 103a of the general statutes.

CTtransit

Although it does not operate in the Greater Bridgeport Region, CTtransit is the state-owned bus service and is the largest bus operation in Connecticut. There are eight CTtransit divisions serving different areas of the State (Hartford, New Haven, Stamford, Waterbury, New Britain, Bristol, Meriden, and Wallingford). Across its eight divisions, CTtransit operates over ninety local and express routes in addition to fixed-route and paratransit services.

GBT FIXED ROUTE SERVICE

GBT operates seventeen fixed routes throughout the Bridgeport region. While these are predominantly local services, there are interregional routes including Route 15 and Route 23, which provide service between Bridgeport and Derby Station, the Route 22x, which provides service between Bridgeport and Shelton, and the Coastal Link, with service between Milford and Norwalk via Bridgeport. Service is provided every day, with modified schedules for weekends and holidays. The service span is generally from 4:30 am to 11:00 pm, with frequencies ranging from 20 minutes to one hour.

Table 5.1: GBT's Fixed Route Cost

MEASURE	GBT	AVG*
Passengers/Revenue Hour	31.4	27.2
Cost/Revenue Hour	$102.90	$142.20
Cost/Trip	$3.28	$5.24

**National Average; Source, National Transit Database 2019*

Compared with national averages, the Region's fixed route service is both productive and efficient. This performance includes high number of passenger boardings per hour, a relatively low cost per revenue hour of service and a low cost per trip (Table 5.1).

The bus service in the region was heavily impacted by the pandemic beginning in March 2020, with ridership dropping from nearly 17,000 boardings daily to as low as 4,000. During this time, GBT made a series of modifications to its services. Frequency where ridership was low was "moved" to routes which continued to carry a significant number of riders. The service was never shut down at any time during the pandemic.

While ridership grew and dropped many times between the commencement of the pandemic and

1 Sec. 7-273b. (a) It is hereby found and declared that the development, maintenance and improvement of systems for the transportation of people and goods within the state, and particularly within the metropolitan areas of the state, by rail, motor carrier or other means of land transportation are essential for the welfare of the citizens of the state and for the development of the state's resources, commerce and industry, that the development and maintenance of modern, efficient and adequate systems of mass transportation are required; that private enterprise lacks financial or other resources necessary to provide such systems of mass transportation; and, that the formation and operation of transit districts with the powers enumerated in this chapter are thus a public necessity."]

the post-pandemic period, today, ridership has returned to pre-pandemic levels. Table 5.2 reflects all GBT routes and monthly passenger boardings pre and post pandemic.

Table 5.2: GBT's Routes & Monthly Boardings Pre- & Post-Pandemic.

ROUTE & SERVICE	MONTHLY BOARDINGS		CURRENT PRODUCTIVITY
	Pre-Pandemic	Post-Pandemic	Trips/Hour
1: Between University of Bridgeport & Dock Shopping Center.	59,596	55,535	41.34
2: Between Milford & Norwalk.	67,115	63,309	19.09
3: Between Downtown Bridgeport & Trumbull Mall via Madison Ave.	43,860	35,431	43.67
4: Between Downtown Bridgeport & Trumbull Mall via Park Ave.	26,047	35,693	52.74
5: Between PT Barnum Apartments & Dock Shopping Center.	24,462	28,859	43.54
6: Between Downtown Bridgeport & Trumbull Mall via. Boston & Trumbull Aves.	25,698	30,527	31.94
7: Between Downtown Bridgeport & Carolton Hospital via Commerce Dr. & Post Rd.	2,345	1,694	32.27
8: Between Downtown Bridgeport & Trumbull Mall via Main St., Bridgeport.	68,184	74,370	58.42
9: Between University of Bridgeport & Hawley Lane Mall via East Main St.	41,228	42,349	44.10
10: Between Fairfield Woods Rd. & Stratford Ave. via Tunxis Hill Rd. and Lordship Blvd.	37,580	39,084	34.77
13: Between Downtown Bridgeport & Pearl Harbor Rd. via Central Ave.	24,405	23,593	41.77
15: Between Downtown Bridgeport & Derby Station via Hawley Ln. Mall & Bridgeport Ave.	18,158	15,640	20.27
17: Cross town between Downtown Bridgeport & Pearl Harbor Rd. via North Ave.	23,719	25,922	37.56
19X: Express between Downtown Bridgeport & US-111 in Monroe via 8/25 Connector.	1,144	980	10.42
22X: Express between Downtown Bridgeport & Derby Station via Bridgeport Ave.	2,615	1,717	17.89
23: Between Downtown Bridgeport & Derby Station via River Rd. & Constitution Blvd.	6,614	5,602	19.10

Source: GBT Ridership Data October 2019 vs. October 2022

DEMAND RESPONSE SERVICES FOR SENIORS & RIDERS WITH DISABILITIES

In addition to its fixed route services, GBT operates a demand response division which currently provides door-to-door transportation service under the Americans with disabilities Act (ADA) and what is known as the Municipal Grant program – door-to-door service for seniors.

Services under the ADA are currently provided in a service area which covers three quarters of a mile around all GBT fixed route services and during the same days and hours of fixed route operations. Prior to the pandemic, GBT provided between 90,000 and 96,000 door-to-door trips under this service. For the current, post pandemic year, ridership is expected to approach 80,000 boardings and growing.

NETWORK OF CONNECTING SERVICES

While GBT operates the majority of the bus transit service in the region, there are numerous, multimodal connecting services (services in the GBVMPO region are highlighted in blue):

- CTtransit (New Haven Division) – Connecting at the Connecticut Post Mall in Milford and the Derby Train Station in Derby
- CTtransit (Stamford Division) – Connecting at the Norwalk Transit District Hub in Norwalk
- Valley Transit District (VTD) - Connecting at several locations in Derby and Shelton
- Milford Transit – Jointly operating the Coastal Link Service
- Norwalk Transit District – Jointly operating the Coastal Link Service

Figure 5.2: Demand response service
Attribute: FHI

- Metro North Railroad – New Haven Line – Connecting at Milford Station, Stratford Station, Bridgeport Station, Fairfield Metro Center (limited), and Fairfield Station
- CTrail – Waterbury Branch Line – Connecting at the Bridgeport Intermodal Transportation Center (BITC)
- Bridgeport/Port Jefferson Ferry Service – Connecting at the BITC
- Interstate Bus (Greyhound) – Connecting at the BITC

Sources of Bus Transit Investment

OPERATING INVESTMENT

The region's bus operations investment is provided through three sources – the state share through the Connecticut Department of Transportation (CTDOT), fares paid by riders to use the service, and municipal contributions. State investment comes from two line items in the State's transportation budget – Fixed Route Operations and ADA Services. The Municipal Grant Program (MGP) Is a formula program which provides funding for transportation for seniors

CAPITAL INVESTMENT

FTA formula and discretionary funds are available to designated recipients to maintain the fleet, facilities, and equipment in a state of good repair, and, when possible, to expand and modernize these elements of the operation. Formula funds comes to the region in the form of federal apportionments and is divided among designated recipients under an Urbanized Area Split Agreement through a state-wide capital program administered by CTDOT. CTDOT also provides the requisite twenty percent matching funding.

TRANSIT PLANS, PROJECTS & IMPROVEMENTS

A detailed list of programmed and illustrative bus transit projects can be found in Tables C.9 and C.11 of Appendix C.

Transit Asset Management Plans (49 U.S.C. 5326)

Maintenance of assets in a State of Good Repair (SGR) is of critical importance to the safety and resilience of the Region's mobility infrastructure. SGR means that assets, including rolling stock, equipment and facilities are maintained so that they operate safely and efficiently throughout their expected useful life. Since the preparation of the previous MTP, FTA has issued new guidance for recipients related to the development of Transit Asset Management (TAM) plans. Among other items, the requirements include the development of a plan aimed at keeping federally funded assets safe and in a State of Good Repair.

For the development of the initial TAM Plan, GBT and VTD joined the TAM Tier 2 Group Plan, which was organized and prepared by CTDOT. The resulting 2018-2021 plan included detailed inventories and assessments on facilities, equipment, and rollingstock along with useful life information and benchmarks.

The TAM Plan must be updated every four years. In the Spring of 2022, CTDOT once again lead the Tier 2 TAM group for the update and conducted a series of comprehensive facility assessments, including assessments of GBT structures at the Cross Street, Bridgeport campus. The outcome of the evaluations resulted in TERM scores of 4.23 for the Downtown Bridgeport bus hub, 4.23 for GBT's Cross Street administrative building, and 4.36 for the Cross Street maintenance facility. GBT will use the TAM Plan and associated facility assessments to inform its on-going capital program.

Transit Asset Management, the TAM Tier 1 and Tier 2 Plans and the performance of GBT, VTD and other transit operators are discussed further in Section 11, Performance.

Public Transportation Agency Safety Plans (PTASP) & Targets (49 U.S. C. 5329 (d))

A requirement to prepare a Public Transportation Agency Safety Plan (PTASP) was promulgated simultaneously with the TAM Plan requirement. The purpose of the PTASP is to formally plan to ensure enhanced safety in transit operations. The PTASP details a transit agency's safety efforts in the areas of risk detection, risk assessment, risk mitigation and the promotion of safety – the pillars of a Safety Management System (SMS).

A key component of the plan is the establishment of safety targets for accidents and injuries for both fixed route and demand response services. The performance section (11) provides an overview of GBT's and VTD's targets and the extent to which they have been reached. The Bipartisan Infrastruc-

ture Law required the inclusion of two additional components in the PTASP: the organization of a joint labor/management safety committee and the preparation of a risk assessment associated with the transmission of infectious diseases. Both of these elements were added to GBT's plan in 2022.

Following the commencement of a new safety program in 2013, GBT has been able to reduce the number of preventable accidents system-wide. This reduction has been the result of new safety equipment, operator training and counseling, and scheduling improvements with increases in driver recovery time The re-organization of GBT's supervision division resulted in improved oversight of day-to-day operations.

An overview of GBT and VTD's safety performance can be found in Section 11, Performance.

REGIONAL MOBILITY GAP ANALYSIS & NEW OFFICE OF MOBILITY ON DEMAND

In 2019, GBT, in partnership with MetroCOG, CTDOT and a number of regional stakeholders, began work on a planning project designed to identify mobility gaps in the region. While interrupted several times during the pandemic, the initial task of the project, the Gap Analysis, was completed in 2021. The project included the establishment of a stakeholder group that represented a broad cross section of the community including seniors, riders with disabilities, economic development, reentry, refugees, current riders and others.

While the outcome of the project identified several frequency and service span concerns regarding the Region's fixed route service, the majority of the recommendations related to the design and deployment of new service to areas which do not lend themselves to traditional fixed route services.

Below is an excerpt from the project which reflects a stakeholder matrix and related mobility gaps. Some of the most pronounced gaps include:

- Late night services for employees, most notable refugees and reentry;
- Same day service for seniors and riders with disabilities;
- Seniors and riders with disabilities who are outside of the ¾-mile radius around the fixed route service area;
- Improved rail connections; and
- Improved information and marketing of existing services.

A project to implement a trolley-like service in the Town of Stratford is also under consideration.

As a result of the outcome of the project, GBT created a new division known as the Office of Mobility on Demand to oversee all current demand response services and to design and implement new expanded services to close mobility gaps in the region with non-traditional transit services and to explore the deployment of new service models including microtransit and micro-mobility projects. This work began in January 2023 when the project moved from the initial task of identifying mobility gaps, to the design of new service solutions.

FIXED ROUTE SERVICE IMPROVEMENT REQUESTS

In the fall of 2022, CTDOT released a request for bus service enhancements across the State. Informed by the recent Gap analysis, customer and staff feedback, GBT submitted the follow request for service enhancements:

- GBT Route 15 - service between Bridgeport and Derby on Bridgeport Avenue - Moving from one hour to thirty minute service frequency;

- Coastal Link - service between Milford and Norwalk via Bridgeport – Moving from thirty minute to twenty minute frequency;
- Route 13 - service from Downtown Bridgeport to Pearl Harbor Street, Bridgeport – Close midday frequency gap by providing thirty minute service all day;
- Route 19X – Express service from Downtown Bridgeport to Monroe via Route 111 and the Route 8/25 Connector – Close the midday gap in service;
- Route 23 – Service between Downtown Bridgeport and Derby – close the midday gap in service; and
- MicroTransit – GBT requested funding for the implementation of a pilot microtransit project in the region.

Facilities, Modernization & State of Good Repair

GBT operates its services using three facilities on two campuses. The administration and maintenance buildings are located at One Cross Street in Bridgeport. The public passenger facility bus station is located at 710 Water Street in Downtown Bridgeport and is a part of the Bridgeport Intermodal Facility.

The 80,000 square foot maintenance facility was built in 1987 and is capable of maintaining and storing GBTs fixed route and demand response buses. Over the past decade, this facility has undergone an extensive series of SGR and modernization projects. GBT's administration building is located on the same campus at Cross street and houses all of GBT's administration functions. This facility was also constructed in 1987.

All of GBT's facilities were constructed using a combination of federal (80%) & state (20%) funding.

Select GBT SGR capital projects include: Replacement of the maintenance facility roof, replacement of all bus lifts and rehabilitation of maintenance bays, replacement of perimeter security fencing, rehabilitation of the bus wash, replacement of underground storage tanks, replacement of the maintenance facility switchgear, installation of the charging infrastructure for battery electric buses.]

The region's bus hub, and terminus for all GBT routes, is located in Downtown Bridgeport and is a part of the Bridgeport Intermodal Transportation Center (BITC), which includes the Bridgeport Train Station and the Bridgeport-Port Jefferson, (Long Island) ferry service. The bus station, completed in 2007, offers a ten thousand square foot passenger waiting facility, seventeen bays for local and interstate bus service, heated enclosures for riders on the platforms and real-time route and schedule information at each bay.

The Valley Transit District operates its fleet out of a 17,350 square foot facility, located at 41 Main Street in Derby. Over the past decade, the VTD completed substantial construction and renovation on this facility, including a total replacement of the HVAC, plumbing, electrical, and mechanical systems and new security systems. In addition, the north yard was totally reconfigured for efficient vehicular flow, including a new fueling station, new subsurface utilities and storm detention, new lighting and a new security fence.

Figure 5.3: Zero Emission Bus
Attribute: Susan Rubinsky

The Region's Bus Transit Fleet

GBT operates a fleet of eighty-seven buses including fifty-seven fixed route buses and thirty demand response minibuses. The fixed route buses range in size from 35 to 40 feet and use a variety of propulsion systems including diesel, hybrid diesel-electric and battery electric buses. The minibus fleet currently uses diesel propulsion systems. GBT is preparing plans to transition to cleaner propulsion systems within the next ten years. All of these buses are maintained and garaged at GBT's maintenance facility at Cross Street, Bridgeport. Details regarding the age and condition of the GBT fleet can be found in the 2022 update of the TAM Plan, with an overview in Section 11.

The Valley Transit District operates a fleet of 14 minibuses located at 41 Main Street in Derby.

TRANSITION OF FLEET TO ZERO EMISSION PROPULSION SYSTEMS

GBT is in the process of transitioning its fleet of public transit buses to zero emission propulsion systems (ZEB)s. Currently, GBT has been operating two battery electric buses (BEB)s in regular city service for more than eighteen months and for an approximate total of 53,000 miles. GBT is confident that the battery electric buses will soon have ranges which will make them close to comparable to diesel propulsion systems. This is important for operations.

Developed in 2017, the initial pilot concept was to replace eleven of the fleet's sixty buses with ZEBs. GBT is soon anticipated to have five BEBs – about nine percent of the fleet. To make this project work, GBT has invested in facility improvements to accommodate the requisite charging infrastructure and continues to progress in workforce development associated with the transition. Continuing the transition will require attention to some of the

emerging concerns about BEBs. These center on energy availability, fleet resilience from an energy perspective, fleet resilience against a catastrophe such as a lithium-ion battery fire, bus facility design, the cost and availability of buses and the lead time for their procurement, and the rapid evolution of the zero-emission bus industry in the United States.

Bringing Facilities to the Energy – If the fleet is to be converted entirely to BEBs, GBT must ensure that energy is available at the maintenance and storage facility and understand the cost of bringing it there. Costs are unknown, and the agency has begun a project to better understand the availability of energy. The effort includes identifying properties near distribution substations in the region, which could also be used as charging facilities.

Fleet Resilience from an Energy Perspective – If current diesel fueling systems fail, GBT can fuel buses via portable tanks, alternate locations, and even directly from fuel tankers. No such alternatives exist for BEBs. Diesel systems have a resilient energy availability that does not yet exist for BEBs. While there have been claims that energy availability will not be a problem for fleet resilience, this is not yet proven. This problem must be overcome to ensure daily deployment of the fleet and no interruptions in service.

Fleet Resilience Against a Catastrophe – Bus service is critical to the region. A recent Hamden BEB fire demonstrated the difficulty in extinguishing a lithium-ion battery pack. GBT is now undertaking a million-dollar fire suppression improvement project. However, the Hamden BEB fire altered the risk assessment of BEB deployment and mitigation measures must also be amended. The future of the transition to this new propulsion system requires the separation of the fleets into multiple facilities to ensure reliance. With only a limited number of these buses deployed in the country, there is not yet enough information to state whether such events are or will be rare. More time is needed to understand these propulsion systems.

Cost, Availability and Lead Time – GBT placed its most recent order for BEBs in December 2021 and they are expected to arrive in early 2023. The lead time for these buses is already long and it is likely to get longer. The cost of BEBs is twice that of the older buses they are to replace. This doubles the total cost of the fleet and will be a strain on the capital program now and in the future.

The Rapid Evolution of the Industry – Technology related to these propulsion systems is rapidly evolving. Chargers purchased two years ago are now obsolete: the first buses deployed in Connecticut were 440 kWh battery packs and the ones in production today are 675 kWh. The next generation is already in testing and uses 738 kWh battery packs. A measured approach to the transition of the fleet will allow the region to benefit from the evolution in bus design, battery (or other zero emission propulsion systems) technology, charging innovation, facility design and advanced fire suppression.

Transit Amenities in the Region

An important component of bus service is the provision of amenities for riders such as benches,

The installation of shelters in the region is made possible through grants from the FTA & CTDOT.

hubs, shelters and information systems. Over the past several years, GBT and its regional partners have made progress in improving the customer experience in these areas. There are now forty-nine passenger shelters in the region, with thirty-six new shelters added over the past ten years, including a new bus hub at the Trumbull Mall (through a partnership with the owner). GBT has an extensive waiting list of more than forty locations awaiting the installation of shelters and other amenities for which it is seeking the requisite funding and approvals.

The VTD is currently working on a bus shelter replacement project that will install new bus shelters at up to 20 locations, including existing locations at which shelters are deteriorated.

GBT provides real-time information for its passengers at the Water Street station and on its mobile-friendly website. GBT is planning release of an RFP for the replacement of much of its real-time passenger facing information systems. The Passenger Information Ecosystem Project will be funded through a combination of Congestion Mitigation Air Quality (CMAQ) and Section 5307 formula funding from the FTA. The project will include the replacement of real time signage at the bus station and new displays at select locations in the region.

Fare box recovery refers to the percent of total operating investment recovered through passenger fares. In the years prior to the pandemic, GBT's fare box recovery hovered at approximately 27-32%, while the national average at that time was approximately 20.9%

Nation al Transit Database 2019

Fares and Special Fare Programs

The current base fare for the bus system in the region is $1.75. The fare structure is based on time rather than boardings, and the base fare provides 120 minutes of unlimited service on any bus, in any direction, for the duration of the pass. While the base fare is $1.75, the average fare is approximately $1.00. This reduced amount is due to the variety of time-based discounted fare passes available to riders. These include an all-day pass for $4.00, a seven-day pass for $35.00 and a thirty-one-day pass for $70.00. Recipients of federal funding are required to provide half fares, which is half of the base fare, to riders with disabilities, seniors and persons carrying a Medicaid card, during peak periods. GBT provides half fares for these riders at all times and for all duration passes.

GBT and CTDOT also offer special fare programs for students. GBT has partnered with the University of Bridgeport to introduce the Eco-Pass, which provides discounted fares for all University of Bridgeport Students at the Bridgeport Campus. At the state-wide level, CTDOT offers the UPass program to all students of the state school system, which includes Housatonic Community College. Under these programs, students have unlimited access to bus service during the school year.

While the fare structure is fairly simple and affordable to most, the variation in fares and restrictions related to pass use across transit services prohibits a certain level of greater regional mobility for pass holders. This is related to fare policy, fare collection methods and equipment and the underlying state operating investment process, which requires

a level of fare box recovery in order to leverage available state operating investment.

The State plans to embark on a project aimed at aligning fare structure, equipment, payment methods and investment strategy to remove any barriers to mobility that may be caused by current fare structures, leading to a more seamless system for riders.

Community Engagement

GBT ensures an ongoing and robust public engagement program. While GBT operates under a Title VI Plan to ensure that there is not discrimination in the way federally funded services are provided, the agency also conducts extensive outreach when considering fare or service changes using in-person, web-based, and social media-based channels. GBT also receives input, including complaints, from riders through its multi-lingual website. During 2022, GBT's complaint rate was 5.5 per 100,000 boardings. During the pandemic, GBT's ridership was made aware of rapid changes in services and new protocols through all its regular channels. In March 2020, GBT introduced a rider newsletter. Since then, 40 newsletters have been issued.

> "...the investments will connect historically disadvantaged and underserved communities to jobs and economic opportunities, support climate justice by improving air quality and tackling climate change and ensure everyone benefits from the good-paying jobs ...."
>
> *USDOT Fact Sheet: Equity in the Bipartisan Infrastructure Law*

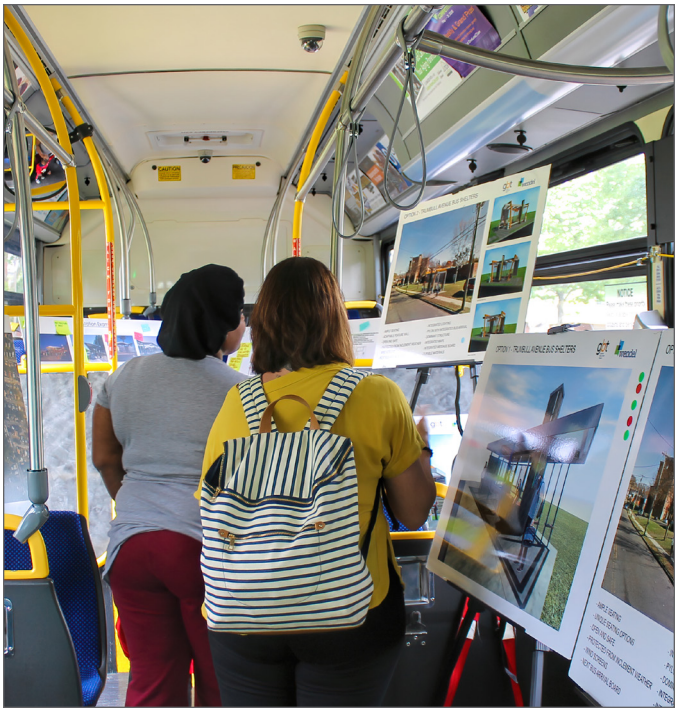


Figure 5.4: Public engagement at GBT
Attribute: GBT

Transit Equity

Transit investment decision making includes economic development, the reduction in vehicle miles traveled, travel time savings, as well as larger international goals related to climate change, air quality, and reducing dependence on foreign or nonrenewable resources. Public transit has always been a part of this work. Transit equity or efforts to target transportation investment toward need, is expanding in awareness and importance and under the recently passed Bipartisan Infrastructure Law, has become an area of greater focus and influence on investment decisions.

Short- & Long-Term Transit Strategies & Service Planning Principles

Fix it First, Continued Operating Investment for the Maintenance of Current Services - Inflation has impacted bus operations in the region with large increases in energy, health care, labor and other costs. Investments allocated for bus operations should take these expenses into account so that current operations are maintained before new services are implemented.

Expand to Meet New Demands - Ensure that bus operations have access to funding allocated to improve and expand services. There is a need in all areas of the State, not just the big cities, to expand to new geographic areas, improve frequencies and address late night mobility needs. From an equity perspective it is important that new investments and the opportunities created are available to all Connecticut Residents.

Continue the Transition to Zero-Emission Bus Propulsion Systems – Across the country, transit agencies are moving to cleaner propulsion systems, including GBT, as eight percent of its fleet is zero emission, battery electric buses. Using a measured approach, the effort to "green" transit fleets and facilities in the region should continue under future transportation planning and capital programing.

Expand Transit Related Amenities Throughout the Region – Over the past five years, the demand for transit amenities from riders and municipal leaders has increased dramatically. The effort to install transit amenities such as shelters, benches, real-time information systems and bicycle racks should be expanded and funding programmed for this purpose.

Continue Robust Community Engagement – Engaging and interacting with riders and the community is critical to the success of the Region's mobility infrastructure. A proactive and continuous effort should be maintained to understand and adjust to the changing transit needs of the region.

Create a Seamless Public Transportation System for Connecticut - Two major barriers to a seamless service in Connecticut are fares and information. A project should be undertaken to unify fares, making easy access across all bus and rail systems available to bus riders. Work to create a statewide mobile application, with information about all bus services is already underway.

Leverage Federal Investment - Continued investment in the Bus Transit Capital Improvement Program is important. Bus operations in the Region depend heavily on federal operating investment which typically covers eighty percent of the cost of fleet, facility and equipment replacement and modernization. It will be important to ensure that State funding is available to leverage the large amounts of federal investment made available to Connecticut over the next five years through the Bipartisan Infrastructure Bill for bus system state of good repair and modernization.

Safety (PTASP) and State of Good Repair (TAM Plan) – Continued emphasis should be placed on State of Good Repair (SGR) and safety to ensure that transit fleets, facilities and equipment are maintained in safe working order and available for service.

Figure 6.1: Fairfield Metro
Attribute: Peralta Design/Steve Cartagena

6 | RAIL TRANSIT

Commuter Rail Service

METRO-NORTH

Commuter rail service is a vital transit-mode within and beyond Connecticut. The Metro-North Railroad (MNRR), a subsidiary of the New York Metropolitan Transportation Authority (MTA), operates the third busiest commuter railroad system in North America behind MTA Long Island Railroad and NJ Transit Rail. Three Metro-North lines terminate at Grand Central Terminal, the Harlem Line (Blue), the Hudson line (Green), and the New Haven line (Red), in addition to four branch lines: Wassaic, Danbury, New Canaan, and Waterbury.

MNRR operates commuter trains on the electrified New Haven Main Line (NHL-ML), the state's busiest commuter line. More than 40,000,000 annual trips taking place prior to the COVID-19 pandemic. The NHL-ML runs east-west along the southwestern shoreline, the most heavily developed and densely populated portion of Connecticut. The eastern and western termini of the NHL-ML are New York City and New Haven respectively. MNRR's service is commuter-oriented, focused on outbound Connecticut morning peak travel to—and inbound Connecticut evening peak travel from—New York City.

MNRR also provides north-south rail service in the region through the Waterbury Branch Line (WBL). The northern and southern termini of the WBL are Waterbury and Bridgeport respectively. The Bridgeport Train Station, shared by Amtrak and Metro-North serves as the transfer station between MNRR's WBL and the NHL-ML.

SHORE LINE EAST & AMTRAK

Shore Line East is operated by the Connecticut Department of Transportation (CTDOT) and provides rail service between New London and New Haven. Until 2020 when it was indefinitely suspended, some Shore Line East peak-service trains continued past New Haven as far as Stamford and stopped in Bridgeport Cross-platform transfer between Shore Line East and Metro-North's NHL-ML are available at Union Station in New Haven. Amtrak operates inter-city and inter-state service along the NHL-ML under an agreement with CTDOT. Amtrak's Northeast Regional and Vermonter lines stop at the Bridgeport station.

STATE OF THE RAIL SYSTEM IN CT & FUTURE SERVICE

Although commuter rail service in the region is oriented to serve those commuting toward New York City during peak hours, the proportion of in-state trips relative to all trips taken has increased steadily over the years and accounts for a more significant portion of total ridership. This increased in-state rail ridership reflects Connecticut's investment in services and programs to better accommodate and serve intrastate commuter rail trips. The state significantly expanded SLE—initially introduced as temporary in 1990—which serves commuters east of New Haven. The Hartford Line connects Springfield, MA, Hartford, and New Haven to Amtrak intercity service and was developed through a partnership between CTDOT, CTrail, and Amtrak. MNRR's Waterbury Branch Line (WBL) underwent signalization upgrades and installation of positive train control and passing which have improved safety, and increased train speeds and increased service capacity.

Table 6.1: Commuter Rail Ridership 2016-21, NHL

YEAR	TOTAL ANNUAL RIDERSHIP	ANNUAL % CHANGE
2016	40,483,793	--
2017	40,169,325	-0.8%
2018	40,298,686	0.3%
2019	40,234,512	-0.2%
2020	12,186,256	-69.7%
2021	14,160,598	16.2%

Source: Connecticut State Rail Plan 2022-2026

COVID-19 DISRUPTIONS

All public transit in the region experienced sharp declines in ridership beginning in March 2020 due to the COVID-19 pandemic. Rail operators statewide reduced their services to adjust to diminished demand, particularly during morning and evening peak hours. Now that transportation ridership levels are beginning to recover, rail operations and service have again increased, but with modifications, such as schedules that align better with changing travel demand.

Seen in Table 6.1, the **Connecticut State Rail Plan (2022-2026)** reported total ridership for the NHL-ML was 40,234,513 in 2019 (prior to pandemic-related travel disruptions), 11,545,691 in 2020 (a drop in ridership of 68.7% from the previous year), and 12,647,827 in 2021 (11.2% of ridership recovery). Other commuter rail in the state also experienced pandemic-induced declines in ridership, the Hartford Line declined by 61.7% in 2020 and recovered by 27.8% in 2021, while SLE ridership declined in both 2020 and 2021 (-76.4% and -21.8% respectively).

Table 6.2: 2035 Connecticut Rail Ridership by Service Level

LINE	2019 EXISTING, ONE-WAY RIDES	NO BUILD % INCREASE	IMPROVED SERVICE % INCREASE
Amtrak	232,700	6%	134%
Shore Line East	660,447	5%	13%
Hartford Line	730,589	5%	21%
New Haven Line	37,657,638	9%	9%
New Canaan Line	1,515,710	6%	5%
Danbury Line	724,630	6%	16%
Waterbury Line	336,534	7%	145%

Source: NEC FUTURE Intercity Model, Connecticut State Rail Plan 2022-2026

RIDERSHIP PROJECTIONS

As part of the Connecticut State Rail Plan (2022-2026) the Federal Railroad Administration's (FRA) NEC FUTURE Intercity Model was calibrated specifically for Connecticut services with a base year of 2019 to model two projected commuter rail ridership scenarios. The first assumes a no-build scenario, in which service levels remain the same as those that existed in 2019, without any improvements. The second scenario assumes that TIME FOR CT improvements are funded and constructed. Ridership projections to 2035 under both scenarios were the same for the NHL (forecasting a 9% increases), while the ridership levels differed significantly for the Waterbury Line (7% increase in the no build scenario; 145% increase in the improved service scenario) and for Amtrak (6% increase in the no build scenario; 134% increase in the improved service scenario). Details are provided in Table 6.2.

Stations, Equipment & Infrastructure

Both the NHL-ML and the WBL are owned by the State of Connecticut and operated by Metro-North Railroad (MNRR) under a service agreement with the Connecticut Department of Transportation (CTDOT). This agreement obligates MNRR to maintain the railroad right-of-way, facilities, and equipment.

NEW HAVEN MAIN LINE (NHL-ML)

The New Haven Main Line (NHL-ML) is approximately 46.8 miles between the New York/Connecticut state-line and New Haven Union Station. There are 20 stations along the NHL-ML, five located in the Greater Bridgeport/Valley region: Stratford, Bridgeport, Fairfield Metro, Fairfield Downtown, and Southport. The right-of-way is comprised of four main tracks (three in one section), constructed with continuous welded rail. It is maintained at FRA Class 4 track standards, with maximum allowable operating speeds of 80mph for passenger trains. The entire NHL-ML

is electrified (the source of power for all trains operated in daily service is electric) by overhead catenary wires. Electric power (three points at 115 kV) is supplied by local utility companies who use transformers to reduce the voltage of the power to an acceptable amount for rail and then distribute it for train operations via wayside substations.

WATERBURY BRANCH LINE (WBL)

The Waterbury Branch Line (WBL) extends from Waterbury to Devon where it interlocks with the NHL-ML. WBL trains continue along the NHL-ML track to make stops at Stratford and Bridgeport. The WBL consists of six stations, with three located in the Greater Bridgeport/Valley Region: Ansonia, Derby/Shelton and Seymour. The 27.1-miles that make up the WBL is non-electrified, single-track, and diesel-powered. The WBL is maintained at FRA Class 3 track standards, with maximum allowable operating speeds of 59mph for passenger trains.

STATIONS – NHL-ML

Bridgeport

The Bridgeport Rail Station in Downtown Bridgeport is about 3.6 miles west of the Stratford station and 1.5 miles east of Fairfield Metro. The station is housed in a concrete air-rights structure over Water Street which was constructed in the early 1970s. The station is a component of an intermodal transportation district that includes commuter parking facilities, the GBT bus terminal, and the Water Street Dock (passenger ferry services). Elevated walkways connect the train station with the bus terminal and parking garage. A large passenger waiting area, rail offices and a ticket sales office are located on the second level and provide direct access to inbound (New York) service. A third tower is located on the east side of the main line and contains a small waiting area for outbound (New Haven) passengers. High-level platforms provide direct boarding access to the trains and are sufficiently long to handle a 10-unit train. The inbound platform is covered to provide all-weather protection, but the outbound platform is unprotected. The Bridgeport Train Station, shared by Amtrak and MNRR, is the busiest MNRR stop between Stamford and New Haven.

Fairfield

The Fairfield Metro Station was constructed on a vacant industrial parcel near the intersection of Commerce Drive and Black Rock Turnpike and at the Bridgeport city line. It is only about 1.5 miles from the Bridgeport Rail Station. A 1,500-space parking lot for rail commuters was built as part of the project. Longer platforms accommodate train-sets of eight to ten cars.

The Fairfield Rail Station is located in Fairfield Center, about 4.8 miles west of the Bridgeport station and 1.7 miles east of Southport. Unlike the Stratford and Bridgeport stations, which have direct access to Interstate 95, access to the Fairfield rail station is via short, narrow local roads from US Route 1. The station consists of two wooden structures. The inbound building provides an indoor waiting area and high-level platforms provide direct boarding access to the trains. Protection for waiting passengers is limited to small, covered structures (resembling a standard bus shelter) along the platforms.

The Town of Fairfield provides rail commuters a variety of parking options, including two, large surface lots, one on each side of the tracks, and a nearby satellite lot. A limited amount of on-street parking is available near the station. The town over-subscribes its parking permits and maintains an extensive waiting list. There are several non-des-

Figure 6.3: Stratford Station
Attribute: Peralta Design/Steve Cartagena

ignated parking areas and private pay facilities in the vicinity of the station which supplements the official rail commuter parking lots and handles excess demand.

The Southport Rail Station is located in a predominantly residential area of Southport, a neighborhood in Fairfield. It is about 1.7 miles west of the Fairfield Center station and 1.7 miles east of the Greens Farms station in Westport. The station consists of two wooden structures that are offset by approximately 700 feet. A pedestrian connection is provided via Railroad Street and an underpass along a narrow sidewalk. No indoor waiting area is provided, and passengers must purchase tickets on the train. High-level platforms provide direct boarding access to the trains, but they can only accommodate four cars at a time. Protection for waiting passengers is limited to small, covered structures (resembling a standard bus shelter) along the platforms. Service to and from the Southport station is more limited than the Fairfield Rail Station. Two surface parking lots, one on each side of the tracks, accommodates rail commuters and a nearby church parking is designated as a satellite lot. The lots at the rail station are well utilized but excess space is available at the satellite location.

Stratford

The Stratford Rail Station is in Stratford Center and lies about 4.3 miles west of the Milford station and 3.6 miles east of Bridgeport. The station consists of two wooden structures and a small, in-door waiting area is provided in the inbound station building. No ticket office is available, and passengers need to use a ticket vending machine to purchase tickets or buy them on the train at a premium. High-level platforms provide direct boarding access to the trains, but do not accommodate a full train-set. Parking at the Stratford station consists of two surface lots. Commuters also park in adjacent private lots and along several nearby streets. As with most NHL-ML stations, parking usage is high, and the Town maintains a parking waiting list.

STATIONS – WBL

Ansonia

The Ansonia Rail Station is located on West Main Street in downtown Ansonia, one block from Main Street (CT-115) and along the east bank of the Naugatuck River. The boarding area consists of bituminous pavement and a low-level wooden platform covered by a wooden canopy. Three plexiglass shelters line the boarding and provide some protection for passengers. Sidewalks connect the downtown with the station. Commuter parking is available just south of the station. Passenger amenities are limited, and ticket vending machine are not available. One local CTtransit bus route serves the station and connects the lower Valley towns with New Haven.

Seymour

The Seymour Rail Station is located on Main Street (CT-115) in downtown Seymour. The station consists of a low-level platform and a shelter. The shelter is unique among the WBL stations in that it is a brick structure with windows and sufficient roof overhang to protect patrons from the elements. Shared parking for both commuters and patrons to local businesses is available in front of the station. Additional commuter parking can be found in nearby mixed-use parking lots, but there is two-hour posted time limit. Access to the station is directly from Main Street, with connections to and from CT-8 nearby. Passenger amenities are limited, and ticket vending machines are not available. One local CTtransit bus route serves the station which connects the lower Valley towns with New Haven. Interest continues in a long-term vision to relocate the station from its constrained downtown location to an area north of the downtown as part of a TOD.

Derby-Shelton

The Derby-Shelton Rail Station is located on the eastern edge of downtown Derby and is within walking distance of downtown Shelton, which is about a quarter-mile from the station. It is easily accessible from CT-8 and CT-34. The station is also referred to as the Derby-Shelton Multi-Modal Center (DSMMC) because of the local bus transfer point located on site. Multi-modal connections can be made to fixed-route bus service operated by Greater Bridgeport Transit – Route 15 and Route 23 – and CTtransit's Route 255. The station building was constructed in 1903; and the newer administrative offices and maintenance facility of the Valley Transit District (VTD) are located on the same site. While the station functions adequately, passenger amenities are minimal. The existing shelter provides only minimal protection from the elements, as it is open on one side. A relatively large parking lot, with space for about 75 vehicles, is available at the station; no fee is required. The Derby Greenway section of the Naugatuck Valley River Greenway Trail is located on the east side of the WBL from the DSMMC but there is no well-defined connection between the station and the greenway. Currently, travelers need to exit the station site and walk along the existing sidewalk on the north side of CT-34, cross the on-ramp to CT-8 northbound and follow a short access driveway before reaching the greenway. While a station gateway sign has been installed at the entrance to the area, signage directing users to the station and parking is minimal. No ticket-vending kiosk is available; train and bus information is limited.

STATION PARKING

With the exception of Sundays and Holidays, NHL-ML, station parking lots are reserved for permitted parking with some spaces set aside for daily

parking for a fee. The number of parking spaces at each station varies. The Fairfield Metro Station and the Bridgeport Train Station, which are overseen CTDOT have over 1,000 parking spaces each. The Fairfield Center and Southport Stations are overseen by the Parking Authority of Fairfield, and have 1,000+ and 100 parking spaces, respectively. The Stratford parking lot is overseen by Stratford Railroad Parking (SRRP) and can accommodate approximately 500 vehicles. On the NHL-ML, the parking utilization rate prior to the Covid-19 pandemic was extremely high. More demand than available parking spaces was a critical issue for many years and resulted in multi-year waitlists for permits. Although parking utilization continues to climb, the parking lots have not reached full, pre-pandemic capacity.

Parking availability varies at the WBL three stations. Some commuter parking is available in Seymour and Ansonia, while the Derby/Shelton station has a large parking lot.

Increasing parking capacity at stations along the NHL-ML and the WBL is a vital objective of the State of Connecticut's strategy to attract and maintain riders on the state's commuter rail network. As rail services continue to expand schedules and grow in ridership, CTDOT continues to prioritize the need for affordable and convenient parking with train station access—particularly in Fairfield County along the NHL-ML where there is the largest need for more parking. Creating new parking for commuters in the region remains a challenging issue as potential sites for expanding parking are extremely limited, parking ownership varies across towns and lots, and actions to expand the supply have been difficult to implement.

To address the rail parking issue, parking, and Transit Oriented Development (TOD) must be balanced. Stations located in lower density areas with road access should consider strategies to increase rail ridership and access that add more surface and structured parking, while stations near walkable areas should consider strategies that maximize affordable housing proximate to the station.

CROSSINGS

The NHL-ML consists of approximately 59 crossings in Bridgeport, Fairfield and Stratford, including: 46 railroad bridges over roadways.

- 8 railroad bridges over waterways;
- 2 movable railroad bridges over waterways; and;
- 3 railroad bridges over structures.

There are numerous crossings along the WBL, including road overpasses and at-grade crossings. The WBL crosses over nine public roads and six rivers. At-grade crossings of public roads have signs, lights, and gates to protect crossing traffic when activated. However, private road crossings are either unprotected or only have signs installed. Active warning systems are not in place at either type of crossing. Both lines cross over below-grade structures including culverts, pipes and other underground structures.

ROLLING STOCK

Locomotives and passenger coaches are referred to as rolling stock. Ownership of rolling stock used along the two lines is split between CTDOT and MTA/MNRR.

INFRASTRUCTURE

CTDOT holds 100% capital responsibility for all fixed infrastructure along the Connecticut portion of

the NHL-ML which includes maintenance facilities, rail stations, platforms, tracks, communications and catenary systems and equipment. NHL-ML infrastructure includes the East Bridgeport Rail Yard, which is home to a two-story facility housing MNRR offices for track, structures, communications, signals, and coach cleaning operations.

TOD

Transit oriented development (TOD) has become an important strategy for communities to provide more choices for reliable transportation, mixed use development, affordable housing and expanded business and economic opportunities that reinforce the existing form and physical character of the community. TOD is a proven economic growth strategy that integrates land use, transportation, and the environment and results in new housing, jobs, and more sustainable and walkable communities. TOD is an essential component of any transportation plan, as it is a form of infill development that encourages use of mass transit such as trains and buses, as well as non-motorized travel such as walking and bicycling.

Communities implement TOD with similar goals, which include increasing economic development opportunities, reducing travel demand by single-occupant vehicles, optimizing infrastructure, improving walkable connections, and reducing environmental impacts. However, the look and feel of a TOD should be unique to each community and it is very important that TOD respect and complement the form, density, and community values of each station area. Customizing TOD projects is critical to ensure that the new development is appropriate and reflects the vision of elected officials and the public, while also achieving a suitable level of building or critical mass to attract private investors.

NHL-ML TOD OPPORTUNITIES

Bridgeport, Fairfield, and Stratford are well-suited to various scales and densities of TOD. Local opportunities, initiatives, projects, and plans include:

Bridgeport

The size and density of Bridgeport's Downtown Village District—is well-suited to support the City's vision of a thriving mixed-use Transit Oriented District (Plan Bridgeport), as many attractions are accessible within a convenient walking distance of public transportation.

Fairfield

Fairfield's TOD Study (2019) identified significant market demand for and opportunities to encourage transit-oriented development at both the Town's full-service train stations. At Fairfield Metro, TOD could transform the station area into a mixed-use neighborhood with walkable multifamily residential and mixed-use development. At Fairfield Downtown, small-scale infill development supports the existing character of the station area's downtown shopping and dining district.

Stratford

The Town of Stratford has long recognized the mixed-use potential of Stratford Center, which was reinforced in 2015 with the Town's TOD Pilot Program, TOD Overlay District and Design Guidelines. Since that time, Stratford has been actively working on redevelopment of Stratford Center into a modern, walkable mixed-use area with open space and access to public transportation.

WBL TOD OPPORTUNITIES

All four Naugatuck Valley communities in the Greater Bridgeport Valley region along the WBL are compact historic urban centers that developed along the Naugatuck River.

Improvements, Investments & Priority Projects

The Metropolitan Transportation Plan (MTP) includes actions to maintain, improve, invest in, and modernize the New Haven Main Line and Waterbury Branch Line. The MTP focuses on efforts within the region to rehabilitate infrastructure, improve and build rail facilities and amenities, and expand train station parking access. Cost appropriate and efficient delivery of rail service depends on identification and allocation of resources including human resources and finances, process improvements, and advances in technology. The MTP recognizes the role of both commuter and intercity rail in fostering a balanced transportation system, which provides necessary mobility for travelers. Consistent commuter rail upkeep and continual efforts to modernize and replace equipment and trains are critical for ensuring the NHL-ML and the WBL right-of-way maintain a state-of-good repair. Along the NHL-ML, multi-modal access to rail stations with frequent, high capacity, and fast service to- and from- New York City is crucial. Modernizing the WBL through improved service and upgraded stations with increased parking is necessary to create a more dynamic and attractive commuter rail that connects Naugatuck Valley to Bridgeport and the state. Regionally significant programmed improvements are highlighted below. A full list of projects can be found in Tables C.12 and C.13 in Appendix C - Programmed Project List (NHL-ML & WBL).

NEW HAVEN MAIN LINE PROGRAMMED PROJECTS

Bridgeport & Stratford:

Track Improvements & Mobility Enhancements (TIME) Program – Bridge Rehabilitation: will enhance service in the rail corridor through improvements to brides and track mainlines, as well as catenary and signal modifications. TIME will also replace five aging rail bridges (West Broad Street, King Street, Main Street, Bruce Avenue and Bishop Avenue) in Bridgeport and Stratford, increase bridge vertical clearances, increase track centers for curve modifications, and improve drainage in flood prone areas.

Bridgeport

New Haven Line High-Speed (Fairfield to Stratford) Planning and Environmental Linkages (PEL) Study

This study will identify and assess potential performance and operational improvements on the NHL in support of Connecticut's High Speed Rail Program. The preliminary study area is made up of a segment of the NHL from Fairfield to Stratford. Agencies, railroads, stakeholders, and the public will be engaged in a collaborative, data-driven alternatives development and recommendation process. The PEL will develop alternatives and identify projects or programs to advance into NEPA/CEPA that would address transportation needs, improve operational performance, and help meet Northeast Corridor (NEC) Service and Performance Objectives set forth in the **NEC FUTURE Record of Decision**.

Stratford-Milford

Devon Movable Bridge: The Devon Bridge is 111-year-old bridge that carries four New Haven

Line tracks over the Housatonic River. The bridge requires interim repairs and replacement as it has experienced serious deterioration. After the Walk Bridge Program (Norwalk), it is the next most critical movable bridge for replacement on the NHL portion of the Northeast Corridor (NEC).

WATERBURY BRANCH LINE – PROGRAMMED PROJECTS

Waterbury Master Plan

The Waterbury Line Master Plan is an ongoing planning project that involves reviewing past studies and data such as the Waterbury Rail Working Group, identifying existing conditions and challenges on the WBL, and assessing rail infrastructure, equipment, and service plans to improve the line's flexibility and attractiveness for commuters. The WBL Master Plan provides short-, medium-, and long-term recommendations for improvements to the rail line, including rail infrastructure, equipment (rail cars and locomotives), and service levels. Implementing improvements to the WBL will involve developing a strategy for modernizing equipment operated on the line, expanding commuter rail service (with a goal of providing 30-minute headways during AM peak and PM peak hours), and identifying new rail storage and maintenance facility sites. Between 2019 and 2021, new passing sidings and signal improvements were installed along the WBL and Positive Train Control (PTC) was activated in November 2021. In 2022, CTDOT started operating M-8 trainsets on the Shore Line East system, which permitted the equipment that had been used on SLE to be shifted to the WBL and accommodate the service increase.

Ansonia

High Level Platforms: Under an All-Station Accessibility Program project, ADA-accessible improvements will made at the Ansonia Rail Station, including a new station building and waiting area with high-level platforms and passenger amenities.

At Grade Railroad Crossing (Division Street): The WBL has one at-grade crossing in the region, located at Division Street in Ansonia This project would replace the crossing with an overpass/underpass.

Seymour

High Level Platforms: Under an All-Station Accessibility Program project, ADA-accessible platforms and amenities will be implemented at the Seymour Station, including relocation and consolidation of the station north of CT-67. This is a combined project with the Beacon Falls station.

Derby/Shelton

Derby-Shelton Rail Station: In 2021, CTDOT was awarded a $24M grant under the USDOT RAISE Program to install high-level platforms and rehabilitate the Derby-Shelton Station. Improvements will include renovating the station-area grounds, revitalizing the station building, improving parking, and adding bus bay and passenger amenities, including information kiosks, walkways, and heated waiting areas.

NEW HAVEN LINE SYSTEM PROGRAMMED PROJECTS

Commuter rail investments and improvements will utilize strategies such as new service to fill gaps, speed enhancements, interagency coordination, new rolling stock, and state of good repair projects. Below is an overview of the various New Haven Line System programmed projects. Table C.14 in Appendix C (Programmed Project List).

Bridge Program

This program includes ongoing improvements to ballasted and timber bridges and repairs to freight bridges which will allow for higher train speeds. Benefits include reducing service gaps, decreasing travel times, providing schedule-makers more operational flexibility, improving the useful life of the bridge and strengthening resilience to climate change.

Signals and Communications Program

This ongoing project includes upgrades to the NHL's signal system to support higher capacities and improve safety. Fiber optic communication cable and equipment will support security cameras at vulnerable passenger stations and bridges and also provide real time information displays to passengers at stations..

Station Improvement Program

This program ensures stations are ADA-accessible, safe, and that customers have an efficient user experience. Projects include customer service initiatives, real-time passenger information system upgrades, and fare collection improvements.

Track & Speed Improvements Program

This program includes several projects that will improve gaps in service by increasing travel speeds and line capacity. Improvements include new electrified tracks, interlockings, and freight sidings that will raise the maximum speed profile for passenger trains. Drainage improvements and switch tower rehabilitation will improve resiliency to flooding and other climate change impacts.

Traction Power Program

This program will improve system reliability by replacing traction and signal power substations along the NHL in six locations over four phases from 2022 to 2029.

Shops & Yards Program

This program will upgrade and expand shops and yards used by CTDOT for storing, maintaining, and servicing trains, including a catenary maintenance vehicle shed in Bridgeport. The program will address service gaps and increase line capacity to meet existing and future needs.

Permanent Devon Transfer Station

Construction of a new, permanent transfer station at the Devon junction would allow the WBL to increase its service frequency and offer additional transfers and connections to NHL-ML trains. As the Naugatuck Avenue Bridge is scheduled to be replaced as part of the planned Devon Bridge project, there is an opportunity to incorporate this Devon transfer station concept proposal into the Naugatuck Avenue Bridge replacement.

NHL-ML & WBL ILLUSTRATIVE PROJECTS

A full list of Illustrative Projects can be found in Table C.15 in Appendix C – Illustrative Project List, Rail

Bridgeport's Second Train Station

In addition to improvements to existing stations, a second train station on the NHL has been proposed in East Bridgeport After the initial feasibility study was completed in 2012, the City of Bridgeport conducted a TOD Plan and the Tower Place Adaptive Reuse Strategy. The station is envisioned as a pedestrian friendly, attractive transit hub that will link residents to jobs and other destinations, as well as providing over 1,000 parking spaces.

Stratford Station Platform Extension (Eastbound)

Currently, the Stratford Station's platform is not long enough to accommodate a full train-set. This project would lengthen the platform and extend the canopy to accommodate full train access/egress and better accommodate passengers.

CONNECTICUT STATE RAIL PLAN & CTDOT CAPITAL PLAN

Connecticut State Rail Plan

These projects are consistent with the recommendations for the NHL described in the Connecticut State Rail Plan (2022-2026).

- On-time performance of 95 percent or better for all passenger rail services through equipment and capital investments.
- Upgrade and expand both CTrail and MTA Metro-North Railroad passenger fleets and associated storage and maintenance facilities.
- Advance priority state of good repair projects, such as the projects identified in the 2022-2026 Capital Program and NEC Commission's CONNECT NEC 2035.

Intercity Services – Amtrak

The State Rail Plan identifies the following programmed improvements to Amtrak:

- New Haven to New Rochelle Capacity & Trip Time Planning Study: This study will assess investment options from New Haven to New Rochelle NY, to accommodate future segment capacity, on-time performance, and speed requirements. NEC versus off-NEC alignment options will be evaluated for feasibility and highest stakeholder value.
- New Haven to Providence Capacity Planning Study: This study will identify on- and off-corridor investment options to accommodate future capacity and service needs between New Haven and Providence, RI.

2022-2026 Capital Program

The CTDOT Capital Program reports on CTDOT's transportation program progress and outlines plans to use state and federal funding to rebuild, replace, or improve transportation infrastructure. Long term programmed regional improvements, as part of the Capital Plan (2022-2026), include:

- New rail cars for the WBL through a future rail car procurement with MNRR
- TIME for CT (TIME), an$8B-10B billion plan to upgrade rail speeds and reduce travel time in Connecticut. Improvements are described earlier in this section and will increase maximum authorized speeds to 90 mph between Milford and Bridgeport, and save 25 minutes from New Haven to New York City by 2035. MNRR replaced NHL rail cars with upgraded M8 rail cars in FYs 2021 and 2022.
- Modernize the Waterbury Line, including high-level platforms at five additional stations (described earlier in this section).

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Figure 7.1: Bridgeport Harbor & Ferry
Attribute: Patrick Carleton

7 | FERRY & AVIATION

Passenger Ferry Services

The Bridgeport Port Authority operates and maintains the Water Street Dock (formerly the Union Square Dock) on the westerly shore of the Bridgeport Inner Harbor just below the P.T. Barnum Bridge carrying I-95 over the Harbor. Facilities include a docking berth for passenger and vehicular ferries, additional berthing space for small vessels, passenger terminal, and vehicle staging area. The Dock has about 255 feet of berth space with 16-to-20 feet of depth. The Ferry Terminal dates to 1883 when it was used for the commercial exchange of industrial products made in Connecticut for Long Island agricultural products. Passengers were also transported from the Dock via ferries.

The Water Street Dock is strategically located in the Downtown and is connected via elevated walkways and sidewalks to the Bridgeport Intermodal Transportation Center, the City of Bridgeport's transportation hub. The Hartford HealthCare Amphitheater, and the Arena at Harbor Yard are directly adjacent to the Water Street Dock. The Dock has undergone several renovations over the last twenty years, including construction of the new ferry terminal. The terminal houses the Harbor Master Office, Marine Police Unit, a cafeteria, and ferry information center. Ongoing improvements and enhancements include reconstruction of the dock and bulkhead, construction of a new access road, rehabilitation and restoration of the timber piers, expansion of the ferry berth, and enhancement and development of a pedestrian walkway along the dock.

The Bridgeport and Port Jefferson Steamboat Company operates passenger and vehicle ferry service to Long Island and leases the Water Street Dock for loading and unloading. The Company provides daily service across Long Island Sound with up

to 16 round trips varying between weekday and weekend schedules. A cross-sound trip (26 miles) takes about one hour and fifteen minutes. The fleet currently consists of three vessels, the "Park City", the "PT Barnum" and the "Grand Republic". The "Park City", which began operations in 1986 is a 280' vessel that can carry up to 95 vehicles and 1,000 passengers. The 300' "PT Barnum" began service in 1999 and can hold 120 vehicles and 1,000 passengers. The "Grand Republic "built in 2003, is another 300' vessel that can hold 120 vehicles and 1,000 passengers. A new vessel is currently under construction. Use of the ferry service has been increasing steadily over the past 10 years. As of 2017 the Bridgeport and Port Jefferson Ferry carried approximately 1.3 million passengers and ±500,000 vehicles annually.

FUTURE FERRY TERMINAL

The Bridgeport and Port Jefferson Steamboat Company continues to revise and update its plans to eventually relocate its terminal facilities across the harbor to property owned by the company. The plans include a terminal building, two berths and surface parking.

HIGH SPEED FERRY SERVICE

The City of Bridgeport/Bridgeport Port Authority has started construction on a High-Speed Ferry Facility just north of the current Ferry Terminal. Market studies have demonstrated that the cost to commute by high-speed ferry would be competitive with other modes and that the service could attract enough passengers so that no operating subsidies would be required. Travel times would be comparable to rail and auto. Initial concepts have identified possible landing sites in New York City.

The proposed service would be operated by a private entity similar to the arrangement between the Bridgeport Port Authority and the Bridgeport and Port Jefferson Steamboat Company. The high-speed ferry service would utilize next generation boats – very maneuverable, state-of-the-art navigation and advance radar plotting aids, and computer-controlled. The service would be able to achieve stable movement in all weather conditions, with low noise water-jet propelled engines and low emissions. Other passenger amenities could include fully reclining airline-style seating, large screen TVs, food services and computer data ports

WATER STREET DOCK

The Water Street Dock and its associated passenger ferry service is an important transportation facility and contributes to Downtown Bridgeport's designation as a regional transportation hub. Renovations have made the Dock an attractive destination for residents and visitors alike and were essential in providing and maintaining an efficient waterborne service. However, the Dock needs to be maintained and enhanced to accommodate future service demands and needs, which may be constrained given the current site configuration. A critical component to meeting future needs is the construction of parking on site. Currently, almost all passenger parking is handled off-site. Accommodating parking on site will be more convenient for customers and make the ferry service more accessible. In addition, the dock has only one berth for passenger ferry service. This limits service and operating hours.

Construction for the State Project 0015-0312 - Bridgeport High-Speed Ferry Terminal began in October 2022 and is scheduled for completion in the last quarter of Fall 2023. The Bridgeport High Speed Ferry Terminal project will address several

deficiencies at the existing dock at 330 Water Street while creating a berth for a high-speed ferry vessel. The project will include the construction of a new concrete deck structure over an existing wharf, fabrication, and installation of fixed and floating docks with guide piles, construction of a new timber deck, resurfacing portions of an existing timber deck and associated utility improvements that includes electricity and phone service.

REHABILITATE RAMP AND APRON AREA

Despite regular maintenance, the reinforced concrete decking of the ramp and apron is in need of repair. The deteriorated conditions are due to high traffic volume (about 500,000 vehicles are loaded and unloaded annually) and the saltwater environment impact on the deck materials. The planned project will rehabilitate and upgrade the ramp and apron structure using materials better suited for a marine environment and for high traffic volumes. It will ensure a stable and safe loading operation into the future.

EXTEND WATERFRONT PARK

The Waterfront Park extends from Stratford Avenue to the stair access to the outbound platform of the Bridgeport Rail Station. This project would extend the boardwalk along the Pequonnock River to link with the Water Street Dock, completing the gap in the Waterfront Park behind the New Haven bound side of the railroad tracks. It would improve and enhance the existing waterfront park and Water Street Dock.

Bridgeport-Sikorsky Airport

The Bridgeport-Sikorsky Airport is the Greater Bridgeport Region's aviation gateway, serving the needs of the area's general aviation users, including a substantial amount of business aviation activity. It provides aviation opportunities not only for the residents of the region, but also to neighboring parts of southwestern Connecticut. It is an important transportation facility, ranked by the FAA as "nationally important," and the location attracts many area and out-of-area travelers and pilots. The Bridgeport-Sikorsky Airport is currently pursuing development as outlined in the recently completed **Airport Master Plan update** which defined a 20-year plan for modernizing and optimizing the airport so that it may continue to serve the aviation needs of the region. Figure 7.3 is from the update and provides an aerial of existing conditions at the airport.

The Bridgeport-Sikorsky Airport is owned and operated by the City of Bridgeport and is located in an industrial area in the South End of Stratford. The physical constraints due to roads, wetlands, and surrounding land uses requires responsible and creative planning for future improvements.

> The term "general aviation" is used to describe a diverse range of aviation activities and includes all segments of the aviation industry except commercial air carriers (including commuter/ regional airlines) and military.
>
> *- FAA*

Figure 7.2: Existing Conditions at Bridgeport-Sikorsky Airport

The three-letter Federal Aviation Administration (FAA) code for Sikorsky Memorial Airport is BDR. The State of Connecticut airport plan defines BDR as primarily a general aviation airport accommodating a significant amount of corporate activity, as well as some regional-type charter service. Scheduled air service was suspended in 1999. The FAA also classifies airports based on their ability to safely accommodate certain types of aircraft. The Airport Reference Code is based on the approach speeds to the airport and the minimum and maximum wingspan of aircraft that can safely land at the airport. The ARC for Sikorsky is C-III indicating approaches between 121 knots and 140 knots with wingspans of 79-to-118 feet. The airspace around the airport is controlled by an FAA Contract Air Traffic Control Tower and extends to 2,500 feet above ground level for a radius of roughly five miles when the tower is in operation. When the tower is closed, the airspace is extended and covered by radar.

The Airport consists of about 750 acres. Facilities and infrastructure include two runways, taxiways, aprons, tie-down areas, hangars, terminal, control tower and a number of related buildings and businesses. Runway 06-24 is 4,677 feet long with a displaced threshold, on the 24 approach, of 320 feet. Runway 11-29 is 4,761 feet long with a displaced threshold, on the 29 approach, of 364 feet.

A Runway Safety Area (RSA) is the land at the ends of the runways that provide a place for aircraft that undershoot, overrun or veer off the runway to safely come to a stop. The FAA has established standards for RSAs and requires all federally certified airports to conform to the RSA requirements to the extent practical. At BDR, the required size of the RSA is

1,000 feet long by 500 feet wide for both runways.

A project was completed in 2016 to address deficiencies to the RSA for Runway 6-24 including the installation of an Engineered Material Arresting System (EMAS) arresting bed. The bed is a supplement to the RSA at airports with space constraints. The EMAS installation necessitated the relocation of CT-113. During relocation, the road was raised slightly to provide enhanced wetland drainage and reduce flooding. Additionally, the surface of Runway 6-24 was repaved and narrowed from 150 feet to 100 feet, based on the design aircraft at the time.

The City of Bridgeport recently completed the Airport Master Plan, Pavement Management Program and Part 150 Noise Study which identified additional improvements to shape the airport moving into the future. The airport was recently awarded a $7 million grant from the State of Connecticut Department of Economic and Community Development to address some known deficiencies in support of existing private and business services, as well as potential scheduled commercial passenger service in the future.

AIRPORT IMPROVEMENTS

The critical needs and recommendations at the Airport are:

- Rehabilitate the pavement and runway safety area improvements to Runway 11-29;
- Perform an airport-specific coastal resiliency and sustainability study;
- Remove surrounding tree obstructions;
- Reconfigure surface parking lot;
- Construct a new terminal and other associated TSA requirements for commercial passenger service;
- Improve taxiway and runup apron;
- Construct new ramp areas and hangars; and
- Purchase various capital equipment.

8 | FREIGHT

Overview

This Chapter discusses the region's existing freight network, current and anticipated performance, and regional strategies to support the goals of the Connecticut Statewide Freight Plan Update (goals and objectives are listed below). The state's update and the strategies in this section will address several new federal requirements for freight planning. Those most relevant to the region include (summarized):

- Truck parking and rest facilities for commercial vehicles: assess the volume of commercial motor vehicle traffic and identify areas that have a shortage of adequate parking facilities, including an analysis of the underlying causes of such a shortage.
- Supply chain cargo flows by mode of transportation.
- Inventory of commercial ports.
- Impacts of e-commerce on freight infrastructure in the state.
- Strategies and goals to decrease the severity of impacts of extreme weather and natural disasters on freight mobility and of freight movement on local air pollution, flooding, stormwater runoff and wildlife habitat loss.
- Any activities carried out under the State freight plan will enhance freight transportation's reliability/redundancy and ability to rapidly restore access.

CT FREIGHT PLAN: GOALS & OBJECTIVES

Click for Plan

1: Safety & Security

Enhance the safety and security of the freight transportation system in all modes.

2: Economic Competitiveness & Efficiency

Support economic competitiveness, efficiency, and development through investment in the freight transportation system. Enhance goods movement efficiency into, out of, and throughout the state. Work with the private sector to identify needs and deficiencies.

3: Optimized Operations, Performance, & Resiliency

Attain and maintain adequate capacity and operational efficiency in the CT freight system. Support the use of ITS and technologies. Improve freight system resiliency and redundancy to extreme weather and natural disaster events or changes in travel demand. Improve intermodal connections.

4: State of Good Repair

Proactively maintain freight system infrastructure to preserve CTDOT's capital investments.

5: Equity, Environmental Protection, & Livability

Mitigate freight movement impacts on communities located near freight facilities or freight corridors. Reduce freight-transportation-related GHG emissions. Increase electric vehicle charging and alternative fuel infrastructure. Reduce impacts of freight movement on flooding and stormwater runoff. Reduce impacts of freight movement on wildlife habitat loss.

6: Program and Service Delivery

Deliver projects and services faster, cost-effectively and with greater customer satisfaction. Create strong partnerships with state agencies, local governments, neighboring states, and the private sector to foster collaboration, improve program delivery and facilitate public–private partnerships.

Table 8.1: Freight Volume, Statewide

DIRECTION	TRUCK	RAIL	WATER	AIR	TOTAL
TONS					
Outbound	27,145,302	4,350,456	236,587	71,955	31,804,300
Inbound	46,902,176	1,747,296	6,811,884	97,478	55,558,834
Intra	17,251,790	560,328	1,128,022	0	18,940,140
Through	66,903,634	3,920	0	0	66,907,554
Total	158,202,902	6,662,000	8,176,493	169,433	173,210,828
UNITS*					
Outbound	2,057,882	43,744	0	0	2,101,626
Inbound	2,711,886	19,240	0	0	2,731,126
Intra	1,289,191	5,584	0	0	1,294,775
Through	3,667,072	40	0	0	3,667,112
Total	9,726,031	68,608	0	0	9,794,639
VALUE/MILLIONS					
Outbound	$27,609	$1,469	$60	$9,404	$38,542
Inbound	$67,065	$1,509	$4,113	$11,921	$84,609
Intra	$24,262	$6	$233	$0	$24,502
Through	$114,721	$1	$0	$0	$114,722
Total	$233,657	$2,986	$4,406	$21,325	$262,374

**number of trucks or railcars* *Source: CT Freight Plan (draft), TRANSEARCH Freight Volume Summary, 2019*

In Connecticut, freight is transported on roads, highways, rail, waterways, ports and via air. According to CTDOT's Statewide Freight Plan Update (2022), $110.5 billion in direct outbound, inbound, and intraregional freight was moved by the state's freight network in 2019. The 451,100 jobs in Connecticut associated directly with freight shippers and receivers represents 19.3% of the state's employment base and 19.8% of statewide income.

The region's freight transportation system consists of:

Surface Roads: Interstate 95, CT-8, CT-25, US-1 and several other arterials are utilized by commercial carriers. The Fairfield Service Plazas on I-95 provides truck parking and some rest facilities. Trucks are prohibited from using CT-15 (Merritt Parkway).

Water: The Port of Bridgeport is a commercial harbor with infrastructure and facilities for access to Long Island Sound and Marine Highway M-295.

Rail: The Maybrook rail line is operated by the Housatonic Railroad and has an interchange in Derby. Metro North's New Haven Main Line and Waterbury Branch Line and Amtrak's Northeast Corridor are primarily utilized for passenger service.

Air: Sikorsky Memorial Airport is regional general aviation airport that supports a variety of private air carrier services.

Generators such as Amazon, FedEx, UPS, Santa Energy, Wheelabrator, Sprague Terminal, LeCoq Cuisine, Meyer Inc., Road Runner Freight, O&G, Enviro Express, and Sikorsky make up the majority of freight generators in the region.

Surface Roads

The Interstate System and trucks are the primary facilitators of freight movement in the state. The Statewide Freight Plan estimates that over 158 million tons of freight (91% of all tonnage) for a value of $234 billion (89% of total value), was moved within, out of, into or through Connecticut by truck. The five leading commodities by tonnage for 2019 were nonmetallic minerals, petroleum or coal products, food or kindred products, secondary traffic, and waste or scrap materials. The five leading commodities by value were transportation equipment, chemicals or allied products, secondary traffic, and electrical equipment. By 2040, the plan estimates that truck tonnage will increase by 20%, to 189 million tons. Food or kindred products and secondary traffic are expected to increase while petroleum or coal products are anticipated to decline.

Through-state truck tonnage made up the greatest percentage of volume, with outbound making up the next highest percentage. Thus, the state imports more freight (and freight value) than it exports. Through-truck and inbound tonnage primarily originate in Massachusetts, New York, Pennsylvania and New Jersey. High percentages of outbound traffic include Massachusetts, New York, and New Jersey. Hartford, Fairfield and New Haven counties make up the counties with the highest origin and destination traffic. These counties have the highest percentages of vehicle miles traveled (VMT) in the state as well. Fairfield County makes up 21.9% of total truck VMT in the state, behind New Haven (25%) and Hartford (24%) counties.

Nationally, over 80% of truck travel occurs on the Interstate System. In Connecticut, the National Highway System (NHS) makes up 7% of state-maintained roads but are some of the most heavily traveled. The state freight plan estimates that 99% of freight transported by truck uses Connecticut's Interstate System, which has the fewest size and weight restrictions. I-95, in addition to I-91, I-684, I-84 and CT-32 are on the nation's Primary Highway Freight System – these are the most critical highways of the U.S. freight system. First and last-mile connections are on locally-maintained, non-NHS roads. These roads provide the access from interstates and arterials to factories, stores, warehouses, distribution centers and intermodal transfer points.

I-95 is the only PHFS facility that runs through the region, but it makes up 28.3% of daily VMT in the state. I-95 from the New York/Connecticut border to New Haven and I-91 between New Haven and Hartford carry the heaviest overall truck volumes. In Bridgeport, up to 22,000 trucks are estimated to pass through the city each day – the highest in the state. In contrast, the total length of

Figure 8.1: Service Plaza on I-95.

Figure 8.2: Attribute: jjbers, licensed under CC BY 2.0.

CT-8 carries 2.6% of volume statewide and the total length of US-1 carries 1.3%.

Freight truck volumes have begun to make up a greater share of the percentage of traffic in the state. Between 2015 and 2019, overall average VMT increased by .02% each year - but truck traffic increased by 7.4% during this time period. Much of this increase occurred on the Interstate System, with I-95, I-91 and I-84 carrying the greatest shares of volume.

TRUCK PARKING

Reliable access to designated parking and services such as restrooms, food and fuel are critical to ensure that truck drivers are able to safely and efficiently operate their vehicles. Sufficient truck parking is a national and regional concern. To comply with Federal Motor Carrier Safety Administration (FMCSA) hours-of-service regulations, truck drivers need uniform availability of designated truck parking that meets demand and real-time information about availability. Drivers should not have to park in undesignated locations, such as on shoulders, entrance/exit ramps, vacant lots and side streets for adequate rest and to comply with regulations. Well lit, secure parking in designated areas with necessary facilities ensures safety for all road users.

Parking locations are uniformly distributed along the I-95 corridor, but uniformity varies on other corridors in the state. In the immediate region, the I-95 SB and NB Fairfield Service plazas each provide restrooms, food, fuel, and 20 overnight spaces. A survey and data collection conducted through the Statewide Freight Plan found that peak rate utilization is under 25%, which indicates that the supply typically meets peak-hour demand. Demand was found to be higher closer to the New York state border - truck drivers may feel that Fairfield is not close enough, especially with the unknown delays that I-95 congestion may cause. The Darien service plazas have a utilization rate that exceeds 75% during the peak hour, and parking in undesignated locations proximate to the NB plaza has been identified as an issue. These plazas have a similar amount of parking and services as the Fairfield plazas but may be more reliable for on-time deliveries during peak congestion periods.

Future demand for truck parking is likely to increase and additional services should be considered, such as showers, laundry, and truck wash stations- essential for long-haul truck drivers. Neither the Darien nor the Fairfield plazas provide these amenities. East of the region in Milford, the privately-owned Pilot Travel Center provides 150 spaces, all standard services and showers, laundry,

and truck washes. As fleets convert to electric or alternative fuels, charging equipment and sufficient infrastructure to provide power should be considered as additional truck parking is planned. Drivers can make informed decisions about where and when to park with real-time information about parking availability via smart-phone app and/or on Variable Message Signs (VMS).

The MAP Forum's Freight Working Group has been active in planning for truck parking and recently completed a truck parking inventory, which is available at **https://map-forum-njtpa.hub.arcgis.com/pages/freight**.

PERFORMANCE OF THE HIGHWAY FREIGHT SYSTEM

The condition and capacity of all roads, but especially the Interstate System impacts the efficient, on-time and safe delivery of freight. CTDOT's transportation asset management process assesses the condition of pavement and bridges. In Fairfield County, a total of 82.58 miles of NHS road pavement is in poor condition (2020): 7.89 miles of the interstate, 3.39 miles of other freeways and expressways, and 71.30 miles of other principal arterials. Two bridges on US-1 were also found to be deficient (in the region). Bridge 00325 over the Yellow Mill Channel in Bridgeport has a superstructure and substructure in serious condition; the deck of bridge 00326 (Metro North Railroad/Stratford) is in poor condition. Funding has been allocated for rehabilitation of both bridges.

The State Freight Plan states that truck-involved crashes occur less frequently than other types of crashes but can be more severe due to the size and weight of the vehicles. Fairfield, Hartford, and New Haven counties made up 84% of truck-involved fatal and injury crashes between 2015 and 2019. These three counties are the most populous and made up 76% of all inbound and outbound tonnage in 2019. Between January 1, 2020 and January 30, 2023, a total of 2,743 light truck and medium/heavy truck crashes were reported in the region (CT Crash Data Repository) – this total encompasses all crashes, including those that did not result in property damage or injury.

The FHWA defines truck bottlenecks as "any segment of roadway with constraints that cause a significant impact on freight mobility and reliability." Excluding crashes, weather, and restrictions (routes/operating times), the following road segments in the region had the highest total delays in the state, most likely resulting from recurring congestion:

- I-95 in Fairfield from Mill Hill Road to the Sherwood Island Connector: demand
- US-1/I-95 intersection in Fairfield, from Stephens Lane to Johnson Drive: demand and traffic control

In addition, the American Transportation Research Institute (ATRI), develops a list of the top 100 truck bottlenecks every year. For 2022, I-95 at CT-8 in Bridgeport was included in this list, as well as 5 other locations on I-95, I-91 and/or I-84.

The Truck Travel Time Reliability Performance Measure is discussed in detail in Sections 11 and 12. Other performance measures that impact the movement of freight on the region's roads, such as safety and pavement and bridge condition, are discussed in Section 11 as well.

TRENDS & FUTURE PROJECTS

Regional freight movement will most likely continue to be dominated by motor carriers and any

diversion of goods to other modes will likely have a marginal impact on modal share and little effect on highway congestion. Diverting goods movement to other modes may be difficult despite various alternatives. These constraints are detailed further in the rail, Bridgeport Harbor, and aviation sections.

Highway Use Fee: In 2021, the Connecticut General Assembly passed a highway use fee based on the weight of, and distance traveled by trucks in Connecticut. Beginning in 2023, all vehicles weighing more than 26,000 pounds will be subject to an additional per mile fee to operate on the state's highways. These fees will be used to help offset the impact of heavier vehicles on roadways and will be deposited in the Special Transportation Fund.

I-95: The recurring congestion on I-95 is partly due to capacity but is exacerbated by weaving conflicts and inadequate acceleration areas. This congestion impacts all drivers but causes unpredictability and poor reliability for on-time freight delivery. Due to their weight and size, trucks occupy more space on the highway, must begin to slow down earlier when exiting and braking, and take a longer time to attain travel speeds when entering the highway. The **I-95 Planning and Environmental Linkages (PEL)** study will inform capacity and safety improvements on I-95. Phase II will focus on I-95 between exits 19 and 27A in Bridgeport and Fairfield and will include strategies for strategic widening on the NB segment. In Stratford, the exit 33 interchange now provides a SB exit and a NB entrance. This project was recently completed. CTDOT has also been implementing **Intelligent Transportation Systems (ITS)** on multiple freight network roadways within Connecticut, including I-95. These include updating the real time traveler information systems (CT Travel Smart), installation of variable message signage, and improvements to traffic surveillance.

First and Last Mile: Locally-owned roads are typically the first and last-mile connection for the majority of truck traffic. As e-commerce increases, available curb space for deliveries must be ensured and coordinated, especially in urban areas. Strategies include allocated loading zones and incentives for e-commerce companies to deliver the same volume of goods but in fewer trips. Mitigation activities and coordination with e-commerce companies may also become necessary on last mile corridors that experience high volumes of truck traffic. The region has seen growth in freight generators which will increase these considerations for both the state and municipalities. The City of Bridgeport's **Seaview Avenue** Corridor improvement project will help to better accommodate truck movements and provide better access to industries in the area. Seaview Avenue is an important local freight and intermodal connector between I-95 and the Port of Bridgeport. Access to industrial sites, including the Foreign Trade Zone and the Lake Success Business Park area, is constrained by the physical condition of the road, especially by the low vertical clearance under the New Haven rail line. Low bridge clearance will continue to be an issue throughout the region, especially as flooding and climate change impacts increase, as further explored in Section 10, Resilience.

Resilience: US-1 and numerous local roads have been designated as a diversion route if I-95 is inaccessible. Improvements to US-1 and designated diversion routes should continue to accommodate freight while ensuring safety for all modes. Several BIL programs aimed at promoting sustainable operations for transportation will allow for development of resilience improvement plans in the region focused on potential alternative fueling stations, additional CMAQ dollars on multimodal freight projects, and electrification projects.

Regional Coordination: The MAP Forum's Freight Working Group continues to coordinate freight planning in the tri-state region, as well as in parts of Pennsylvania. Recent topics have included parking, clean freight movement and last mile workforce accessibility options.

Freight Railroads

After the highway system, rail is the next highest facilitator of freight movement in the state. The Statewide Freight Plan (2019) estimates that 6.7 million tons of freight valued at $3 billion was transported via the state's freight rail system. 99% of this volume either originated or terminated in the state. The four leading commodities by tonnage for 2019 were nonmetallic minerals, waste or scrap materials, clay, concrete, glass, or stone, and primary metal products. By value, the four leading commodities were primary metal products, clay, concrete, glass, or stone, nonmetallic minerals, waste or scrap materials, and chemicals or allied products. By 2040, the plan estimates that rail freight will have increased by 30% to 8.6 million tons. Significant changes to the major commodity mix are not anticipated.

The 2022-2026 Connecticut State Rail Plan identified the following goals applicable to freight rail:

- Economic Goal 2: Leveraging the Rail System to Support Economic Competitiveness
- Sustainability Goal 1: Integrate Resiliency into Passenger and Freight Rail Projects
- Sustainability Goal 2: Reduce Greenhouse Gas (GHG) Emissions by Encouraging Mode Shift

Rail freight in Connecticut is operated by the private sector. Freight rail right-of-way is owned by freight rail companies, CTDOT, Amtrak and a municipality (2 miles in Bristol). As owner of the New Haven Line, CTDOT leases rights to CSX for freight operations. Similar to I-95 from the New York line to New Haven, the New Haven Line via CSX transports the most freight tonnage in the state. Much of this tonnage is made up of outbound freight from New Haven County to the New York City Metro area, which is anticipated to continue to 2040.

The 10 private freight operators own 200.1 miles of track. For privately owned-track, the freight railroad/operator pays for operating expenses and most capital expenses. In the Greater Bridgeport and Valley region, the Maybrook line begins in Danbury and connects to the Waterbury and Pan Am Southern freight lines immediately south

Table 8.2: Freight Rail Lines

	ROW MILES
PUBLIC	
Freight Railroad Operating Rights	
Federal – Amtrak owned (Shore Line & Springfield Line)	122.5
State of Connecticut owned (NHL, Branch Lines & misc.)	128.2
Freight Railroad Lease Agreements	
State of Connecticut owned	129.1
Municipal – City of Bristol owned	2.0
Total Public	381.8
PRIVATE	
Freight Railroad Companies (privately owned)	246.7
Total Private	246.7
TOTAL MILES	628.5

Source: Connecticut State Rail Plan 2022-2026 Draft, CTDOT

of the Derby/Shelton passenger rail station. The Housatonic Railroad Company owns this line, and it maintains it at FRA Class 1 track standards, which allows for maximum speeds of up to 10 miles per hour for freight. The carload weight limit is 286,000 pounds and there is no passenger service on this line. The State Rail Plan noted that the Housatonic Railroad Company is planning to repair tracks on the Maybrook line and re-establish an interchange in Derby.

Transporting freight via rail rather than truck results in greater fuel efficiency and fewer emissions. On average, freight railroads are three to four times more fuel-efficient than trucks, which suggests that one rail car can move four trucks of tonnage while consuming the same amount of fuel. Further, freight rail is more reliable than barges and more efficient per ton than trucks (State Rail Plan). However, expanding freight rail in the region is limited due to the following:

- Conflicts with passenger rail services: As passenger rail service grows, freight operators have fewer opportunities to use this track. Maintenance, especially at night also causes conflicts. Passenger rail and freight rail with overlapping track can lead to chokepoints and congestion.
- Intermodal limitations: Ports, airports, and highways are not always proximate or connected to freight rail service. For example, in Bridgeport the rail system does not extend to the port and facilities are limited to passengers.
- Limited vertical clearance: The state's rail lines cannot accommodate double-stacked rail cars. Catenary wire and overhead platforms may also impact the height of cars.
- Existing track structure: The FRA allows for a standard maximum car weight of 286,000 pounds but a significant portion of track in Connecticut only accommodates up to 263,000 pounds. These limitations result in a higher cost per ton and undermines the efficiencies of rail versus truck freight. In the State Freight Plan, rail stakeholders anticipate that the new standard weight capacity will increase to 315,000 pounds.

Figure 8.3: Bridgeport Harbor.

Attribute: Mark Goetz

Bridgeport Harbor

The maritime transportation system is comprised of waterways, ports, and land-based infrastructure (roadways, railroads and pipelines) that connects the waterborne system to the rest of the nation. The Port of Bridgeport is one of three deep water ports in Connecticut and includes two natural harbors, Black Rock Harbor and Bridgeport Harbor. The majority of waterfront facilities in both harbors are privately owned and operated. Black Rock Harbor is primarily recreational, while Bridgeport Harbor includes a ferry terminus, private marinas, ship

repair and maintenance facilities, tank farm, and construction firms. Bridgeport Harbor is a designated Primary Highway Freight System Intermodal Connector on the NHS. Petroleum products are currently transported to a fuel terminal and tank farm via the port. Other activities within the harbor include recreational boating and support facilities, commercial fishing, dry dock and boat repair facilities, tug-boat docking and passenger and vehicle ferry service.

Data on water-borne freight is limited. While some water-borne freight activity occurs at Bridgeport and New Haven Harbors, the Port Authority of New York and New Jersey (PANYNJ) is the most significant handler of water-borne freight. In 2019, the PANYNJ handled 136 million tons of freight, while Bridgeport handled 1.8 tons and New Haven handled 9.3 tons.

Bridgeport Harbor continues to attract water-dependent industries, freight-related infrastructure investments should ensure public access to the waterfront and support the City's vision for the waterfront, as detailed in "Waterfront Bridgeport."

The Bridgeport Harbor channel is less than 30-foot deep and the USACE is considering a maintenance dredge to 33 feet or 35 feet. A 14- or 18-foot dredge is under consideration for Black Rock Harbor. The state would be responsible for the cost difference associated with the deeper dredges. Before any dredging can begin, the ACOE must complete a Dredged Material Management Plan (DMMP), which should be approved by the time of this document's release. Based on this timeframe, the earliest a dredge could be completed would be January of 2025.

In addition to the need for dredging, the Statewide Freight Plan identified the lack of conveniently accessible freight rail, lack of connectivity to Bradley Airport and inadequate parking on the eastern side of the port as limitations. The Port of New York and New Jersey is more convenient for waterborne cargo (whether foreign or domestic) and has significantly greater capacity for off-loading and regional distribution.

Air Cargo Services

The air cargo industry has experienced a high rate of growth in recent years and transports a wide range of commodities, primarily those with a high value or time sensitivity. In addition to shipments by air, the air cargo freight system includes ground transportation by truck, either motor carriers or air cargo affiliates that operate their own fleet of trucks, such as UPS and FedEx.

In Connecticut, air cargo mostly passes through Bradley International Airport (BDL) in Windsor Locks, which is over 70 miles from Sikorsky Memorial Airport in Stratford. BDL is the only airport in the state that has regularly scheduled commercial freight service. According to the State Freight Plan, BDL landed approximately 1.2 million pounds of air cargo in 2020, ranking 30th in the nation.

Other regional and general aviation airports may receive occasional small deliveries, primarily for local businesses. The Sikorsky Memorial Airport is a general and commercial aviation airport serving general and corporate activity. However, because of its size and function, it is unlikely that air cargo services will expand greatly and account for a larger portion of freight movement in the region. In addition, the proximity of the region to the New York airports and Bradley Airport north of Hartford will limit the amount of air cargo flown directly to and from the region.

9 | SAFETY, OPERATIONS & EMERGING TECHNOLOGIES

Transportation safety, operations, and innovative technologies provides a multi-disciplinary approach to preserving and improving the safety, reliability, and efficiency of the transportation system. These elements seek to solve transportation problems by increasing performance efficiencies. That is, rather than adding capacity through building a new or wider highway, operational improvements can be leveraged as tools to reduce vehicular congestion, and increase multi-modal safety, reliability, and efficiency.

Many of the projects included in the following section include Intelligent Transportation System (ITS) enhancements supported through funding by the USDOT, the State of Connecticut Department of Transportation (CTDOT), Greater Bridgeport Transit (GBT) and other state, regional, and local organizations. Projects without ITS elements are considered unfunded needs and serve as illustrative projects, should funding become available.

State & Regional Collaboration

MetroCOG and NVCOG staff are active participants in numerous data related discussions with CTDOT Planning, Engineering, and IT staff to develop collaboration protocols, data governance policies, and data sharing strategies. This collaboration will be essential to implementing robust data driven transportation analysis tools and products. Data management best practices should be developed to minimize costs associated with building and maintaining transportation GIS data such as those identified by FHWA's "GIS Data Governance and Data Management Case Study" and "GIS in Maintenance Peer Exchange" reports.

Safety

The national, state, and regional goal of a safe, multi-modal transportation system across all modes and abilities is a crucial element of the Metropolitan Transportation Plan. MetroCOG and NVCOG recently completed Regional Transportation Safety Plans (2020 and 2021, respectively) and have made a commitment to Vision Zero. As part of the Safety Action Planning process, MetroCOG committed to achieving zero deaths by 2050. NVCOG made a commitment to realizing zero

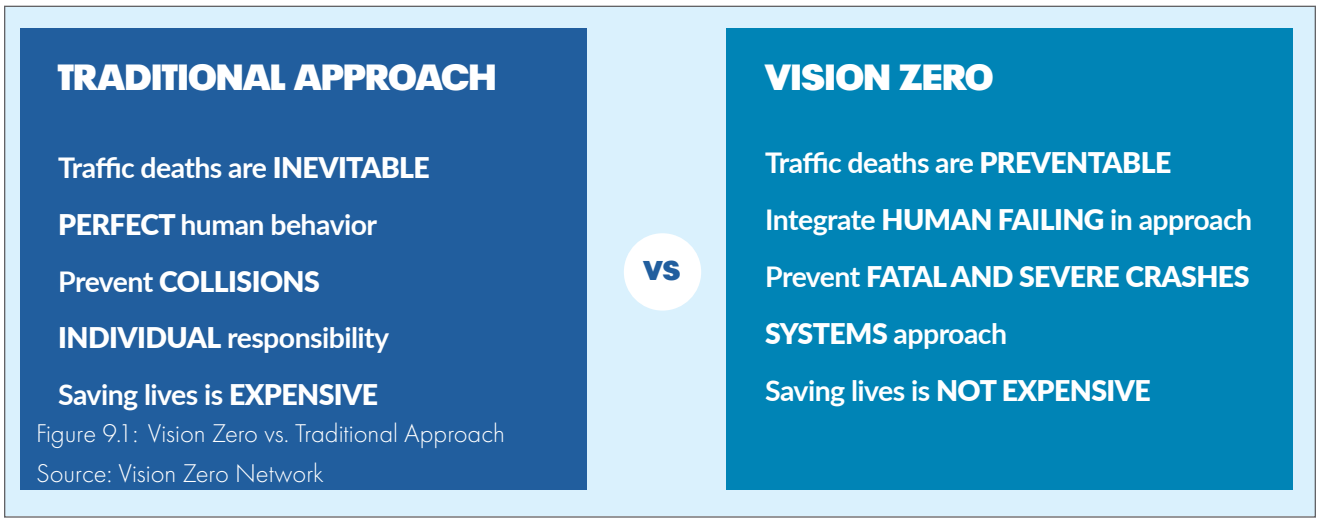


Figure 9.1: Vision Zero vs. Traditional Approach
Source: Vision Zero Network

deaths by 2060 through the update/addendum of their Regional Transportation Safety Plan (2022).

VISION ZERO

Vision Zero is a strategy to eliminate traffic fatalities and severe injuries among all road users, and to ensure safe, healthy, equitable mobility for all. Figure 9.1 illustrates the differences between Vision Zero and the traditional approach to transportation safety.

With the 2022 release of the National Roadway Safety Strategy and a federal commitment to Vision Zero and a Safe System Approach, the state, region, and local governments have a comprehensive, multi-disciplinary framework to plan for a safe transportation system.

> *"Together, we must strive for zero roadway fatalities. Zero is the only acceptable number of deaths on our highways, roads, and streets. The United States Department of Transportation is committed to taking substantial, comprehensive action to significantly reduce serious and fatal injuries on the Nation's roadways. However, no one will reach this goal acting alone. Reaching zero will require U.S. DOT to work with the entire roadway transportation community and the American people to lead a significant cultural shift that treats roadway deaths as unacceptable and preventable".*
>
> - National Roadway Safety Strategy 2022

SAFE SYSTEMS APPROACH

The Safe System approach aims to eliminate fatal and serious injuries for all road users. It does so through a holistic view of the road system that first anticipates human mistakes and second that human bodies have limited ability to tolerate crash impacts.

Figure 9.2:
5 Core Elements of the Safe Systems Approach
Source: FHWA

Applying the Safe System approach involves anticipating human mistakes by designing and managing road infrastructure to keep the risk of a mistake low; and when a mistake leads to a crash, the impact on the human body doesn't result in a fatality or serious injury. Road design and management should encourage safe speeds and manipulate appropriate crash angles to reduce injury severity.

Safer People: Encourage safe, responsible behavior by people who use our roads and create conditions that prioritize their ability to reach their destination unharmed.

Safer Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.

Safer Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.

Safer Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.

Post-Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

VISION ZERO & TRANSPORTATION SAFETY IN CONNECTICUT

The MTP is aligned with national and state goals for transportation safety. In Connecticut, the Vision Zero Council was established by the Connecticut General Assembly in 2021. The Council is an interagency work group tasked with developing statewide policy to eliminate transportation-related fatalities and severe injuries involving pedestrians, bicyclists, transit users, motorists, and passengers. Policy recommendations are in development by the Council. CTDOT is responsible for the development of several federally required safety plans.

STRATEGIC HIGHWAY SAFETY PLAN (SHSP)

The **Strategic Highway Safety Plan** (2022-2026) is the statewide framework that identifies key safety needs and guides investments to reduce roadway fatalities and serious injuries on all public roads. An up-to-date SHSP is a requirement for the state to receive federal Highway Safety Improvement Program (HSIP) funds. The plan envisions "all users of Connecticut's transportation system will arrive safely to their destinations, achieving zero deaths."

FHWA'S SAFE SYSTEM APPROACH – 6 PRINCIPLES

1. Death and Serious Injuries are Unacceptable.

While no crashes are desirable, the Safe System Approach prioritizes the elimination of crashes that result in death and serious injuries since no one should experience either when using the transportation system.

2. Humans Make Mistakes.

People will inevitably make mistakes and decisions that can lead or contribute to crashes, but the transportation system can be designed and operated to accommodate certain types and levels of human mistakes, and avoid death and serious injuries when a crash occurs.

3. Humans Are Vulnerable.

People have physical limits for tolerating crash forces before death or serious injury occurs; therefore, it is critical to design and operate a transportation system that is human-centric and accommodates physical human vulnerabilities.

4. Responsibility is Shared.

All stakeholders – including government at all levels, industry, nonprofit/advocacy, researchers, and the public – are vital to preventing fatalities and serious injuries on our roadways.

5. Safety is Proactive.

Proactive tools should be used to identify and address safety issues in the transportation system, rather than waiting for crashes to occur and reacting afterwards.

6. Redundancy is Crucial.

Reducing risks requires that all parts of the transportation system be strengthened, so that if one part fails, the other parts still protect people.

The plan's mission is to "provide a safe transportation system by using partnerships to coordinate education, enforcement, engineering, and emer-

gency response initiatives." To this end, the goal of the plan is to "achieve a 15% reduction or more based on the five year rolling average of fatalities and serious injuries from 2022 to 2026."[1]

Based on data analysis and stakeholder input, the plan identified three emphasis areas. Each emphasis area included potential countermeasures and mitigation strategies, which should be considered for spot improvements and/or integration into larger projects.

- Infrastructure: reduce the number of fatal and serious injury roadway departure and intersection-related crashes.
- Behavioral: eliminate fatalities and serious injuries related to impaired driving, aggressive driving, unrestrained occupants, motorcycles, and distracted driving.
- Pedestrian: eliminate fatalities and severe injuries while walking, running, or standing along or near the roadway.

HIGHWAY SAFETY IMPROVEMENT PROGRAM IMPLEMENTATION PLAN

The FHWA requires that CTDOT develop the **Highway Safety Improvement Program Implementation Plan** since the state did not meet or make significant progress toward their 2020 safety performance targets. The plan must identify a combination of programs and strategies that will (1) contribute to a reduction in fatalities and serious injuries and (2) help the State achieve or make significant progress towards achieving their safety performance targets in subsequent years. The programs, strategies, and activities recommended in the plan must address roadway features that constitute a hazard to road users and projects identified based on crash experience, crash potential, or other data-supported means. Similar to the SHSP, program areas for 2023 are outlined below.

- Roadway departure crashes: planned projects include horizontal alignment signing and high friction surface treatment.
- Angle/Intersection crashes: planned projects include traffic signal improvements, signing and paving markings at unsignalized intersections and spot improvements at intersections.
- Pedestrian crashes: rectangular rapid flashing beacon (RRFB), pedestrian improvements at signalized intersections and clearance interval projects.

HIGHWAY SAFETY PLAN

CTDOT's Highway Safety Office (HSO) is responsible for carrying out the **Highway Safety Program** (HSP). The program's goal is to prevent roadway fatalities and injuries as a result of crashes related to driver behavior (as opposed to infrastructure or environmental issues). The HSO plans, coordinates, and implements effective highway safety programs and provides technical leadership, support, and policy direction to highway safety partners. The HSP is an annual planning document that addresses identified and defined highway and traffic safety problems.

1The three SHSP emphasis areas—infrastructure, behavioral, and pedestrian—encompass the majority of fatalities and serious injuries in the state. Additional safety areas were also identified, which include unlicensed drivers, hit-and-runs, work zones, commercial vehicles, older drivers/older pedestrians, pedal cyclists, younger drivers, railway-highway grade crossings, tribal owned roadways, wrong way drivers and traffic incident management. While many of these strategies are best-suited for implementation at the state-level, MetroCOG will identify opportunities to support all SHSP strategies.

The most recent HSP identified problem areas that included impaired driving, occupant protection/child passenger safety, police traffic services, distracted driving, motorcycles, traffic records, community traffic safety, pedestrians/bicyclists, evidence-based traffic safety enforcement and attitudes/awareness. Countermeasures such as communications/outreach, education, enforcement, and program administration are applicable to all or most of these problem areas.

METROCOG'S REGIONAL SAFETY ACTION PLAN

The **Safety Action Plan** is an important step towards MetroCOG's goal of reaching zero traffic-related deaths region-wide by the year 2050. A large portion of developing the plan and identifying appropriate countermeasures, strategies, and projects was the identification of the High Injury Network (HIN) analysis. This analysis identified the region's roadways where a disproportionately high amount of traffic deaths and serious injuries occur. Through this analysis, all stakeholders are better able to focus limited resources on the most problematic locations and issues. Core components of the action plan regional and municipal HIN analyses, project selection and prioritization, an equity impact assessment, public engagement, policy strategies and how to measure progress in the future. Policies, process changes, and strategies utilized Safe Systems Approach. The Safety Action

Figure 9.3: Vision Zero Priorities for the MetroCOG Region
Source: MetroCOG's Regional Safety Action Plan

Plan informed many of the projects in the MTP and is integrated into this document.

A key component of the Safety Action Plan is a shared commitment among varying stakeholders, including but not limited to transportation officials, municipal staff/leaders, state DOTs, Metropolitan Planning Organizations, residents, advocacy groups and organizations. MetroCOG established the Safety Planning Subcommittee (TTAC) in Fall 2022 to carry out the objectives of the Safety Action Plan, including annual progress updates.

NVCOG REGIONAL SAFETY ACTION PLAN & 2022 ADDENDUM

Both region's Regional Transportation Safety Plans (RTSP) were intended to be updated every five years. A mid-term **addendum** was compiled to support the Naugatuck Valley Region's Vision Zero policy and goal. The addendum adds an expanded project list, based both on data and on the input from municipal leaders and the public. An expanded public engagement strategy was developed for this update and is detailed in this section as well. Updated crash data for the region, looking at the three full years of 2019, 2020, and 2021 were analyzed. Finally, a more thorough equity analysis was completed, ensuring that the updated 2022 project list programmed several projects within Environmental Justice and Equity areas of concern within the region.

REGIONAL TRANSPORTATION SAFETY PLAN (METROCOG, 2020 & NVCOG, 2021)

The purpose of the RTSP is to reduce crashes that result in serious or fatal injuries on state and local roads that are not limited access highways. Both MetroCOG and NVCOG's RTSPs align with the State Highway Safety Plan. The plans serve as strategic road maps to assist the MPO and municipalities in collaborating with the state to reduce the most serious crashes. The plan uses a similar methodology as the SHSP but is with a local and regional focus that reflects the needs of individual communities. The plan was developed involving local stakeholders from the four E's of transportation safety: engineering, enforcement, education, and emergency response. Each municipal report includes local crash data and incorporates stakeholder input to develop proactive goals and countermeasures that can potentially mitigate fatal and injury crashes. To inform this process, data from the UConn Crash Data Repository was analyzed, and municipal representatives were consulted to identify priority locations to reduce severe crashes.

MetroCOG's Safety Action Plan and NVCOG's Addendum utilized a more comprehensive and multi-disciplinary approach to safety planning and equity considerations were utilized to guide the analysis, project prioritization and policy recommendation.

Transportation Security

The security of the surface transportation system and infrastructure is a critical issue due to concerns that these facilities are attractive targets to terrorist attacks and vulnerable to natural disasters. The transportation system can also play a key role in responding to an emergency, evacuating affected populations, and providing alerts and advisories to travelers. The loss of a critical asset could hamper emergency response efforts, as well as disrupt daily travel patterns.

The overall objective of transportation security is to protect the entire system. However, it is not practical or cost effective to safeguard all infrastructure, facilities, and equipment. The focus of transportation security varies depending on the transportation asset and the environment in which it is located.

CRITICAL TRANSPORTATION ASSETS CATEGORIES:

- Infrastructure: Arterial roads, interstates, bridges, overpasses/interchanges, roads on dams, and fixed guideway/rail line.
- Facilities: Fuels storage areas, maintenance yards, ports, rest areas, traffic operations centers, terminals (bus and rail stations), parking garages, vehicle inspection stations, and weigh stations.
- Equipment: Roadway monitoring equipment, traffic signal control, variable message signs, vehicles (buses and rail rolling stock), and communications systems.
- Personnel: Municipal personnel, emergency responders, CTDOT personnel, and rail and bus passengers.

CRITICAL RISK MANAGEMENT

Although research suggests the surface transportation system has low risk as a terrorist target, there is a need to emphasize protection of critical mobility infrastructure, such as bridges, tunnels, and interchange areas. Transit resources, including rail lines, terminals and vehicles should also be protected. It is equally important to ensure that alerting and advising systems are secure and available when they are needed and that the information provided is accurate, reliable, and comes from an authorized source.

EMERGENCY MANAGEMENT

Region 1 Emergency Planning Team (R1EPT)

The Connecticut Department of Emergency Management and Homeland Security (DEMHS) has divided the state into five emergency planning regions. The municipalities of the Connecticut Metropolitan Council of Governments (MetroCOG) have been combined with a portion of the Western Connecticut Council of Governments (WestCOG) to form the DEMHS Region 1. This region is depicted in the following map. The four other municipalities of the GBVMPO (Ansonia, Derby, Seymour, and Shelton) are in DEMHS Region 2.

The mission of R1EPT is to provide the highest level of emergency preparedness and protection to the citizens of the region as they face new emergency management challenges. The intent is to bring together persons, agencies, first responders and other organizations to better understand emergency management issues, concerns and threats and better plan and coordinate responses to natural and man-made events. The planning effort has significantly advanced resources, training and capabilities of the Bridgeport-Stamford area to effectively plan, prepare for and respond to man-made and natural disasters.

A key component of the R1EPT is the convening of various Emergency Support Function Groups, referred to as ESFs. These ESFs focus their attention on critical discipline-oriented areas. These are working groups tasked with advising and making recommendations to the Regional Emergency Planning Team relative to their specialized area of expertise. The Federal Emergency Response Plan has identified 17 specific ESF areas. In Region 1, the REPT has convened 17 RESFs.

MetroCOG is a member of the R1EPT and participates in monthly meetings, as well as emergency planning workshops. MetroCOG is involved in working with and providing technical assistance to appropriate ESFs, primarily RESF-1: Transportation and RESF-3: Public Works. The purpose and scope of RESF-1 is as follows:

Regional Emergency Support Function 1 – Transportation

Purpose: The purpose of RESF-1: Transportation is to facilitate and coordinate planning and training activities among several municipalities and agencies concerning transportation issues and activities during a major disaster in Region 1.

Scope: The RESF-1 function is intended to focus on major disruptions of the transportation system requiring inter-jurisdictional coordination, information, and asset sharing. Transportation disruptions can occur as a result of direct impacts to the transportation infrastructure (e.g. disasters and evacuations) or from demands placed on the system by unforeseen events/emergencies. The system developed will be a component of the Region 1 Regional Evacuation and Shelter Guide as well as facilitating interaction with the State Disaster Plan, and National Response Framework (NRF).

Regional Emergency Support Function 3 – Public Works

Purpose: The purpose of Public Works and Engineering: RESF-3 is to develop and implement a system of resources and response capability for handling regional emergencies concerning water supply, wastewater, solid waste, and debris management during and after a potential or actual regional emergency.

Scope: RESF-3 is intended to focus on the coordination and communication related to potential or actual disruptions of critical services that have a regional impact.

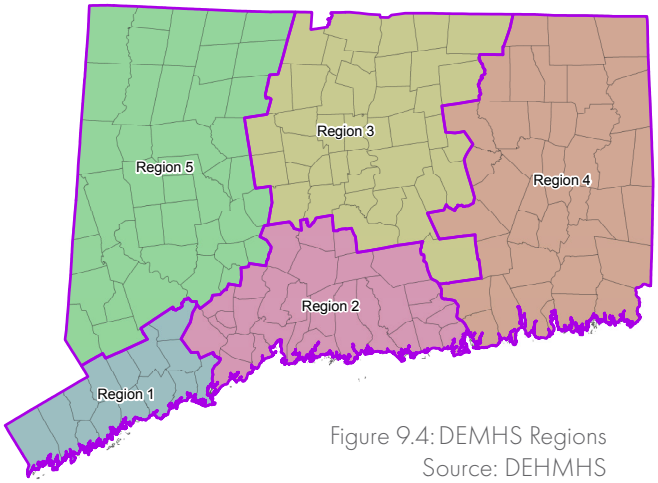


Figure 9.4: DEMHS Regions
Source: DEHMHS

Projects:

ESF-1 Transit Inventory: Throughout the COVID-19 pandemic, MetroCOG, WestCOG,, and Northwest Hills Council of Governments (NHCOG) were tasked with preparing a comprehensive Transit Asset Inventory of available transportation resources throughout DEMHS Regions 1 and 5. The development of these resources were to provide the REPT, emergency responders, and local governments with a database of resources to facilitate the emergency movement of non-COVID positive persons residing in long term care facilities, like nursing homes. In order to compile this database, information from transportation agencies who were awarded Section 5310 grant funds were utilized. This database will be updated bi-annually as 5310 grant awards are provided to transportation agencies. Future development and expansion of this database is dependent on program funding and resources of the REPT and MPOs. MetroCOG, WestCOG, and NHCOG attend quarterly meetings to brainstorm and develop innovative transportation related projects that may assist regional first responders, and REPT.

Region 1 Diversion Route Updates: CTDOT initiated a project with the nine regional COGs and the consulting firm IBI Group to undergo a comprehensive update of all diversion route plans for the major highways and interstates within the state. Through 2022 and 2023, MetroCOG and WestCOG participated in several planning meetings with municipal Engineering, Planning, Public Works, Police, and Fire departments to update diversion route plans for Interstate 95. Diversion route plans for I-95 through the DEMHS Region 1 were previously updated in 1998. This project will update all diversion routes by identifying detours for both passenger and commercial vehicles, identify road hazards, prescribe placement of detour signs, traffic control lights and message signs, and finally, electronically publish and distribute each plan online. Diversion plan updates began with I-95, and once completed will move on to Route 8, Route 15, and Route 25 in the Greater Bridgeport area.

Shared Data Tools

GEOGRAPHIC INFORMATION SYSTEMS (GIS) DATA MANAGEMENT & SHARING

The ability to accomplish the many goals and targets in this plan are greatly enhanced from a robust geographic information system to model roadway features and conditions into the transportation system's digital twin. The data developed needs to be accurate enough to support a wide range of uses from reporting, planning, research, design, construction, compliance, maintenance, operations, and emergency response. There are several key transportation GIS datasets that need to be constructed as part of this database such as bridges, culverts, signs, guardrails.

STATEWIDE & REGIONAL TRANSPORTATION GIS DATA – SAFETY

A robust transportation GIS is necessary to analyze transportation safety. Safety improvements must be based on a data driven process. Data sources will include but are not limited to high quality and complete crash data from the **CT Crash Data Repository**, US Census demographic data, the CTDOT LRS Roadway Information System, CTDOT asset GIS data, and local/regional GIS asset and parcel data. Data analysis will support the accurate identification of safety problems, development of reliable countermeasures, and a clear understanding of effectiveness. The federally required performance measurement and target-setting process places additional emphasis on data quality and analysis.

CT CRASH DATA REPOSITORY

MetroCOG and NVCOG staff regularly utilize and analyze data from the CT Crash Data Repository, which includes crash specifics, vehicle information and persons information. This data provides an opportunity to regionally assess safety issues to assist municipalities with identifying candidate locations for countermeasures. Crash data analysis will continue on an ongoing basis. Currently, gaps in local roadway counts limit the ability to determine crash rates on local roads. To improve the overall crash data analysis, several improvements are required: improved accuracy of crash locations contained within the CT Crash Data Repository, improved count and VMT data on all roads (to determine crash rates), and more complete Roadway Safety asset data (signs, guardrails, and other physical countermeasure assets).

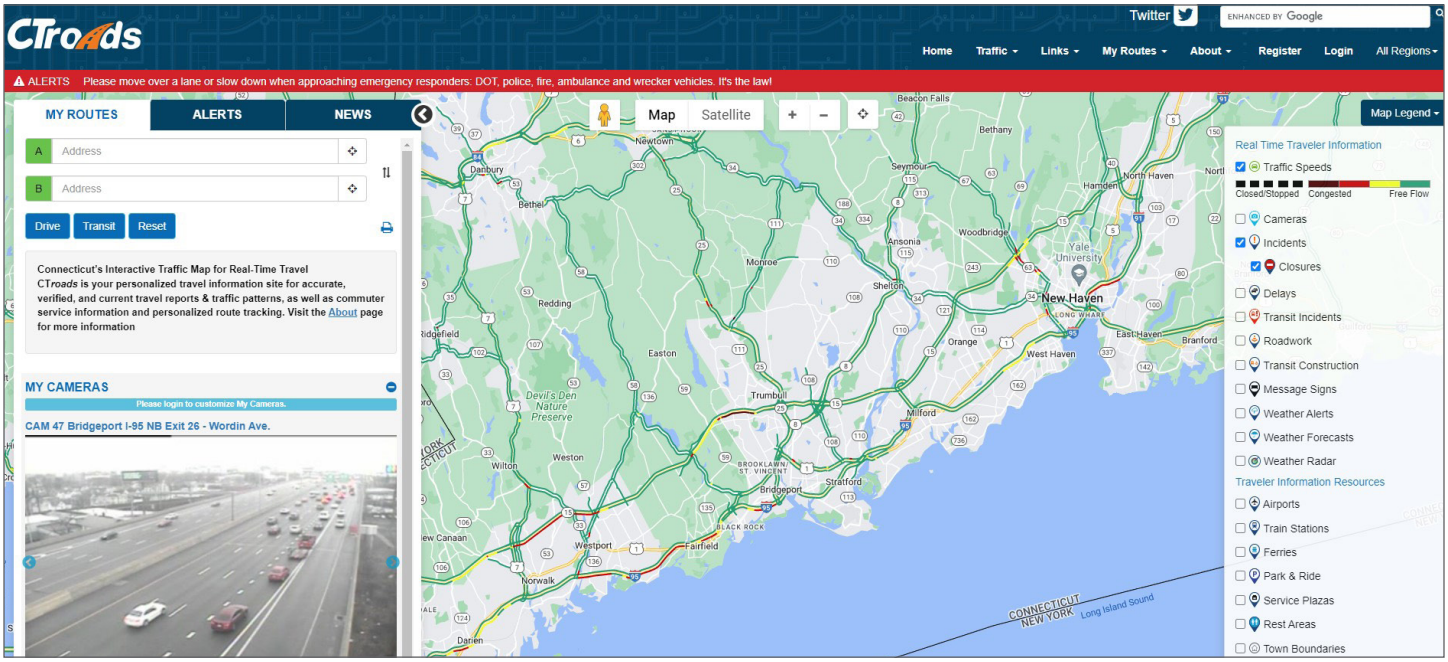


Figure 9.5: CTroads

TRAVELER INFORMATION SYSTEMS

Transportation information systems are essential for informing travelers about emergencies and advising them regarding natural and man-made threats. Wide area alerts use driver and traveler information systems, such as dynamic message signs, highway advisory radio, in-vehicle systems, transit displays, 511 traveler information systems, and traveler information web sites, to alert the public in emergency situations. Evacuation and re-entry information can also be transmitted via these devices.

In 2017, CTDOT developed an interactive online traveler web tool designed to assist road users, drivers, and passengers with travel between destinations. The program was formerly known as CT Travel Smart. This web tool provided online traffic mapping and visuals of Connecticut's roadways with real time travel information. In 2022, the program received an update as well as a name change to **CTroads**. The information shown through the web tool is a direct feed from CTDOT's state-wide Intelligent Transportation System Network and its state-of-the-art Highway Operations Center. CTroads enables users access to personalized and customizable information for trip planning such as construction updates, messages on variable message signs (VMS), weather alerts/radars, and information for public transit, etc.

TRANSPORTATION GIS DATASETS

Most important to this work is a roadway centerline linear referencing system (LRS) supporting a variety of analytical reporting requirements. These transportation GIS datasets are best developed using highly accurate basemap information products such as aerial orthophotography, surveyed or photogrammetrically derived ground features (planimetric mapping) and aerial or terrestrial LiDAR mapping. In 2020, CTDOT established an Enterprise GIS. By developing robust data standards, sharing agreements, and ownership hierarchies, CTDOT was able to compile and share verified transportation GIS datasets and mapping

products through their Open Data Portal. Datasets that were previously only available in AutoCAD or shared internally, are now easily accessible by the public. The Enterprise GIS will empower MPOs to make more informed data driven decisions.

The transportation system is comprised of many assets owned, maintained, and overseen by a variety of different organizations. To build and maintain this data requires a shared and collaborative vision built around standards, strong data governance policy and the financial commitment to consistent and regularly scheduled basemapping activities. In 2021, legislation was passed establishing a CT GIS office led by a Geographic Information Officer (GIO) in the Office of Policy and Management. Working with the CT GIS Advisory Council, the GIO is tasked with the coordination, procurement, processing, storage, and distribution of free and public GIS data. This new office will lead efforts to regularly acquire aerial imagery and elevation data. Currently, they have budgeted for flights in 2023 and 2026.These basemapping activities will benefit multiple organizations including municipalities, RPO's/MPO's, CTDOT, other state agencies, various federal agencies, and public utilities.

Emerging Technologies

CONNECTED & AUTONOMOUS VEHICLES

Connected and Autonomous Vehicles (CAVs) have the potential to improve the safety, reliability, accessibility, efficiency and environmental impact of the transportation system. A range of vehicles, whether privately-owned, shared and/or commercial/freight now have some level of connectivity or automation. CAV technology will continue to evolve, improve, and impact travel. Current AV technology has likely prevented or reduced the severity of vehicular crashes – but the extent of advancement and the ramifications of CAV technology to 2050 is uncertain and can only be anticipated. Transportation planning and investment must ensure that the current system accommodates existing technologies and has the ability to flexibly adapt as innovation continues. Most importantly,

WHAT ARE CONNECTED VEHICLES?

- CVs change how drivers interact with each other and the transportation system.
- With CV technologies, vehicles wirelessly communicate with each other and with infrastructure.
- CVs enable a range of safety, mobility, and environmental functions.
- CVs obtain information through wireless communications to support safety, mobility and environmental applications that assist the driver.
- CV technology can be used by AV technology.

WHAT ARE AUTOMATED VEHICLES?

- AVs change how vehicles and drivers interact with each other and the transportation system.
- Automated systems perform at least one element of operation without driver input.
- As automation increases, vehicles are increasingly able to perform dynamic driving functions in varied conditions and environments.
- AVs can take over some levels of driving tasks and can use information through communication technologies to enhance the Automated Driving System capabilities to safely and efficiently interact with the roadway environment.

Connected & Automated Vehicles at FHWA's Transportation Planning Capacity Building site, https://www.planning.dot.gov/planning/topic_CVAV.aspx

CAV technology implementation and support will necessitate significant public investment and therefore must provide equitable benefits to all users of the transportation system.

CAVS

Connected vehicle technology enables vehicles, roads and other infrastructure, and mobile devices to communicate and share transportation information wirelessly. This information includes the position of other vehicles, the status of road devices (ie, traffic signals), and/or roadway conditions. Collectively known as "vehicle-to-everything," (V2X) these communications fall into the following categories:

- vehicle-to-vehicle (V2V)
- vehicle-to-infrastructure (V2I)
- vehicle-to-pedestrian (V2P) communications

AVS

The transition from driver control to vehicle control has been defined by six levels of automation by the Society of Automotive Engineers (SAE), ranging from no automation (Level 0) to full automation (Level 5), (National Highway Safety Traffic Safety Administration) The SAE continues to refine these definitions. Figure 9.8 is the most recent, from 2021.

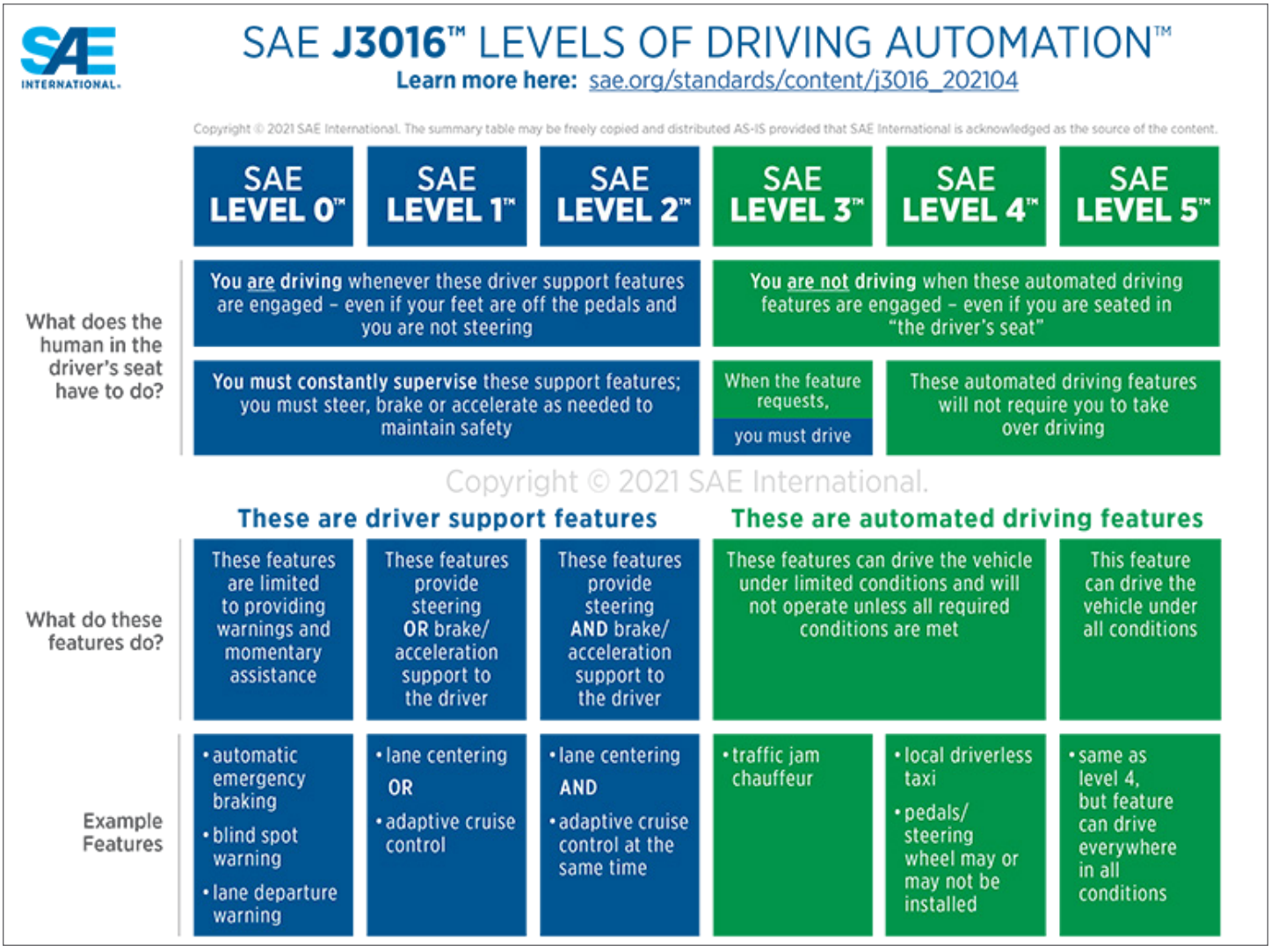


Figure 9.6: SAE Levels of Driving Automation

ADAS means "Advanced Driver Assistance System," and refers to SAE Level 2. ADAS provides partial driving automation in the form of assisting an attentive driver. ADS means "Automated Driving System" and refers to SAE Levels 3-5. In a vehicle equipped with ADAS, the driver must continually monitor the driving environment, and always be prepared to provide steering, braking, and throttle inputs. Level 2 is the highest level allowed by the National Highway Traffic Safety Administration (NHTSA). Levels 3-5 are not available in the United States.

The forthcoming 11th edition of the *Manual on Uniform Traffic Control Devices for Streets and Highways* will be released in May 2023. The new edition will include standards "supporting the safe testing of automated vehicle technology and any preparation necessary for the safe integration of automated vehicles onto public streets."

At the policy level, national and state-level plans have identified near- and long-term strategies that should be integrated into future plans, policies and projects that impact the transportation system.

NATIONAL

The vision of the USDOT's Automated Vehicles Comprehensive Plan (Comprehensive Plan) is to prioritize safety while preparing for the future of transportation, which will be accomplished by achieving three goals:

1. Promote Collaboration and Transparency: USDOT will promote access to clear and reliable information to its partners and stakeholders, including the public, regarding the capabilities and limitations of ADS (Automated Driving Systems).
2. Modernize the Regulatory Environment: USDOT will modernize regulations to remove unintended and unnecessary barriers to innovative vehicle designs, features, and operational models, and will develop safety-focused frameworks and tools to assess the safe performance of ADS technologies.
3. Prepare the Transportation System: USDOT will conduct, in partnership with stakeholders, the foundational research and demonstration activities needed to safely evaluate and integrate ADS, while working to improve the safety, efficiency, and accessibility of the transportation system.

EASTERN/NORTHEAST

The I-95 Corridor Coalition is a 16-state (and the District of Columbia) association tasked with monitoring travel along I-95. Evolving autonomous and connected vehicle technologies have become a focus of the Coalition. Although the Coalition is not sponsoring or testing CAV technology, it has determined that there is a strong need for a dialogue among partners regarding interoperability of these systems across state borders.

The New England Transportation Consortium is comprised of state Departments of Transportation from the six New England states. Its mission is to conduct shared transportation research initiatives. The Consortium is working to identify multi-state issues related to the testing and deployment of CAVs in New England, document opportunities and challenges and prepare an action plan to minimize challenges and pursues opportunities. A key focus is developing a roadmap to address and overcome multi-state issues and challenges.

CONNECTICUT

Connecticut's **"Preparing for Connected and Automated Vehicles Strategic Plan"** (CTDOT, 2021) focused on vehicles with both autonomous and connected features. This plan identified both near-term and long-term strategies necessary to deploy CAV in the state.

Near-Term Strategy (2021-2025) – The CTDOT will focus its CAV objectives and actions on tangibles and deliverables, centered around the multiple facets of CAV technologies where there has been and continues to be significant advancements by both industry and public sector. This includes a variety of activities such as early policy coordination and development; assessments of workforce and infrastructure readiness; experience deploying pilot projects; and other activities.

Long-Term Strategy (Beyond 2025) – The CTDOT will continue to establish a timely feedback loop to adapt and engage with on-going advancements in CAV technologies, policies, and readiness to prepare for and support larger CAV deployments, to develop more comprehensive CAV policies, and to commit to upgrading the State's infrastructure and workforce for cooperative automation. This long-term strategy will be part of an overall assessment of the CTDOT's own capabilities to implement multimodal CAV supportive infrastructure programs and to facilitate CAV technologies and services at larger scale subject to available funding, standards, market penetration and readiness.

CTDOT has identified multiple actions necessary to advance CAV in the state, the following are from the 2021 strategic plan:

Actions Needed to Advance CAV

- Increased testing and deployments of CAV technologies and equipment within laboratories, controlled testbeds and especially on public roadways around the country;
- Increased public sector investments and improvements in surface transportation SOGR and cooperative CAV infrastructure to enhance the safety, performance and capabilities of CAV;
- Development of consistent laws, regulations and policies among all levels of government throughout the country that support seamless operation of CAV across all jurisdictions;
- Establishment of additional and effective national industry standards to promote safe, reliable, consistent, and interoperable deployment of CAV technologies that are more future proof and provide both industry and infrastructure owner operators (IOO) with the confidence needed to invest more of their time, resources, equipment and infrastructure into CAV technologies;
- Federal Communications Commission (FCC) preservation of the entire 5.9GHz spectrum6 (safety band) to limit interference issues and enable and ensure full connectivity options for CAV technologies; and
- Vast improvements in the general public understanding, experience and acceptance of CAV technologies.

Current CAV projects in Connecticut are occurring in Hartford County on CTfastrak and the Berlin Turnpike. For CAVs to become relevant to the diverse transportation conditions and needs in the state, pilot projects must expand to other parts of Connecticut, including Fairfield and New Haven counties. CAV-supportive infrastructure will be necessary on both state and locally-owned roads. As

the majority of roads in the state are locally-owned and maintained, thus, training and engagement with municipal staff is also necessary.

CAVS IN FREIGHT & RIDESHARING

In addition to private vehicles, CAV technology has impacted freight, commercial vehicles, and ride-sharing services.

Trucks: CAVs will impact how freight travels and is delivered. Benefits may include safer trips, reduced fuel usage and emissions, potential reduction of vehicular crashes and improved information-sharing for on-time delivery and greater efficiency.

Shared Mobility: Transportation Network Companies or (TNCs) continue to work towards developing driverless vehicles. In dense urban areas, on demand mobility could be provided through a fleet of autonomous vehicles which could address "first mile/last mile" considerations.

BENEFITS/IMPACTS OF AV

The National Highway Traffic Safety Administration (NHTSA) identified multiple benefits from AVs, both at the existing lower level of automation and higher levels in the future. These benefits are described below, as well as potential negative impacts.

- Safety: Active safety systems are types of advanced driver assistance systems available now. These systems provide lower levels of automation that can assist a driver by anticipating imminent dangers and working to avoid them. The NHTSA anticipates that as higher levels of automation are developed, their impacts on vehicular safety could be far-reaching. Both lower and higher levels of automation will protect drivers, passengers, bicyclists, and pedestrians.
- Enhanced mobility: Higher levels of automation could increase mobility for seniors and people with disabilities and expand transportation options for underrepresented communities.
- Societal/Economic: A NHTSA study showed that motor vehicle crashes cost billions each year. Eliminating the majority of vehicle crashes through technology could reduce this cost.
- Environmental: Electric AVs and less personal driving will reduce emissions and air quality will improve.
- Land Use: Automated shared ride and shuttle fleets could reduce the need for individual parking spaces and lots, as well as encourage greater urban densities. However, if driving becomes unnecessary and work/entertainment occurs during the commute/travel time, suburban/exurban development could increase.
- Congestion: CAV features will encourage smoother traffic flows and reduce congestion. However, deployment of AV fleets during peak travel times could clog streets and increase time spent waiting for a ride, especially in urban/downtown areas.
- Transit: Traditional bus service could be significantly impacted if fixed route service is replaced by shared AV fleets with dispersed boarding and alighting stops. However, public transit and TNCs could partner to solve the "first mile/last mile" problem and fill gaps in regular bus service, especially on weekends and late night hours.

Figure 10.1: Easton, Reservoir
Attribute: Peralta Design/Steve Cartagena

10 | RESILIENCE & MITIGATION

The GBVMPO has been proactive in identifying, assessing, and developing strategies to mitigate the impacts of natural hazards. The GBVMPO is fortunate to have resources at the national, state, regional and local levels that track the impacts of natural hazards on the built environment and transportation system. The GBVMPO promotes available resources for monitoring natural hazards to ensure its municipalities are aware of the latest data and tools, and often, the MPO is actively involved in development of these resources. Many of the transportation projects included in this plan (Appendix C) have resilience, sustainability and mitigation components.

Reducing regional vulnerability to natural hazards, climate change, and sea level rise involves mitigating the impacts of the transportation system on the natural environment. Personal vehicles and public transportation—the two primary modes of travel for the vast majority of MetroCOG residents—are large contributors to emissions, known to accelerate climate change and negatively impact the air nearby residents breathe. Shifting travel to cleaner modes of transportation, including active transportation and electric vehicles and buses, preserving environmentally valuable land, and construction of transportation infrastructure to low-impact development will support regional resiliency by improving air quality, managing storm water, and mitigating emissions and other pollutants that contribute to climate change.

Sustainable transportation looks beyond infrastructure investments in highway improvements to consider how transportation decisions made today will affect the health and wealth of communities in the future. Transportation investments that take into consideration economic, environmental, and social issues, create opportunities to improve all travelers' quality- of-life and livability.

The following section discusses strategies to strengthen resiliency, reduce vulnerabilities, mitigate environmental impacts, and realize a sustainable transportation system in MetroCOG. Firstly, the importance of resiliency and mitigation will be established through findings and recommendations from national and multi-state studies and plans. The section will then continue to discuss issues and recommendations at the state- and local-level from recently completed natural hazard mitigation and resiliency building plans.

The Fourth National Climate Assessment

The Global Change Research Act of 1990 mandated the U.S. Global Change Research Program (USGCRP) deliver a report to Congress and the President no less than every four years that.

> *"1) integrates, evaluates, and interprets the findings of the Program . . .; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years."*

The next iteration of the report is anticipated to be released later in 2023. Click here to learn more.

PROJECTIONS IN THE NORTHEAST

The Regional chapters of the Fourth National Climate Assessment provide region-specific detail for current and future risks and actions to minimize risk. Projections for the Northeast suggest that sea level rise will be greater than the annual global average of approximately 0.12 inches. The more probable sea level rise scenarios (Intermediate-Low and Intermediate scenarios from a recent federal interagency sea level rise report) project sea level rise of 2 feet and 4.5 feet by 2100. The strongest hurricanes are anticipated to become both more frequent and more intense in the future.

Post Hurricane Sandy Transportation Resilience Study in NY, NJ, & CT (FHWA)

The Post Hurricane Sandy Transportation Resilience Study was finalized in October of 2017. Much of the data collected through the study continues to inform tri-state planning toward a resilient transportation system.

The intent of the study was to prepare transportation agencies for changing climate conditions and extreme weather events both the regional and facility levels. The study assessed the resilience of the tri-state region's transportation system to climate, sea level rise and extreme weather. The report leverages lessons learned and information detailing damage and disruption to the region's transportation systems from Hurricane Sandy along with that of Hurricane Irene, Tropical Storm Lee, and Halloween Nor'easter Alfred to underline the importance of developing resilience strategies and managing vulnerabilities during future events.

Regional Framework for Coastal Resiliency

In the aftermath of Tropical Storms Irene and Sandy, which greatly impacted Greater New Haven and Greater Bridgeport, coastal areas in particular

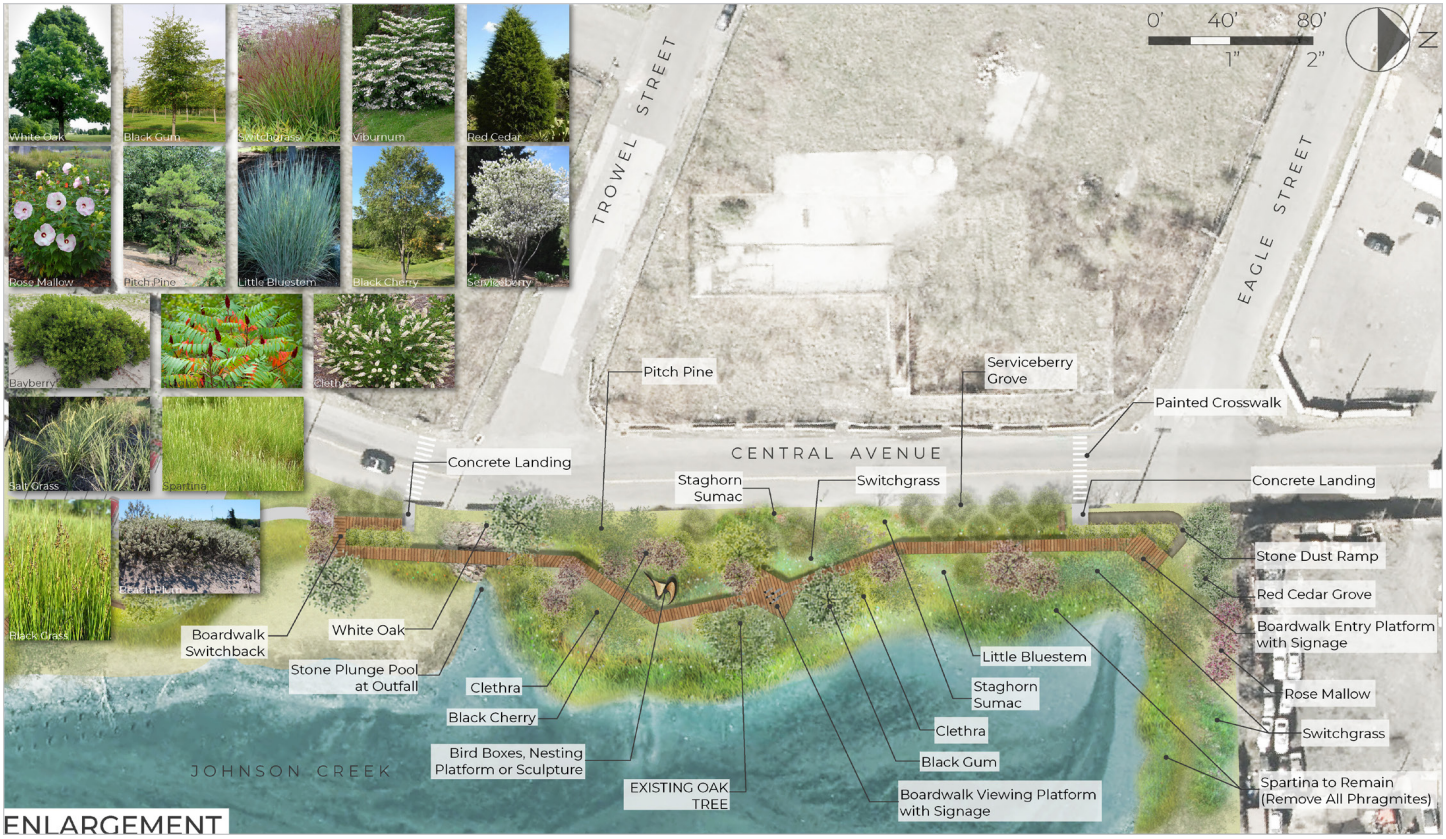


Figure 10.2: Concept for Johnsons Creek, Bridgeport
Attribute: MMI/SLR

(Fairfield East to Madison) recognized their significant level-of-exposure and vulnerability of their infrastructure, environmental, and socio-economic assets to extreme weather events. To counteract immediate and longer-term risks and broaden dialogue on community resilience building, the **Southern Connecticut Regional Framework for Coastal Resilience** project was launched with the goal of producing the Regional Framework for Coastal Resiliency in. The risk of coastal flooding continues to increase for coastal populations and infrastructure throughout Connecticut.

COASTAL INUNDATION

Coastal areas that have been altered, either through fill or channel alteration are the most vulnerable areas to inundation. These areas were naturally flooded and thus are often the first areas inundated during storm events. Coastal development also prevents the natural movement of the coast and creating conflict between storms and infrastructure, including the transportation system.

In Bridgeport, the Regional Framework for Coastal Resiliency presents initial concepts for a Johnson's Creek shoreline restoration and public access project. Since the report was published in 2017, the concept and vision for the area has expanded to include an adjacent portion of Central Avenue, which experiences persistent tidal and weather-related flooding. This section of the Avenue is significantly lower in elevation than the surrounding road network. A comprehensive assessment of various alternatives for the shoreline and adjacent roadway could identify a feasible design that will improve public access to the waterfront and build resilience in the neighborhood. Alternatives under consideration include, but are not limited to, raising the elevation of this portion of Central Avenue or retreating to abandon It.

VULNERABILITY TO COASTAL FLOODING

Fairfield

Beach Road Green Infrastructure Retrofit: The project area includes Beach Road parallel to Penfield Beach and the parking lot, which was inundated by Sandy. The area is in FEMA's flood hazard zones with some sections falling below the 100-year flood elevation. Penfield Beach Road is a major access route for residents that live along this portion of Fairfield's coastline. The project would incorporate green infrastructure to reduce stormwater runoff, erosion, and flooding along Penfield Beach Road. Techniques include bioswales, bioretention areas, curb bump-outs, pervious pavement, and other applications.

Fairchild Avenue Green Infrastructure: The project site is situated perpendicular from Route 1 (Kings Highway). The Rooster River runs immediately behind the street and the low-lying area contains a high-water table with some sections along the street falling below the 100-year flood elevation. As a result, the area experienced flooding impacts from Sandy. The project would consist of retrofitting the street with bioswales, curb bump-outs, tree box plantings, bioretention areas, pervious pavement, or other green street strategies to improve drainage and mitigate future flooding.

Post Road Traffic Circle Green Infrastructure Retrofit: This project could potentially be integrated with future improvements recommended in the Post Road Traffic Circle Study, as described in the Roads and Highways section. The project site is in the middle of the Post Road Traffic Circle and immediately adjacent to the McDonalds parking lot. This one-acre, semi-circular grass area contains several catch basins that discharge through an underground culvert. Turney Creek flows from north to south through an 865-foot culvert underneath Route 1 and towards the center of the grass area. The current topography is sloped toward the middle allowing runoff from the McDonald's parking lot to flow towards the middle and discharge underground. This green infrastructure retrofit project will primarily focus on improving the stormwater management system at this site by retrofitting the landscape with bioswales, rain gardens, tree box plantings, and other techniques to improve overall drainage.

Kings Highway Green Infrastructure and Bank Stabilization: Kings Highway, or Route 1 is a major access route in Fairfield. The highway contains a few low-lying areas where flooding has previously occurred. During Sandy, sections of the road were flooded resulting in closures of major access routes. Many sections with poor drainage also flood during heavy rainfall events. The project would incorporate green street strategies such as bioswales, rain gardens, bioretention areas, tree box plantings, vegetation, curb bump-outs, and bank stabilization to mitigate future flooding and erosion.

Reef Road Enhancement: One of several options for Reef Road. In this alternative, the road would be widened and/or elevated to provide better egress.

Stratford

Sikorsky Estuary Walk Green Infrastructure Retrofit: This project can be incorporated into various improvements recommended by the Route 110 Planning and Engineering Study. The Sikorsky Estuary Walk is near Ryder Lane and Main Street and extends from Ryder Lane along the bank of the Housatonic River and then travels underneath Route 15. A detention area is in the middle of the parcel with the Estuary Walk rapping around it. The topography of the land is sloped towards the

detention area and the river. Many opportunities exist to retrofit the nature walk with additional green infrastructure strategies such as rain gardens, bioretention areas, vegetated swales, tree box plantings, berms, and more.

Natural Hazard Mitigation Plan

The primary goal of the **Natural Hazard Mitigation Plan (NHMP)** is to reduce the loss of life, personal injury and damage to property, infrastructure, and natural, cultural, and economic resources from a natural disaster. The last Natural Hazard Mitigation Plan for the municipalities of the Greater Bridgeport Region (Bridgeport, Easton, Fairfield, Monroe, Stratford, and Trumbull) was adopted in 2019. Concurrent with the update of the MTP, the Greater Bridgeport Region's NHMP is also undergoing an update, which is planned for completion in June 2024. The Plan will identify natural hazards that could occur in the Region, such as Coastal Flooding, Inland Flooding, Hurricanes, Winter Storms, Tornadoes, Earthquakes, Dam Failures, and evaluate the vulnerabilities of structures and populations. The Plan will continue to be used to promote resiliency by emphasizing actions that can be implemented now to reduce and prevent damage from a future natural disaster.

2019 PLAN RECOMMENDATIONS

The 2019 Plan was assessed to identify the hazards that had the most impact to the Region's transportation system at that time. It should be noted that Hurricane Sandy and other significant events occurred prior to the completion of the 2014 Plan. The impacts from and lessons learned during these events were incorporated into the 2014 Plan.

The following section discusses challenges and mitigation actions at a regional level. The recommendations common to most municipalities are highlighted here.

Infrastructure Issues & Recommendations

Throughout the planning and implementation process, factoring climate change impacts into all critical infrastructure improvement plans is desired, as are mitigation strategies such as:

- Elevating roads in areas that experience regular flooding, especially those that are low-lying, located in the 100-year flood plain and/or serve as evacuation routes.
- Improving drainage when completing roadway projects. This includes a Complete Streets approach, the use of pervious road materials, and green infrastructure designs to improve on-site storm water retention and reduce storm water runoff.
- Installing, replacing, or upgrading culverts in areas that experience regular flooding.
- Address flooding at underpasses of the New Haven rail line and I-95.

Evacuation Route, Access & Education Issues & Recommendations

- Incorporating the use of signage and large, visible staffs to indicate depths of water so that vehicles can avoid flooded viaducts when necessary.
- Identifying vulnerable neighborhood egress chokepoints and identify alternate access routes to neighborhoods and facilities when those chokepoints are not passable; harden and flood proof these chokepoints as necessary to ensure they remain open.
- During flood events, install barricades on flooded roads to prevent access.

- Severe winds cause downed trees and limbs, which block evacuation routes. The Region's heavily forested areas in mostly suburban and rural residential neighborhoods are most vulnerable to these impacts. Because of the development patterns in these areas, few alternate routes around downed trees exist, effectively isolating impacted areas.

In addition to regional planning, several municipalities have begun local programs to build resiliency, as well as statewide initiatives.

Resilient Bridgeport

Led by the State of Connecticut's Department of Housing, **Resilient Bridgeport** will reduce vulnerability to flooding in Bridgeport's South End. In 2022, the first phase of redeveloping the flood prone Marina Village public housing complex into the mixed-income Windward Apartments was completed. The development benefits residents and the South End neighborhood with the inclusion of a community health care center. The Windward Apartments Phase I and the Flood Risk Reduction Project furthers Plan Bridgeport's goals of livability, equity and value for nature, as specified in the strategy to "support the Rebuild by Design: Resilient Bridgeport/Natural Disaster Resilience Competition project efforts to create a comprehensive flood protection system throughout the South End neighborhood" (pages 20, 40 and 55).

The Flood Risk Reduction Project will reduce the risk of flooding throughout the South End neighborhood and increase resident safety during heavy rain events. Johnson Street will be extended and elevated to provide dry egress and access for emergency responders. A stormwater park will capture, store, and manage stormwater from the Windward Apartments and adjacent roadways and properties. A pump station, designed to the 100-year storm event will further strengthen resilience and will alleviate nuisance flooding.

Resilient Bridgeport is part of the Connecticut Department of Housing Sandy Recovery and National Disaster Resilience programs funded by the Federal Department of the Housing and Urban Development Community Development Block Grant Disaster Recovery program. The principal targeted outcomes include lowering the risk of chronic and acute flooding, providing dry egress during emergencies, and educating the public about sea level rise and flood risk.

Stratford Coastal Community Resilience Plan

The Town of Stratford's Coastal Community Resilience Plan (2016) was a response to the impacts of Hurricane Sandy and sea level rise. Many of Stratford's 51,500 residents and approximately two-thirds of its commercial properties are located in areas where the ground surface elevation is just a few feet above high tide. The purpose of the Plan is to:

- Introduce the community to the concept of "risk" as it applies to coastal floods, sea level rise, and resiliency;
- Characterize coastal flooding in Stratford including tides, storm surge, and waves, now and in the future;
- Identify the Town's vulnerability to coastal flooding, including the consequences of floods;
- Identify strategies, actions, and projects that can be employed to minimize these consequences and create a more resilient Stratford; and
- Introduce coastal resiliency into the Town's planning process including future revisions of

Figure 10.3: Stratford, Housatonic River
Attribute: Peralta Design/Steve Cartagena

the Town's Plan of Conservation and Development (POCD) and Hazard Mitigation Plan.

In 2022, Stratford applied for a DEEP Climate Resiliency Grant, building upon the work done in conjunction with the Stratford's Coastal Community Resilience Plan. The proposed project area is in close proximity to vulnerable populations living in the South End neighborhood of the Town. During major flooding events along Elm Street between Shore Road and Birdseye Street, vulnerable populations living east and southwest of the project area are consistently impacted. Based on Connecticut's Environmental Justice Communities Mapper, vulnerable populations census tracts are shown near the project location. The EJ Mapper shows Census Tracts 804 and Census Tract 806 as EJ Communities close to low lying marsh land, coastal wetlands, and tributaries leading to the Long Island Sound.

The Community Resiliency Plan and its identified projects outlays strategies that fall within three categories: "Protect", "Retreat", and "Accommodate". Each category incorporates recommendations for specific coastal resiliency projects consistent with and supported by the POCD. As the goal of the POCD is to guide future development, strategies within the "Accommodate" section of the Community Resiliency Plan directly correlates and supports resiliency goals against climate change, sea level rise, and severe weather/storm events. The POCD emphasizes resilience planning across several key areas through Goals and Action Steps – all of which reiterate, and support efforts shown by the Town's planning activities. Furthermore, the POCD describes Action Steps to prevent further loss and damage to Stratford's Housing & Transportation Infrastructure, Historic & Cultural Resources, Public & Community Facilities/Services, and Waterfront & Natural Resources. The redundancy of Goals, Action Steps, and projects throughout both planning documents highlights the significance Stratford places on long term resilience against the effects of climate change.

PLAN OF CONSERVATION AND DEVELOPMENT

The Town of Stratford's Plan of Conservation and Development (2014) includes policies and projects to implement the Future Land Use Plan and provides a decision-making framework for guiding growth development, and conservation for Stratford through the end of 2023. The Town's Planning Commission began the 2023 update process in 2022. The POCD Advisory Committee has conducted seven of a series of twelve planned meetings with regional councils of governments, municipalities and state agencies to review the prior plan, address important issues, and identify plan priorities goals, and strategies.

HAZARD MITIGATION PLAN

MetroCOG's 2019 **Regional Natural Hazard Mitigation Plan** provides further context, strategies, and projects to reduce the damaging effects of natural hazards to the Town of Stratford. As a coastal community on the Long Island Sound, several areas of the Stratford, especially the South End Neighborhood, will increasingly experience the harmful effects of climate change which are subject to flooding due to sea-level rise, severe storm surges, and tidal inundation. The Natural Hazard Mitigation Plan analyzes the current risks to the Town, and develops strategies, action plans, and projects to reduce the consequences and impacts to the natural environment, property & infrastructure, and lives within the Town.

The planning processes and development of documents like Natural Hazard Mitigation Plan, the Community Resilience Plan, and the Plan of Conservation and Development highlights the concerted efforts by the Town, and its partners, to protect Stratford for the future.

Flood Risk & Flood Protection Projects

While I-95 and the MNR rail were found to have a low probability of flood risk over the next 100 years, state and primary roads were found to have a high probability of flood risk. The recommended flood protection projects would mitigate flooding in coastal areas as well as other vulnerable interior areas, such as the South End. These include:

Construction of a new bridge over Ferry Creek (Broad Street, structure 138-005), including raising of the bridge deck elevation, construction of the new culverts and tide gates and raising of the roadway grades to serve (in combination with the existing pump station) as a flood control levee;

Construction of a series of flood protection measures (levees and flood walls) along the Housatonic Riverfront, from the Water Pollution Control Facility to (and including) the Stratford Army Engine Plant. Components of this project could be integrated with the Housatonic Greenway and are described in Section 4, Active Transportation.

DEEP Climate Resilience Fund: Stratford has applied for funding through the Department of Energy and Environmental Protection as part of the Climate Resilience Fund. The DEEP Climate Resilience Fund is responsible for providing funds for climate adaptation and resilience planning and project development with the following conditions set by EO 21-3, pursuant to CGS Sec. 16-243y. Stratford's application focused on the corridor of Elm Street between Birdseye Street and Shore Road, areas which are subject to flooding and potential saltwater intrusion. Impacts of saltwater intrusion and flooding can cause deleterious effects to homes and property, creating economic loss and displacement for residents. Goals of implementation include Incorporating vegetative revetment

around coastal wetland areas, which will help counteract increased rates and volumes of surface water runoff from pavement, providing clear roads for emergency evacuation efforts and improved water quality for vulnerable populations in the South End neighborhood. Added support from tide gate installation and native flood berm creation will further reduce flooding in low lying areas will help prevent potential economic loss.

Environmental Mitigation

Until this point, much of the discussion has focused on resiliency strategies, or strategies for increasing the resiliency of the transportation system, to prepare for the impacts of climate change and sea level rise. Equally important, mitigation strategies are strategies that seek to reduce the impact of the transportation system on the environment.

FEDERAL & STATE REQUIREMENTS

For many transportation projects, an environmental assessment is often conducted to understand the environmental consequences of the project and take appropriate actions to protect, restore, and enhance the environment. For large scale projects and major transportation investments, environmental impact statements are required that fully document feasible alternatives and describe the impacts to the affected environment. In addition, the Connecticut General Statutes require the preparation of an Environmental Impact Evaluation (EIE) whenever a planned action has the potential to significantly affect the environment (Section 22a-1b(c)). The EIE includes:

- a written evaluation of the potential environmental impacts of the proposed action,
- a detailed description of the proposed action and the need for the action,
- the direct and indirect impacts of the action, both positive as well as adverse,
- alternatives to the proposed action which were considered,
- the consistency of the action with the state Conservation and Development Policies Plan, and
- the economic, social, and environmental costs and benefits of the proposed action.

The MTP addresses environmental mitigation by supporting regulations that require the conduct of an EIE, environmental assessment or EIS for most highway projects and encouraging the design of projects that follow a flexible design approach as embodied in the Context Sensitive Solutions techniques. In general, environmental mitigation includes:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

Compensating for the impact by replacing or providing substitute resources or environments.

CONSULTATION & MITIGATION ACTIONS

Mitigation of potential impacts from a proposed action requires careful study and assessment to determine the extent of impacts, the possibility of altering alignment or scope to avoid impacts, and consultation with resource and environmental agencies and managers, including the Connecticut Department of Energy & Environmental Protection

(DEEP), State Historic Preservation Office (SHPO), State Archaeologist, United States Environmental Protection Agency (EPA), and United States Army Corps of Engineers. Depending on the size and scope of the project, mitigation actions include the following:

- Noise: Assess noise impacts from construction and post construction; limit construction activities to daytime hours and standard work schedules; and consider effectiveness of and need for noise barriers.
- Air quality: Assess air impacts and adjust project design to ensure improvement in auto-related emissions, if necessary.
- Property acquisition: Provide just compensation based on market value and certified appraisal and provide relocation assistance.
- Surface water: Install erosion and sedimentation controls during construction; and install stormwater management system to capture, detain and treat storm flows before discharge.
- Groundwater recharge and water supplies: Provide temporary, on-site treatment of possible groundwater containments, including heavy metals; and implement primary treatment to remove sediments and secondary treatment to remove heavy metals.
- Topography: Minimize alterations to existing grades and provide contours within project area that result in no impact to adjacent properties.
- Environmental Justice (Social/Neighborhood): Ensure action has a positive and beneficial impact on the neighborhood and does not result in a disproportionately high impact on the area.
- Soil and geology: Remediate any impacts on soils and geology within the project area and minimize contamination of soils.
- Floodway: Develop alignment options that cause the least impact to the 100-year floodway and create new flood storage to compensate for any volumetric flood storage loss in the 100-year flood zone caused by the action on a 1:1 basis.
- Wetlands: Develop alignment options that cause the least impact to wetlands; loss or impact to wetlands would be mitigated through enhancement, restoration and creation efforts and focus not only on replacing lost wetland types but also for loss of function and value; and efforts would incorporate a combination of hydrologic, vegetative and soil features.
- Natural environment: Assess the potential and probable impacts to various elements of the natural environment, including biodiversity, fisheries, aquatic, reptilian, amphibian, avian and mammalian resources, threatened and endangered species, and species habitats, and implement mitigation measures, especially avoidance, as appropriate.

Green Infrastructure & Low Impact Development

Hard surfaces in urban and suburban environments are a major source of surface water pollution. As rainwater falls on these impervious surfaces, it runs off, usually to a system of gutters, ditches, storm drains and conveyances to be discharged directly into streams, rivers and wetlands. With it, the rainwater carries pollutants including dust, lubricants, tire rubber, animal waste, traction sand, salt, and anything else that may have built up since the last rainfall, depositing it directly into the receiving water. This typical method of dealing with storm water also causes much heavier than natural peak flows during and shortly after rain events, causes drastic water temperature spikes, and may cause

erosion of streambanks and washouts or damage to culverts and bridges, impacting the reliability of the transportation network.

Green infrastructure (GI) and Low Impact Development (LID) are alternative planning, design, and construction best management practices (BMPs) that aim to mimic the pre-construction hydrology of a site. The goal of their implementation is to slow, filter, store, evaporate and/or infiltrate stormwater close to its source. These methods include non-structural planning and design techniques as well as structural features designed to minimize stormwater impacts.

NON-STRUCTURAL SOLUTIONS

Non-structural techniques begin with good land use planning and design aimed at minimizing the amount of impervious surface associated with a development, and properly siting development with surface water impacts in mind. This can be accomplished through several techniques, including:

- Clustering development – by minimizing the amount of area that is disturbed by development, natural stormwater infiltration functions can be preserved. Clustered development also minimizes the amount of roadway and other infrastructure needed to serve a development.
- Prioritizing infill development and redevelopment of vacant or under-utilized previously developed properties over development of forest or farmland.
- Minimizing lawn areas in favor of more natural vegetation cover.
- Avoidance of steep grades.
- Designing roads that are not excessively wide and better relate to the service and function they provide. This would allow narrower street widths and less impervious pavement.
- Smart design of appropriately sized parking lots, promoting shared parking, and incorporating covered garages to reduce the amount of impervious parking lot cover.
- Designing with proper materials in mind including natural materials and native plants.

STRUCTURAL SOLUTIONS

On-site structural green stormwater infrastructure can also greatly reduce the amount of runoff entering traditional storm water systems and surface receiving waters. These GI features are typically built to treat a specific amount of runoff, with overflows built in to default to traditional stormwater systems when overloaded during more extreme events. In some cases, the need for traditional stormwater infrastructure can be eliminated. Some structural GI BMPs include:

- Bioswales/ Bioretention – shallow vegetated depressions that infiltrate or temporarily store runoff.
- Rain Gardens – landscaped areas designed to receive and infiltrate stormwater, typically include native plants and are designed to infiltrate water quickly.
- Permeable Pavement – By eliminating fines in asphalt or concrete, or using pavers with spaces in between, water can flow through the pavement and properly prepared sub-base and into the ground below.
- Tree boxes – similar in appearance to traditional street tree planters, but designed to retain, filter and infiltrate stormwater. These are often connected to a stormwater system to handle excess flows.
- Storm water planter – a small, contained vegetated area that collects and treats storm water using bioretention. They typically contain native,

hydrophilic flowers, grasses, shrubs and trees. Treated storm water is either infiltrated into the ground or discharged into a traditional storm water drainage system. The planters are relatively small and do not require a large amount of space. However, they need periodic maintenance, including weeding, plant replacement, cleaning inflow and outflow pipes, watering during dry periods and removing litter.

- Rainwater storage and repurposing – Cisterns and rain barrels can be used to collect and store runoff so that it can be used at a later date, typically for irrigation. Using rainwater for irrigation has the added benefit of reducing demands on drinking water supplies, and reducing the energy used to treat and deliver drinking water.
- Vegetated roof – lightweight planter systems can be integrated into rooftops to slow rainwater which is taken up by low maintenance plants. These roofs help insulate buildings and help mitigate the heat- island effect in urban areas.
- Solar- As a renewable source of power, solar energy plays an important role in reducing greenhouse gas emissions and mitigating climate change impacts. Exploration of installing solar along unused right of ways may provide regional sustainable benefits.

CONNECTICUT'S MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) GENERAL PERMIT

The Connecticut "Municipal Separate Storm Sewer System (MS4) General Permit" went into effect in 2017 and applies to all GBVMPO municipalities. An MS4 is the municipally owned system of drains, conveyances, pipes, outfalls, etc. that transmits runoff to surface waters.

Directly Connected Impervious Area

As a condition of the permit, municipalities are required to "disconnect" directly connected impervious area (DCIA). Impervious surfaces are considered disconnected if runoff from the impervious surface does not enter the MS4, or if the volume of runoff generated from one inch of rainfall on a site is infiltrated or treated. Since municipalities do not have direct control of privately owned parking lots, driveways, rooftops and other impervious surfaces, they are left with town owned facilities and roads from which they can directly disconnect DCIA. Retrofitting existing facilities or designing new facilities with GI BMPs is one way in which towns can reach compliance with the permit. Implementing GI BMPs during roadway reconstruction wherever possible will help towns meet the requirements of the MS4 permit and will help restore and preserve surface water quality.

Regulatory Obstacles to Low Impact Development (LID)

The MS4 permit also requires that municipalities eliminate all obstacles to the implementation of LID in local regulations. By changing local regulations to meet the MS4 permit requirements, municipalities will be in a better position to encourage private developers to implement LID BMPs during new development and re-development, helping towns reach their DCIA disconnection goals. UConn's Center for Land Use Education and Outreach (CLEAR) provides tools, information and assistance to help municipalities with MS4 compliance and GI implementation.

GREEN INFRASTRUCTURE (GI), LID & WATERSHED BASED PLANS

GI and LID are proven ways to protect surface water quality. GI can be incorporated into new construction, or by retrofitting traditional stormwater

Figure 10.4: Parlor Rock Park, Trumbull

systems. Both GI and LID are significant recommendations in Watershed Plans.

Low Impact Development (LID) is an approach to development that manages stormwater as close to its source as possible while protecting the natural landscape. Stormwater runoff carries pollutants that can enter local waterways through storm sewers. Much of the Gray infrastructure—gutters pipes, tunnels, and other historically relied upon methods for capturing stormwater and moving it to treatment plans or into water bodies—is aging and inefficient. That is, its capacity to sufficiently capture increasingly large volumes of stormwater seen during heavy storms and cloudburst events is diminished leading to overflows, which damages property and infrastructure. LID uses innovative strategies and water treatment practices to protect water quality, reduce development impacts by preserving as much of the natural site as possible, and manage runoff close to the site—rather than conveying stormwater through a costly drainage system.

Green Infrastructure (GI) refers broadly to measures that improve on-site drainage, slow, filter, and move stormwater using natural methods (e.g. inherent absorbency of soil). According to the 2019 Water Infrastructure Improvement Act, Green Infrastructure (GI) is, ""the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate stormwater and reduce flows to sewer systems or to surface waters." In short, GI encompasses a range of measures that seek to filter and absorb stormwater where it falls. By implementing LID principles and practices that employ GI, water can be managed in a way that reduces the impact of infrastructure, preserves ecology, and promotes more natural movement of water within an ecosystem or watershed.

Watershed Plans: Watershed management is a term used to describe the process of implementing land use practices and water management practices to protect and improve the quality

of the water and other natural resources within a watershed by managing the use of those land and water resources in a comprehensive manner (CT DEEP). Watershed Based Plans include examples of existing structures that can be retrofitted with GI to help improve water quality. Watershed Based Plans that have been completed for watersheds in the MetroCOG region include the following:

- Mill River: Fairfield, Easton, Trumbull.
- Pequonnock River: Bridgeport, Monroe, Trumbull. See a description of the Pequonnock River Trail in Section 4, Active Transportation.
- Rooster River: Bridgeport, Fairfield, Trumbull
- Sasco Brook: Easton, Fairfield and, Westport
- Saugatuck-Aspetuck River: Bethel, Easton, Fairfield, Monroe, Newtown, Redding, Ridgefield, Weston, Westport, Wilton, and Norwalk

Many of the examples included in the Plans are within public right-of-way along roadways and public parking lots. Public ROW projects are a good starting place for municipalities to implement GI because they are portions of the storm water system under municipality control. Public ROWs also frequently encompass important routes within municipal and regional transportation networks, making such GI efforts equally impactful for managing stormwater on and maintaining these roads for travel and emergency management.

Heat Vulnerability

Heat Vulnerability refers to how likely a person is to be harmed by periods of hot weather. Numerous heat vulnerability factors play an important role in one's ability to adapt to heat, including individual

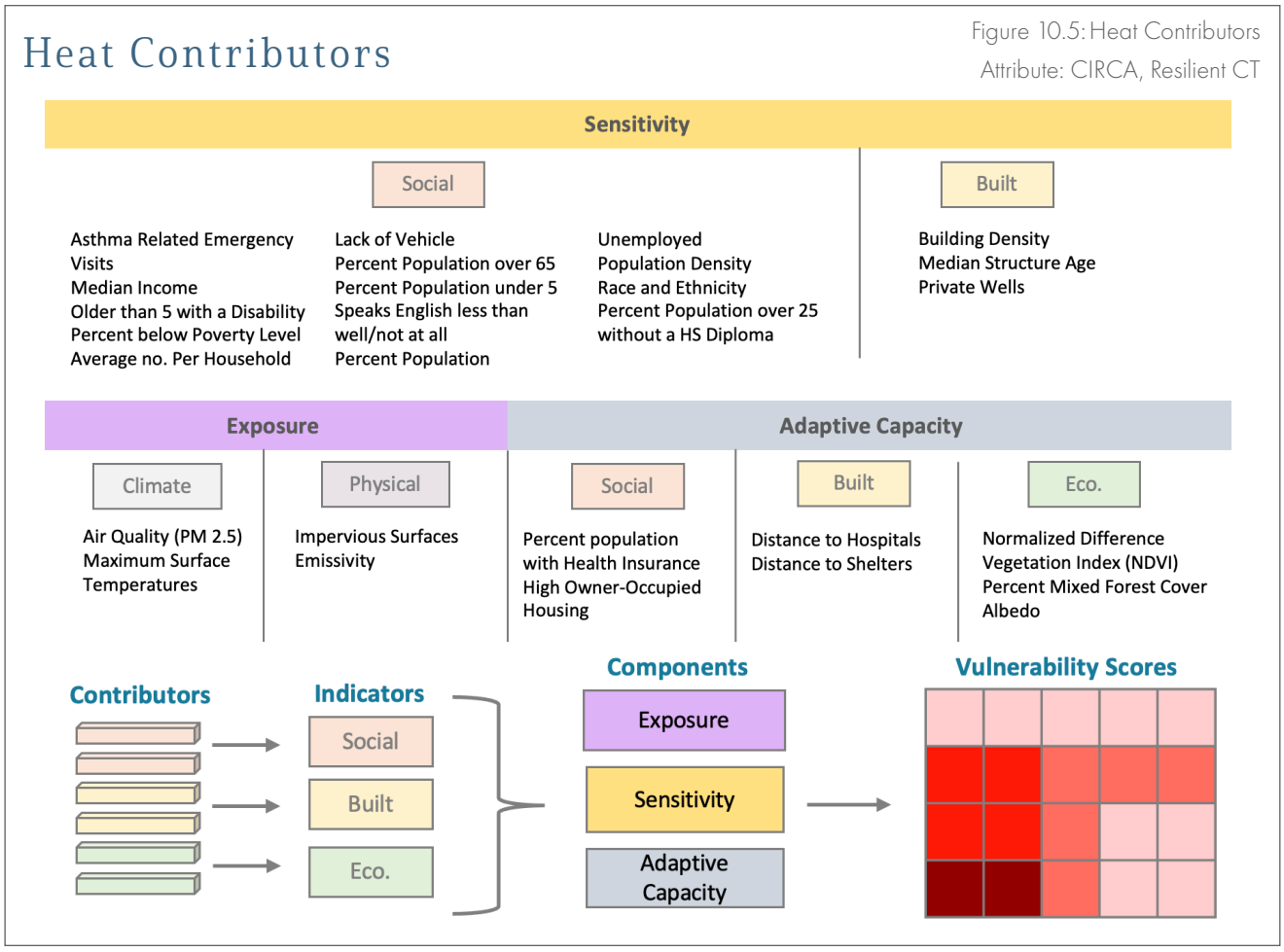


Figure 10.5: Heat Contributors
Attribute: CIRCA, Resilient CT

characteristics (health status, socio-demographics) and community characteristics (environment, community demographics). Heat-related deaths and illnesses are becoming increasingly common in the Northeast during summer months. According to **Resilienct CT**'s CCVI (Climate Change Vulnerability Index) areas in Fairfield, Bridgeport, and Stratford receive some of the highest scores in the state for heat vulnerability. Heat contributors and their impact on vulnerability are detailed in Figure 10.5.

Electric Vehicles (EVs) & Infrastructure

According to the EPA, transportation was responsible for 27% of U.S. greenhouse gas emissions in 2020, representing the largest share of greenhouse gas emissions in the nation. Over 90 % of the fuels used in transportation are petroleum based, mainly gasoline and diesel being burned in internal combustion engines (ICEs). Electric Vehicles (EVs) are widely seen as a way to curb these impacts by shifting away from the use of fossil fuels in motor vehicles to those that will be less impactful.

EV Technologies Include:

- Hybrid electric vehicles (HEVs) have both ICEs and electric motors that provide power for locomotion. These vehicles use energy produced by the IC engine and/or through regenerative braking systems to charge batteries that drive the electric motor.
- Plug-in hybrid electric vehicles (PHEVs) have larger batteries that can be charged by plugging into the electric grid to extend range or to reduce ICE use.
- Battery electric vehicles (BEVs) only have electric motors powered by a battery that must be charged by plugging into the electric grid.
- Fuel Cell Electric Vehicles (FCEVs) are less established than other types of EVs. FCEVs produce electricity using a chemical process that combines hydrogen and oxygen in the air in a fuel cell stack. FCEVs do not rely on combustion and produce no harmful emissions; however, they require hydrogen fuel to operate.

INFRASTRUCTURE NEEDS

HEVs require no special infrastructure to operate and return much better fuel efficiency compared to similar IC vehicles. PHEVs do not necessarily need special infrastructure since they have IC engines to rely on if its battery is depleted, and they can fuel up at any gas station. BEVs and FCEVs, however, need a network of special fueling stations to operate. While BEVs can be charged at a home charging station for routine trips or commuting, publicly available electric charging stations are necessary for longer trips.

There are 3 General Types of EV Chargers:

- Type I chargers use a standard 120 volt AC outlet and 3-prong plug to deliver approximately 2-5 miles of range per hour of charging. Level I is good for overnight home charging and requires no special equipment or investment.
- Type 2 chargers deliver a charge to batteries more quickly, about 10-to-20 miles of range per hour of charging, but require special 240 volt equipment and a dedicated circuit.
- Level 3 or DC fast charging stations can add 60-to-80 miles of range in 20 minutes of charging; however, these charging units are expensive and require substantial investment.

In order to avoid "range anxiety" or the worry that a BEV driver will be stranded with a depleted battery and no recharging option, a robust network of publicly available charging stations is necessary.

THE EV CHARGING STATION INCENTIVE PROGRAM

EVConnecticut, a Department of Energy and Environmental Protection (CTDEEP) program focusing on the expansion of EV technology in the state, has provided funding to expand the network of charging stations. The **Electric Vehicle Charging Station Incentive Program** has provided several rounds of funding to businesses and municipalities for the installation of publicly accessible charging stations. The program offered full reimbursement of charging equipment and installation, as long as the charger was made available to the public and was available free of charge for a period of time. The program website provides "Find a Charger" locational maps and information regarding common EV questions. .

FUEL CELL ELECTRIC VEHICLES (FCEVS)

With respects to FCEVs, there are currently two known hydrogen fueling stations in Connecticut- one at Pride Travel Center on Jennings Road in Hartford, and one in Wallingford at Nel Hydrogen. FCEVs are an emerging technology with some limited adoption in southern California, where a network of hydrogen fueling stations is developing. In 2018, CTDEEP solicited applications for funding to develop a retail hydrogen refueling station in the greater New Haven area with the goal of beginning to establish supportive infrastructure for FCEVs.

CONSUMER & MUNICIPAL INCENTIVES

There are additional incentives encouraging consumers to purchase EVs. The Connecticut Hydrogen and Electric Automobile Purchase Rebate (CHEAPR) offers a rebate to help offset additional costs associated with EV purchase, and there are also federal rebates available for hydrogen and EV consumers. Effective July 1, 2022, CHEAPR has increased the new eligible vehicle MSRP cap to $50,000. With this change, 10 more EVs are now eligible for a CHEAPR rebate CTDEEP provided funding to offset the additional cost of EVs purchased for municipal fleet vehicles as well.

Improving technology, extended ranges, and an expanding charging network and purchase incentives are all driving the increased popularity of EVs in general and BEVs more specifically. Electric vehicles are increasing as a percentage of the American motor vehicle market. As battery capacity increases and longer range BEV vehicles become available and affordable, a larger portion of these vehicles will be predominantly charged at home since consumers will likely "right-size" their vehicle to confidently accommodate their daily driving needs. As more PHEVs and BEVs enter the market, however, there will be more long distance trips taken using these vehicles. There will be increased demand for additional charging infrastructure, and for that infrastructure to be located in convenient locations and have adequate capacity. More Level 3 or DC fast charge infrastructure will be needed along interstate and long-distance highway corridors, and more Level 2 or Level 3 infrastructure will be needed at destinations of long distance travel.

REGIONAL SUPPORT FOR EVS

The GBVMPO will continue to work with municipalities to accommodate electric vehicles, specifically:

- Monitor the need for EV charging stations along I-95, Route 15, Route 8, and Route 25.

Figure 10.6: Bridgeport, Golden Hill Street streetscape event

- Work with municipalities to fully utilize funding opportunities for the installation of EV Charging infrastructure and purchase of EV fleet vehicles.
- Work with CTDEEP to improve grant funding delivery to better reach communities with less capacity to site and install chargers where EV infrastructure is needed.
- Work with CTDEEP and municipalities to properly site EV charging infrastructure.
- On projects under the purview of MetroCOG, NVCOG of the GBVMPO, consider the inclusion of EV charging infrastructure to any roadside or lot parking as appropriate.
- Encourage the installation of EV chargers at train stations and commuter parking lots; CTDEEP recommends that 3% of all new commuter parking spaces should be EV-ready.

Between 2021 and 2022, Bridgeport, Easton, Fairfield, Monroe, Shelton, Stratford, and Trumbull participated in the **Live Green Electric School Bus Toolkit program**. Over the 6-week course, municipal leaders learned how to bring electric school buses to their communities. Inventories of current municipal fleets were taken to prepare for potential EV additions and changes in the coming years.

Sustainable CT

Sustainable CT is a voluntary municipal certification program that recognizes Connecticut municipalities that take local actions toward sustainability. One of the program's goals is to broaden the understanding of sustainability, looking beyond the environmental to include the economy, housing, transportation, culture, equity and public services and events. Municipalities choose Sustainable CT actions, implement them, and earn points toward certification. Every Sustainable CT action can produce multiple community benefits, demonstrating how local action can have a statewide impact..

Of the ten GBVMPO municipalities, the Towns of Fairfield, Stratford, and Trumbull have received a silver certification (the highest certification, as of

2022). Fairfield and Stratford have also been designated as 2 of 6 Climate Leaders in the state. Ansonia, Bridgeport, Derby, Easton, Monroe, Shelton, and Seymour have all registered for Sustainable CT but are not yet certified.

CLEAN & DIVERSE TRANSPORTATION SYSTEMS & CHOICES

Transportation is one of the nine Sustainable CT action categories. More specifically, the "Clean and Diverse Transportation Systems and Choices" category includes many sub-categories and actions which municipalities and the GBVMPO may collaborate on to improve the sustainability of the transportation system regionwide. This category includes actions taken to implement complete streets, promote effective parking management, encourage smart commuting, support zero emissions vehicle deployment, promote public transit and other mobility strategies, and manage municipal fleets. These transportation related sustainable actions can be locally implemented to achieve Sustainable CT certification:

- Implement complete streets: From training and planning to project construction, this sub category affords municipalities opportunities to score points when they are in the process of adding completes streets to their community.
- Promote effective parking management: Parking supports the vitality of commercial districts. However, effective parking management can also mitigate environmental impacts, including excessive land consumption, degraded water quality, and exacerbated heat island effects and reduce greenhouse gas emissions by encouraging alternative modes of transit.
- Encourage smart commuting: Communities demonstrate they are making efforts and providing options to their employees to use alternative modes of transportation for their commutes.
- Support zero emissions vehicle deployment: Encourages communities to transition their municipal vehicle fleet and create infrastructure for zero emission vehicles (ZEV) that city officials, residents, businesses, and travelers may use. While the goal is increased deployment of ZEVs within the municipal fleet, there are many intermediate steps municipalities can take including inventorying existing infrastructure.
- Promote public transit and other mobility strategies: For most travelers, public transportation is the best alternative to single occupancy vehicle commuting. Sustainable CT will reward actions taken to promote and enhance public transportation, including steps taken to better coordinate public transportation with walking and bicycling.
- Manage Municipal Fleets: Implementing improvement projects to increase environmental sustainability of municipal fleets and maintenance programs through inventorying existing fleets will provide an analysis for future environmental management.
- Equity: Fairness and the ability of everyone to get what they need in order to improve their quality of life. It is a practice which underlies the six livability principles and, as such, is a component and benefit of a sustainable action. Sustainable CT views Equity benefits as new, improved, and valued relationships between different members of the community. In the context of transportation systems and planning, the Title VI regulations prescribe equity policy for more inclusive decision-making and improved access to services and sharing

of benefits with all residents, both current and future, regardless of race, income, ability, age, gender, sexual orientation, etc. Sustainable CT attempts to advance equity by asking municipalities to demonstrate its application in municipal decision-making processes.

Fairfield's Sustainability Plan

The Town of Fairfield's Sustainability Plan (2018) was put together by the Sustainable Fairfield Task Force, Town officials and other stakeholders to advance the broader use of clean, renewable energy sources Town-wide, help safeguard the Town's natural environment, and make Fairfield a more sustainable community.

Many of the recommendations are directly or indirectly linked to mitigating the environmental impacts of the region's transportation system. The Plan identifies the impact of two-car households on carbon emissions, and the role mass transit, bicycling, walking and fuel efficient/electronic vehicles have in reducing emissions. Increasing the use of electronic vehicles (both town-owned and privately-owned), providing EV chargers, supporting transit, transit oriented development and rideshares are goals for 2020, with the long term (2050) goal of reduced traffic and 100% of transportation provided by sustainable sources.

The Plan recognizes that supporting a safe environment for walking and biking is crucial to encouraging active transportation. Many of the recommendations made regarding walkability and bikeability are detailed in Section 4, Active Transportation. These include the Complete Streets policy, applying the policy to new projects and fully implementing the bike route plan and complete streets plan.

Figure 10.7: Fairfield beach
Attribute: Peralta Design/Steve Cartagena

11 | PERFORMANCE MEASURES & TARGETS

After passage of MAP-21 and continuing with the FAST Act and the Bipartisan Infrastructure Law (BIL), FHWA and FTA were required to establish national performance measures to evaluate progress in realizing the national goals for safety, infrastructure condition, congestion reduction, system reliability, freight movement, economic vitality, environmental sustainability and reduced project delivery delays. To measure their progress in supporting the national measures, State DOTs and MPOs are now required to establish performance targets.

The USDOT published the final rule related to implementation of performance based transportation planning in May 2016. The rule requires the CTDOT, GBVMPO, and the operators of public transportation to use performance measures to document expectations for future performance. Initially, only statewide targets were required under the rule. Since Connecticut has multiple urban areas with over 200,000 people, two new performance measures went into effect in 2022. CTDOT is now required to develop targets to measure peak hour excessive delay and non-single occupancy vehicle usage for each urban area with over 200,000 people. The Bridgeport-Stamford urban area has well over 200,000 people. These measures are detailed later in this section.

Performance-based management and planning increases the accountability and transparency of the Federal-aid Program and offers a framework to support improved investment decision-making by focusing on performance outcomes for national transportation goals. As part of this performance-based approach, recipients of Federal-aid highway program funds and Federal transit funds

The FHWA defines a "performance target" as a

"quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the FHWA".

The FHWA encourages that the target

"represent the condition/performance of the transportation network or geographic area."

are required to link the investment priorities contained in the TIP/STIP to achievement of performance targets.

The MAP-21 performance-related provisions also require States, MPOs, and operators of public transportation to develop other performance-based plans and processes or add new requirements on existing performance-based plans and processes. These performance-based plans and processes include the Congestion Mitigation and Air Quality Improvement (CMAQ) Program performance plan, the Strategic Highway Safety Plan, the public transportation agency safety plan, the highway and transit asset management plans, and the State Freight Plan.

The GBVMPO has implemented performance measures that have been developed by CTDOT and will invest resources in projects to achieve adopted targets. Each performance measure, related projects, and statewide or urban targets are described below. The projects presented throughout

this plan further at least one performance target—and many support multiple performance targets.

Highway Safety

Highway Safety is determined by the interaction between drivers, their behavior and the highway infrastructure.

The five performance measures for Highway Safety cover all public roads and include:

- The number of fatalities;
- The rate of fatalities;
- The number of serious injuries;
- The rate of serious injuries; and,
- The number of non-motorized fatalities and serious injuries.

The CTDOT and the GBVMPO collaborate in programming the appropriate Highway Safety Improvement Program (HSIP) safety projects in the TIP/STIP to meet the targets set by the CTDOT and agreed upon by the GBVMPO. Projects include:

Location-specific highway safety projects: This includes roadway safety improvements selected to correct known safety problems at locations with a high frequency or severity of crashes.

Programmatic or systematic highway safety improvements: Projects or programs that are conducted regularly throughout the state such as signing and pavement marking and guide rail.

Systemic highway safety improvement projects: Roadway safety improvements that are widely implemented based on high risk roadway features that are correlated with particular severe crash types.

The GBVMPO has been active in planning for transportation and supporting projects to improve transportation safety. The Regional Transportation Safety and Regional Safety Action Plans are described in Section 9.

CTDOT submitted its 2023 targets to FHWA in August 2022 via the **Highway Safety Plan** and **Highway Safety Improvement Program**. Each performance target established by CTDOT is based on a five-year moving average (2016-2020), the method used by FHWA to determine the state's progress toward achieving their safety performance targets.

The five-year moving average is used to normalize data trends over time and includes a projection based on the five-year moving average. CTDOT has found that a five-year moving average may not accurately reflect recent motor vehicle crash trends (i.e., those that have occurred in the last 2-3 years). For this reason, CTDOT has modified their approach to target-setting. Since 2021, in addition to the 5-year moving average, CTDOT's Highway Safety Office (HSO) has used ten years of data for the annual projection (trendline) and their professional judgment to assist with better decision-making and determine crash trends. The following factors influenced CTDOT's decision to modify their approach to target-setting:

Changes in both national and state trends in fatalities and serious injuries:

- Crashes resulting in fatalities increased in 2020 (from 2019).
- In 2021, as traffic volumes returned to 2019 levels, fatalities continued to increase.
- Speeding, impaired driving and not using seat belts, as well as a potential reduction in law enforcement presence could be factors that

Table 11.1: Performance Targets, Highway Safety

MEASURE	YEARLY TARGETS						ACTUALS	
	2018	2019	2020	2021	2022	2023	5-Year Average*	Annual Trendlines**
Number of fatalities/year	257	274	277	270	270	270	289	327
Rate of fatalities/100 million Vehicle Miles Traveled (VMT)†	0.823	0.873	0.883	0.85	0.85	0.85	.932††	1.064
Number of serious injuries/year	1,571	1,574	1,547	1,360	1,300	1,300	1,442	1,521
Rate of serious injuries/100 million VMT	5.033	5.024	4.93	4.3	4.3	4.3	4.643††	4.951
Number of non-motorized fatalities & serious injuries/year	280	290	307	300	280	280	307	296

**5 year moving average for 2021, based on 2016-2020. This is how FHWA calculates progress toward achieving the target.*

*** 10 years, 2011-2021 (if 2021 data was available). CTDOT utilized this calculation to inform the 2023 target setting process.*

† Vehicle miles traveled; not yet available for 2021.

†† 2021 VMT data is not yet available, thus .932 and 4.643 are the 5-year moving averages for 2016-2020.

contribute to risky driving behavior and increased traffic fatalities.

Impact of COVID-19 on 2020 travel patterns (Connecticut data)

- March & April of 2020: 40%-50% drop in volume.
- May 2020 through the rest of the year: gradual increases in traffic volumes.
- The reduced volumes should have resulted in a similar drop in serious injury and fatality crashes. While overall crashes decreased (including serious injury crashes), the number of fatality crashes increased. Reckless driving was a likely factor in many of these crashes.

Incorporating ten-year projections into annual highway safety performance target-setting recognizes that these targets have fluctuated from year-to-year. Unfortunately, the state experienced an increase in fatalities following the pandemic, an upwards trend which mirrors the national numbers. As there was a decreasing trend in the state between 2015 and 2019, this new approach to target-setting results in final targets that will require a more aggressive safety improvement approach. The performance targets determined through this process (as well as past years) are provided in Table 11.1.

The GBVMPO endorsed the state's safety targets in January 2023. These safety targets are the only performance targets that the GBVMPO has endorsed.

The following sections provide the 2022 targets developed by CTDOT and submitted to FHWA in December 2022. The GBVMPO has until June 2023 to endorse these targets, or to develop their own. Except for the UZA-specific targets, the 2018 targets shown in each table were adopted by CTDOT on May 20, 2018, and by the GBVMPO on August 30, 2018. Note the MPO-level baseline conditions are for informational purposes only.

Table 11.2: Performance Targets, Pavement Condition

MEASURE	BASELINE				2019 TARGETS		2022 TARGETS**	
	2019 State	2019 GBVMPO*	Current State	Current GBVMPO*	2-year (2020)	4-year (2022)	2-year (2023)	4-year (2025)
% interstate in good condition	66.2%	62%	68.6%	65.1%	65.5%	64.4%	72%	70%
% interstate in poor condition	2.2%	1%	0.2%	0%	2%	2.6%	1%	1.3%
% non-interstate NHS in good condition	37.9%	47.7%	37.9%	52.4%	36%	31.9%	37%	35%
% non-interstate NHS in poor condition	8.6%	0.7%	1.8%	0.08%	6.8%	7.6%	2.7%	3.5%

*The GBVMPO measures are for informational purposes only. **The GBVMPO has not yet endorsed the 2022 targets

Pavement & Bridge Condition

PAVEMENT

The four performance measures for Pavement Condition are:

- The percentage of the pavement on the Interstate system in Good condition;
- The percentage of pavement on the Interstate system in Poor condition, with a maximum percentage of lane miles in poor condition at 5%;
- The percentage of the pavement on the non-Interstate National Highway System (NHS) in Good condition; and
- The percentage of the pavement on the non-Interstate NHS in Poor condition.

Three condition metrics determine the overall condition of Asphalt and Jointed Concrete:

- The amount of roughness (International Roughness Index or IRI);
- Surface depression (rutting/faulting); and
- Cracking (an unintentional break in the continuous surface).

Asphalt and Jointed Concrete in good condition has low levels of IRI, rutting/faulting and cracking. Asphalt and Jointed Concrete with all three condition metrics rated "good" is in good condition; Asphalt and Jointed Concrete with two or more metrics rated "poor" is in poor condition; and all other combinations of ratings for Asphalt or Jointed Concrete is in fair condition.

Two condition metrics determine the overall condition of Continuous Concrete: IRI and cracking. Continuous Concrete with both condition metrics rated "good" is in good condition; Continuous Concrete with both metrics rated "poor" is in poor condition; and all other combinations of ratings for Continuous Concrete is in fair condition.

CTDOT utilized their existing Pavement Management System to determine the performance targets in Table 11.2.

Table 11.3: Performance Targets, Bridge Condition

MEASURE	BASELINE				2019 TARGETS		2022 TARGETS**	
	2019 State	2019 GBVMPO*	Current State	Current GBVMPO*	2-year (2020)	4-year (2022)	2-year (2023)	4-year (2025)
% bridges in good condition	18.1%	23.1%	14.1%	22.1%	22.1%	26.9%	14.2%	14.5%
% bridges in poor condition	15.0%	3.5%	7.7%	1.5%	7.9%	5.7%	6.2%	6.0%

**The GBVMPO measures are for informational purposes only. **The GBVMPO has not yet endorsed the 2022 targets*

BRIDGE

The two performance measures for Bridge Condition are:

- The percentage of NHS bridges by deck area in Good condition; and
- The percent of NHS bridges by deck area in Poor condition, which may not exceed 10%.

The lowest of the National Bridge Inventory (NBI) condition ratings for deck (surface), superstructure (deck support) and substructure (abutments and piers) determines the overall condition of each bridge. If the lowest rating is greater than or equal to 7, the bridge is classified as good; if it is less than or equal to 4, the bridge is classified as poor.

Statewide percentages are determined by the percentage of all bridges (by length and width) in good, fair and poor condition. For the bridge condition performance measures, FHWA established the baseline condition from the National Bridge Inventory (NBI). The 2-year and 4-year performance targets in Table 11.3 were determined through CTDOT's Bridge Management System.

TRANSPORTATION ASSET MANAGEMENT PLAN (TAMP)

In collaboration with GBVMPO, CTDOT programs projects to meet performance targets using the Department's Pavement Management and Bridge Management Systems, which are used to systematically develop optimal strategies. These strategies are included in the **CTDOT Transportation Asset Management Plan (TAMP)**, which was certified by the FHWA in September 2022.

Pavement and Bridge State of Good Repair (SOGR) needs are identified, quantified, and prioritized through the Transportation Asset Management Planning (TAMP) process. MAP-21 defines Asset Management as "a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the life cycle of the assets at minimum practicable cost" (23 U.S.C. 101(a)(2), MAP-21 § 1103). The TAMP serves as a tactical-level document for asset information and associated plans for management, options development, long-term expenditures, programs and delivery, and reporting mechanisms that en-

Table 11.4: Performance Targets, Travel Time Reliability

% RELIABLE PERSON MILES	BASELINE				2019 TARGETS		2022 TARGETS**	
	2019 State	2019 GBVMPO*	Current State	2019 only GBVMPO*	2-year (2020)	4-year (2022)	2-year (2023)	4-year (2025)
On the Interstate NHS	78.3%	63.0%	86.2%	53.1%	75.2%	72.1%	78.6%	78.6%
On the non-Interstate NHS	83.6%	75.0%	90.0%	85.9%	80.0%	76.4%	84.9%	84.9%

*The GBVMPO measures are for informational purposes only.
**The GBVMPO has not yet endorsed the 2022 targets. Targets were developed with 2017-2019 data.

sure strategic objectives are achieved. Projects to address SOGR repair needs are selected from the TAMP for inclusion in the STIP.

System Reliability

Highway travel time reliability is closely related to congestion and is greatly influenced by the complex interactions of traffic demand, physical capacity, and roadway "events." Travel time reliability is a significant aspect of transportation system performance. The FHWA explains the importance of this metric:

> "Travel time reliability is significant to many transportation system users, whether they are vehicle drivers, transit riders, freight shippers, or even air travelers. Personal and business travelers value reliability because it allows them to make better use of their own time. Shippers and freight carriers require predictable travel times to remain competitive."

Operational-improvement, capacity-expansion, and to a certain degree highway road and bridge condition improvement projects, impact both congestion and system reliability. Demand-management initiatives also impact system reliability.

The level of travel time reliability (LOTTR) is expressed as a ratio of the 80th percentile travel time of a reporting segment to the "normal" (50th percentile) travel time of a reporting segment occurring throughout a full calendar year. Segments that have a ratio less than 1.5 are considered "reliable." The performance measure, as defined in Title 23 CFR 490.507, is the percent of the person-miles traveled on the Interstate section and the non-Interstate NHS that are reliable.

LEVEL OF TRAVEL TIME RELIABILITY (LOTTR)

- **"Normal" travel time (50th percentile)**: 50% of the times are shorter in duration and 50% are longer.
- **80th percentile travel time:** Longer travel times. 80% of the travel times are shorter in duration and 20% are longer.
- The longest travel times are in the 100th percentile.

Table 11.5: Performance Targets, Congestion, BS-UZA

CONGESTION MEASURES	BASELINE	2022 TARGETS*	
	2017-2021	2-year (2023)	4-year (2025)
Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita	12.60%	20	21.9
Percent of non-Single Occupancy (non-SOV) Travel	30.40%	27.80%	27.80%

**The GBVMPO has not yet endorsed the 2022 targets. PHED targets were developed with 2017-2019 data; non-SOV travel based on 2015-2019 ACS.*

Travel times are collected in 15-minute intervals for each reporting segment from the National Performance Management Research Data Set (NPMRDS) . Travel times are measured for four time periods:

- Monday-Friday 6 am to 10 am
- Monday-Friday 10 am to 4 pm
- Monday-Friday 4 pm to 8 pm
- Weekends 6 am to 8 pm

Due to the COVID-19 pandemic, only 2017-2019 data was used to develop targets; 2020 and 2021 data were excluded. The baseline condition includes all years. Targets can be found in Table 11.4.

Since 2022, CTDOT is required to determine additional targets for system reliability in urban areas with over 200,000 people. The Bridgeport-Stamford Urbanized Area (BS-UZA) has well over 200,000 people.

PEAK HOUR EXCESSIVE DELAY (PHED)

Peak Hour Excessive Delay (PHED) measures additional delay over the regular delay during rush hour. In Connecticut, PHED was analyzed for 6-10AM and 3-7PM in each urban area. Like travel time reliability, targets were developed with 2017-2019 data and excluded 2020 and 2021.

NON-SINGLE OCCUPANCY VEHICLE (NON-SOV)

Non-Single Occupancy Vehicle (Non-SOV) is the measure of people who work remotely/virtually or commute to work utilizing public transportation, carpooling, walking or other means.2015-2019 American Community Survey estimates was utilized to calculate this measure.

Table 11.5 provides targets for PHED and non-SOV travel; as these targets were instated in 2022, there are no prior metrics for point of comparison.

The CTDOT and the GBVMPO will program projects in the TIP/STIP to meet System Reliability targets. Over time—and as quantifiable impacts are observed and measured—PHED and non-SOV performance targets will become a formal part of the project selection process.

Freight Movement

Freight movement is assessed by the Truck Travel Time Reliability (TTTR) index. The TTTR index/metric is the ratio of long travel times (95th percentile) to a normal travel time (50th percentile). This measure considers factors that are unique to the trucking industry, which include:

- Use of the system during all hours of the day;
- High percentage of travel in off-peak periods; and

Table 11.6: Performance Targets, Truck Travel Time Reliability

MEASURE, INTERSTATE ONLY	BASELINE				2019 TARGETS		2022 TARGETS**	
	2019 State	2019 GBVMPO*	Current State	2019 only GBVMPO*	2-year (2020)	4-year (2022)	2-year (2023)	4-year (2025)
Truck Travel Time Reliability (TTTR) Index	1.75	2.62	1.56	2.85	1.79	1.83	1.95	2.02

*The GBVMPO measures are for informational purposes only.
**The GBVMPO has not yet endorsed the 2022 targets. Targets were developed with 2017-2019 data.

- Need for shippers and receivers to factor in more 'buffer' time into their logistics planning for on-time arrivals. [23 CFR 490.607].

TRUCK TRAVEL TIME RELIABILITY (TTTR) INDEX

- **"Normal" travel time (50th percentile):** 50% of the times are shorter in duration and 50% are longer.
- **95th percentile travel time:** Longer travel times. 95% of the travel times are shorter in duration and 5% are longer.
- The longest travel times are in the 100th percentile.

FHWA defines reliable TTTR as less than 1.5; the comparison between the 50th and 95th percentiles is reliable if it is less than 1.5. The TTTR is a measure of truck travel time reliability, not congestion. Segments of the highway that are regularly and predictably congested will not have a high TTTR index number.

Rather, those segments of highway where delays are unpredictable and severe are scored highest. Prioritizing reliability over congestion came from stakeholder outreach with the freight industry where predictability was deemed more important for scheduling. The TTTR index only applies to roads on the National Highway System. The time period with the highest TTTR is used to determine the overall segment's TTTR, which is weighted by the segment length. The TTTR five statutorily defined time periods are:

- AM peak period
- Mid-day period
- PM peak period
- Overnight
- Weekends

Due to the COVID-19 pandemic, only 2017-2019 data was used to develop targets; 2020 and 2021 data were excluded. The baseline condition includes all years. Targets can be found in Table 11.6.

Air Quality

The USDOT requires that states and MPOs assess the impact of their transportation systems on air quality and specifically the impacts from vehicle exhaust emissions. The performance measure for air quality is based only on an assessment of projects selected for funding under the FHWA's Congestion Mitigation and Air Quality Improvement (CMAQ) program.

The CMAQ program's purpose is to fund transportation projects or programs that contribute to the attainment or maintenance of National Ambient Air Quality Standards (NAAQS). The TIP/STIP will program projects to meet the targets by selecting

Table 11.7: Performance Targets, Air Quality

EMISSION CUMULATIVE KG/DAY	BASELINE			2019 TARGETS		2022 TARGETS*	
	2017 2-year	2017 4-year	Full Period	2-year (2020)	4-year (2022)	2-year (2023)	4-year (2025)
Volatile Organic Compounds (VOC)	10.82	263.89	13.8	19.32	30.14	87.346	87.346
Nitrogen Oxide (NOX)	34.68	462.49	40.349	67.69	102.37	81.978	81.978
Particulate Matter PM2.5	1.04	12.95	2.84	1.632	2.674	6.29	6.29

**The GBVMPO has not yet endorsed the 2022 targets. Targets were developed with 2017-2019 data.*

appropriate CMAQ eligible projects including, congestion reduction and traffic flow improvements, ridesharing; transit improvements, travel demand management, and bicycle and pedestrian facilities.

On July 15th, 2022, FHWA proposed to amend its regulations governing national performance management measures to require State DOTs and MPOs to establish declining carbon dioxide CO2 targets and to establish a method for the measurement and reporting of GHG emissions associated with transportation. Comments on the rule were due in October of 2022 – as of the writing of this MTP (early 2023), the rule has not yet been finalized. Air quality targets are in Table 11.7. More information on air quality in the state and region can be found in the Introduction (Section 1).

Transit Asset Management

The Transit Asset Management (TAM) rule requires that recipients and sub-recipients of FTA funds set annual performance targets for federally established State of Good Repair (SGR) measures (see box to the right). SGR performance measures for the four asset categories in the three public transportation modes of rail, bus and ferry are:

State of Good Repair (SGR) means that assets, including rolling stock, equipment and facilities are maintained so that they operate safely and efficiently throughout their expected useful life

Rolling Stock – Revenue Vehicles: Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark (ULB). ULB is the maximum age of an asset based on operational characteristics (age, mileage, environment) before it is replaced or enters into the SGR backlog. See Tables 11.8 and 11.9.

Equipment – Service Vehicles: Percentage of non-revenue, support service and maintenance vehicles equipment that have either met or exceeded their ULB. See Tables 11.8 and 11.9.

Infrastructure – Guideway: Percentage of fixed guideway track segments with speed restrictions. See Table 11.10.

Table 11.8: Performance Targets, Transit: Tier I Revenue Vehicles & Service Vehicles

TRANSIT ASSET, TIER I:	ULB*, IN YEARS		% VEHICLES THAT MEET OR EXCEED THEIR ULB		
			Actuals		Targets
	Default	CT	2017	2021	2019 & 2022
Rolling Stock/Revenue Vehicles					
Bus	14	12	19%	22%	14%
Articulated Bus	14	12	0%	49%	14%
Over-the-road Bus	14	12	3%	49%	14%
Cutaway	10	5	0%	100%	17%
Rail/Revenue Vehicles					
MNR Commuter Rail Locomotive	39	35	54%	37%	13%
MNR Commuter Rail Passenger Coach	39	35	0%	38%	13%
Commuter Rail Self-Propelled Passenger Car	39	35	12%	0%	13%
Service Vehicles					
Trucks	14	14	26%	37%	7%
Automobiles	8	5	46%	100%	17%
SUVs	8	5	30%	72%	17%
Vans	8	5	54%	100%	17%
Steel Wheel Vehicle (Rail Support)	25	25	98%	100%	0%

*ULB = Useful Life Benchmark **State Fiscal Year

TERM scale means the five (5) category rating system used in the Federal Transit Administration's Transit Economic Requirements Model (TERM) to describe the condition of an asset:
5.0 - Excellent, 4.0 - Good;
3.0 - Adequate, 2.0 - Marginal, and
1.0 - Poor.

Facilities: Percentage of facilities within an asset class, rated below condition 3 on the five-point FTA Transit Economic Requirements Model (TERM) scale. Condition 3 is considered adequate. See Tables 11.12 and 11.13.

CTDOT coordinated with transit providers in Connecticut to develop the initial SGR performance targets in the four asset categories by the deadline of January 1, 2017, as set in the federal rules. BIL continues the MAP-21 and FAST Act requirement

Table 11.9: Performance Targets, Transit: Tier II Revenue Vehicles & Service Vehicles

TRANSIT ASSET, TIER II	ULB*, IN YEARS		% VEHICLES THAT MEET OR EXCEED THEIR ULB							
			Actual, 2017			Actual, 2021			Target for SFY**	
	Default	CT	CT	GBT	VTD	CT	GBT	VTD	2019	2022
Rolling Stock/Revenue Vehicles										
Bus	14	12	24%	9%	NA	5%	2%	NA	14%	14%
Cutaway	10	5	46%	13%	100%	57%	100%	0%	17%	17%
Minivan	8	5	0%	NA	NA	100%	NA	NA	17%	17%
Service Vehicles										
Trucks	14	14	32%	50%	100%	22%	29%	NA	7%	7%
Automobiles	8	5	100%	100%	NA	100%	100%	NA	17%	17%
SUVs	8	5	29%	50%	0%	81%	100%	100%	17%	17%
Vans	8	5	40%	NA	NA	71%	NA	NA	17%	17%

*ULB = Useful Life Benchmark **State Fiscal Year

that transit providers "describe any changes in the condition of its transit system from the previous year and describe the progress made during the year to meet the targets previously set for that year," by submitting an annual narrative report to the National Transit Database. CTDOT's Public Transportation Transit Asset Management Plan 2022-2025 was developed in coordination with transit providers and submitted to the FTA on September 30, 2022.

The TIP/STIP programs projects to meet the transit SGR targets by prioritizing capital projects based on projected asset conditions, a list included in CTDOT's Public Transit and Group TAMPs. This list of prioritized projects—developed with the aid of CTDOT's analytical decision support tool, Transit Asset Prioritization Tool, better known as TAPT—will be updated every four years along with the Plans.

Tables 11.8 through 11.13 are based on **CTDOT's Public Transportation Transit Asset Management Plans (TAMP)** 2018-2021 and 2022-2025 and provides summaries of the performance targets by asset class for **Tier I** and **Tier II** systems. Tier I transit systems are owned by CTDOT and include assets operated by Metro-North Railroad on the New Haven Main and Branch Lines, as well as the CT-transit system, which is operated by several private contractors. Tables 11.8 and 11.10-11.13 provide baseline data and targets for Tier I systems.

Table 11.10: Performance Targets, Rail Infrastructure

GUIDEWAY	ACTUAL		TARGET	
	2017	2021	2019	2022
Percentage of track segments with performance restrictions	5%	3%	2%	4%

Table 11.11: Performance Targets, Rail Infrastructure

INVENTORY & CONDITION	% RATED BELOW 3 ON TERM* SCALE	
	2018	2022
Track		
Rail	50%	50%
Tie	31%	31%
Turnout	28%	28%
Power		
Overhead Catenary	0%	57%
Power Cable	99%	100%
Catenary Poles	100%	100%
Substations / Power Distribution	36%	88%
Structures		
Fixed Bridges	32%	39%
Movable Bridges	40%	60%
Culverts	14%	11%
Station Pedestrian Bridges/Tunnels	18%	9%
Signals		
New Haven Main Line	0%	50%
Waterbury Branch	100%	0%

**TERM - FTA's Transit Economic Requirements Model scale.*

In the Greater Bridgeport and Valley region, Tier II systems include the Greater Bridgeport Transit Authority and the Valley Transit District. Tables 11.9 and 11.13 provide baseline data and targets for Tier II systems.

These targets were adopted by the CTDOT on January 1, 2017 and by the GBVMPO on June 15, 2017 .

Transit Safety

Transit districts are also required to measure their safety performance. Greater Bridgeport Transit and the Valley Transit District are both required to prepare a Public Transportation Agency Safety Plan (PTASP). A key component of the PTASP is the establishment of safety performance targets (SPTs) for actions and injuries for fixed route and demand response services.

As a provider of both fixed route and demand response service GBT has established seven mode-specific safety performance targets organized into four cate-

Table 11.12: Performance Targets, Transit Facilities

ALL TIER I & II	% FACILITIES RATED BELOW 3 ON TERM* SCALE						
	2017			2021			State Fiscal Year 2019 & 2022 Targets
	Tier I	GBT	VTD	Tier I	GBT	VTD	
Administrative/Maintenance Facility Inventory & Condition	0%	0%	0%	0%	0%	0%	0%
Passenger Facility Inventory & Condition	58%	0%	NA	58%	0%	NA	0%

**TERM - FTA's Transit Economic Requirements Model scale.*

gories. Targets were developed using a baseline year of 2019.

VTD provides demand response service only. Three years of performance data was used to develop these targets.

FATALITIES

GBT's target is 0 fatalities. In the base year of 2019, no fatalities occurred on either fixed route or demand response service. VTD also has a target of 0 fatalities. No fatalities occurred during the three-year period prior to their target-setting.

Fatalities are measured by:

1. Total number of fatalities reported to the National Transit Database (NTD).
2. Fatality rate per total vehicle revenue miles (VRM) for Fixed Route (FR) and Demand Response (DR).

INJURIES

Injuries can be found in Table 11.14, and are measured by:

3. The total number of injuries reported to NTD.
4. The rate per total VRM for FR and DR services.

SAFETY EVENTS

Measures all reported safety events that occur during transit operations and the performance of regular supervisory or maintenance activities. Safety Events can be found in Table 11.15 and are measured by:

5. The total number of safety events reported to NTD.
6. The rate per total VRM for FR and DR services.

Table 11.13: Transit Safety Targets, Reportable Injuries

REPORTABLE INJURIES	FIXED ROUTE		DEMAND RESPONSE			
	GBT		GBT		VTD	
	2019*	Target	2019*	Target	3-year**	Target
Count						
Preventable	9	9	2	2	7	7
Non-Preventable	26	26	3	3		
Total	35	35	5	5		
Rate per 100,000 vehicle revenue miles (VRMs)						
Preventable	0.5	0.5	0.39	0.39	3.33	3.33
Non-Preventable	1.45	1.45	1.19	1.19		
Total	1.95	1.95	1.59	1.59		

*2019 is the baseline year **3-year period prior to 2020

Table 11.14: Transit Safety Targets, Safety Events

SAFETY EVENTS	FIXED ROUTE		DEMAND RESPONSE			
	GBT		GBT		VTD	
	2019*	Target	2019*	Target	3-year**	Target
Count						
Preventable	32	32	2	2	8	8
Non-Preventable	48	48	6	6		
Total	80	80	8	8		
Rate per 100,000 vehicle revenue miles (VRMs)						
All Events	4.46	4.46	1.59	1.59	3.8	3.8

*2019 is the baseline year

SYSTEM RELIABILITY

7. Reliability is determined by calculating the mean distance between major mechanical failures by mode. The rate of vehicle failures in service is defined as the mean distance between major mechanical failures and is measured as revenue miles operated divided by the number of major mechanical failures. Reliability measures can be found in Table 11.16.

GBT HAS ADOPTED THREE ADDITIONAL METRICS

These metrics can be found in Table 11.17.

8. Preventable Accident Rate: The National Safety Council (NSC) defines a preventable accident as: "The driver failed to do everything that they reasonably could have done to avoid a collision." The NSC assigns a grade of preventable/non-preventable to all accidents. GBT's preventable accident rate is expressed as "Preventable Accidents/100,000 Miles (All Miles Traveled)"
9. Driver Assaults
10. Threats Against Drivers

Click here for GBT's Public Transportation Agency Safety Plan.

Table 11.15: Transit Safety Targets, System Reliability

RELIABILITY, IN MILES	FIXED ROUTE		DEMAND RESPONSE			
	GBT		GBT		VTD	
	2019*	Target	2019*	Target	3-year**	Target
Mean distance between mechanical failures	7,339	7,000	15,598	15,000	32,837	32,837

*2019 is the baseline year **3-year period prior to 2020

Table 11.16: Additional Safety Targets, GBT

SAFETY EVENTS	FIXED ROUTE		DEMAND RESPONSE	
	2019*	Target	2019*	Target
Average monthly preventable accident rate	1.7	1.5	0.39	0.39
Driver Assaults	0	0	0	0
Threats against drivers	0	0	0	0

*2019 is the baseline year

12 | CONGESTION MANAGEMENT PROCESS

A Congestion Management Process (CMP) is required for any Metropolitan Planning Organization (MPO) that includes an urbanized area exceeding 200,000 known as a Transportation Management Area (TMAs). The Greater Bridgeport Valley MPO (GBVMPO) includes the Bridgeport-Stamford Urbanized Area, thus requiring a CMP. The CMP is a data driven approach for managing congestion that utilizes current data, including performance measures, to assess alternative strategies for congestion management. With increased coordination between MPOs, the 2023 CMP represents a major update to the 2019 CMP as it encompasses the entire Bridgeport-Stamford TMA. This section is a summary of the full 2023 CMP, which can be found in Appendix F.

Objectives

The CMP provides an analytical process for understanding congestion and developing mitigating strategies in the Bridgeport-Stamford TMA.

The primary objectives are:

- Determine the highway & transit CMP network
- Calculate current congestion through performance measures
- Develop strategies to reduce congestion:
  - ◊ Increase Non-Single Occupancy Vehicle (Non-SOV) Travel
  - ◊ Increase Level of Travel Time Reliability
  - ◊ Increase Truck Travel Time Reliability
  - ◊ Decrease Peak Hour Excessive Delay

CMP Network

The Bridgeport-Stamford Urbanized Area (BS-UZA) encompasses five MPOs in southwestern Connecticut; Housatonic Valley, Southwestern, Greater Bridgeport and Valley, Central Naugatuck Valley and South Central. The MPOs do not share boundaries with the Council of Governments in CT so the same BS-UZA encompasses four COGs; Western CT, Naugatuck Valley, CT Metropolitan, and South Central CT.

The analysis focused on the National Highway System (NHS) roadways located within the urbanized area. A detailed description of each route and map of the NHS can be found in the full Congestion Management Plan in Appendix F.

Performance Measures

Four performance measures were calculated in the Congestion Management Process. Non-SOV Travel, Level of Travel Time Reliability, Truck Travel Time Reliability, and Peak Hour Excessive Delay. Datasets and methodology for the measures can be found in the full CMP in Appendix F.

NON-SINGLE OCCUPANCY VEHICLE (NON-SOV) TRAVEL

The Non-SOV measure was calculated to assess the use of other modes of transportation besides single occupancy vehicle travel in the Bridgeport--Stamford, CT-NY TMA. This metric was calculated using the 2017, 2018, 2019, 2020 and 2021 ACS 5-year estimate.

Results: In the Bridgeport--Stamford, CT--NY TMA the Non-SOV measure was 32.93% in 2021. . Since 2017, Non-SOV travel has increased 4.57 percentage points (Table 12.1).

Table 12.1: Non-SOV Vehicle Travel

5-YEAR ACS*	TOTAL WORKFORCE	DROVE ALONE	NON-SOV	% NON-SOV
2017 ACS	462,878	331,627	131,251	28.36%
2018 ACS	464,586	335,351	129,235	27.82%
2019 ACS	466,800	336,220	130,580	27.97%
2020 ACS	467,159	325,013	142,146	30.43%
2021 ACS	473,213	317,363	155,850	32.93%

American Community Survey

LEVEL OF TRAVEL TIME RELIABILITY (LOTTR)

Highway travel time reliability is closely related to congestion and is greatly influenced by the complex interactions of traffic demand, physical capacity, and roadway "events." Travel time reliability is a significant aspect of transportation system and has the opportunity to creates or mitigate challenges for users.

Results: The LOTTR (Level of Travel Time Reliability) measure for the region was 79.25%. That is, 79.25% of the NHS person miles traveled were reliable. The map below shows the NHS segments that were calculated as reliable or unreliable (Figure 12.2).

By comparison the targets in Table 12.2 were adopted by the CTDOT on May 20, 2018 and by the GBVMPO on August 30, 2018.

Most of the unreliable person miles in the region are confined to I-95 and Route 15. This can be attributed to the high volume of traffic on these two roadways. These coastal routes consist of the highest count of roadway miles. The unreliable segments for I-95 appear south of the intersection with Route 8 in Bridgeport both on the northbound and southbound Routes. Southbound on I-95 has more unreliable person miles during the AM peak of 6am-10am. The northbound side has higher unreliable miles during the PM peak 4pm-8pm. Route 15 shows unreliable segments in Fairfield, south of the Route 8 and Route 25 interchange through Stamford where Route 15 crosses Route 104. A more detailed breakdown of reliability by route can be found in the full CMP in Appendix F.

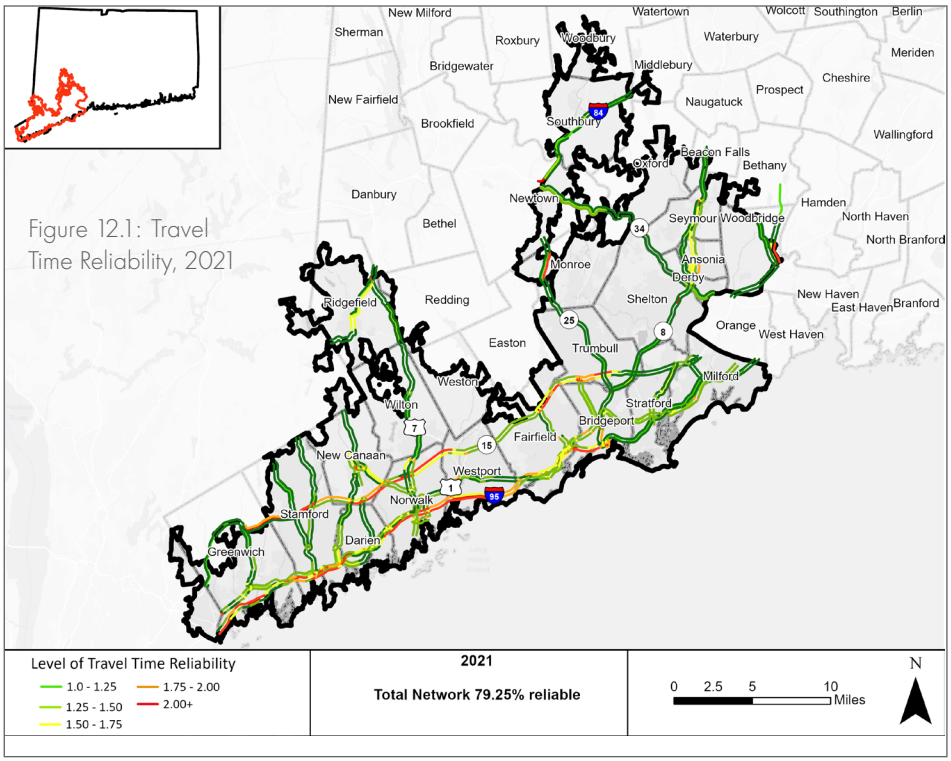


Figure 12.1: Travel Time Reliability, 2021

Table 12.2: CTDOT System Reliability Targets

FHWA MEASURE	BASELINE (STATE)	TARGETS 2-yr (2020)	TARGETS 4-yr (2022)	CURRENT BS-UZA
% person-miles of Interstate NHS that are "reliable"	86.2%	78.6%	78.6%	79.25%

Table 12.3: CTDOT Freight Reliability Targets

FHWA MEASURE INTERSTATE NHS	BASELINE (STATE)	TARGETS 2-yr (2020)	TARGETS 4-yr (2022)	CURRENT BS-UZA
Truck Travel Time Reliability (TTTR) Index	1.56	1.95	2.02	2.50

TRUCK TRAVEL TIME RELIABILITY (TTTR):

Freight movement is assessed by the Truck Travel Time Reliability (TTTR) index. The Truck Travel Time Reliability metric is the ratio of long travel times (95th percentile) to a normal travel time (50th percentile). This measure considers factors that are unique to the trucking industry. The unusual characteristics of truck freight include:

- Use of the system during all hours of the day;
- High percentage of travel in off-peak periods; and
- Need for shippers and receivers to factor in more 'buffer' time into their logistics planning for on-time arrivals.

Results: The Truck Travel Time Reliability for 2021 was calculated to be 2.50 for the region. Similarly to LOTTR, a score of 1.5 represents reliable travel. (Figure 12.2 and Table 12.3).

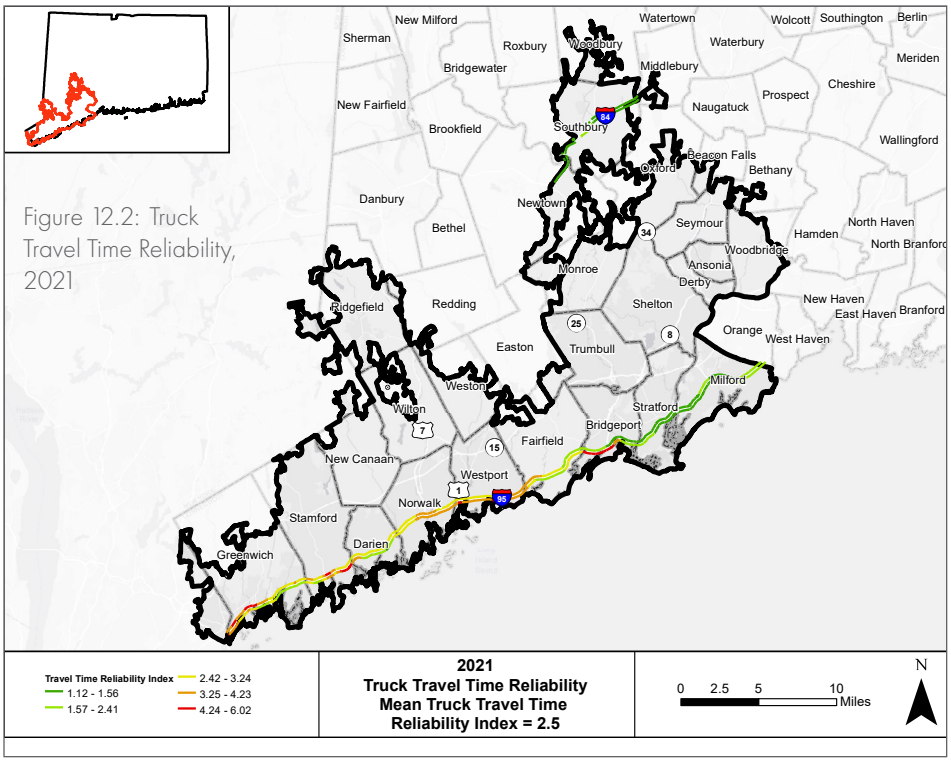


Figure 12.2: Truck Travel Time Reliability, 2021

By comparison, the following targets were adopted by the CTDOT on May 20, 2018, and the state's MPOs within the following months:

Over the five-year period reviewed for this report, global events and the COVID-19 pandemic have had a significant impact on TTTR. Despite these changes, the 2021 TTTR remains lower than the pre-pandemic trend, with the 2021 index coming in at 2.5 and the 2018 and 2019 TTTR index at 2.7.

Between the two interstate highways, there is great variation in the Truck Travel Time

Reliability Index. Interstate 84, through less reliable both east and west of the UZA, scores below the target of 1.5 for 2021 with a score of 1.3. Within that year, only two of the 26 segments in the region had an index above 1.5, with the area of 84 westbound at exit 14 having a reliability of 1.89 and the area of 84 westbound at the entrance ramp from Bullet Hill Road having an index of 1.65. A more detailed breakdown of Truck Travel Time Reliability by route can be found in the full CMP in Appendix F.

PEAK HOUR EXCESSIVE DELAY (PHED)

The Peak Hour Excessive Delay measure was calculated to assess recurring congestion during commuting hours in the Bridgeport-Stamford TMA.

Results: The annual hours of peak hour excessive delay per capita for the region for 2021 was 12.1. This calculation was generated by the RITIS MAP-21 tool by dividing the delay by the total population of the MPO. There was a total of 11,871,079 hours of excessive delay in the TMA. By comparison, the targets above were adopted by the CTDOT on May 20, 2018, and the state's MPOs within the following months (Table 12.4)

Table 12.4: CTDOT Peak Hour Excessive Delay Targets

FHWA MEASURE PHED	BASELINE (STATE)	TARGETS 2-yr (2020)	TARGETS 4-yr (2022)	CURRENT BS-UZA
Annual Hours of PHED Per Capita	**	20.0	21.9	12.6

High excessive delay occurred in some of the same areas that had high LOTTR and TTTR values such as I-95 and Route 15 south of Bridgeport. This indicates that these roadways experience both recurring and non-recurring events that delay travel over time (Figure 12.3).

I-95 accounted for 5,843,151 hours of delay in 2021, amounting to 49.2% of the delays in the TMA. Route 1 was next highest, with 2,213,007 hours of delay (18.6%) followed by Route 15, 1,545,007 (13.0%) The other 19.2% of delay in the TMA were spread out over the remaining NHS segments. A more detailed breakdown of PHED by route can be found in the full CMP in Appendix F.

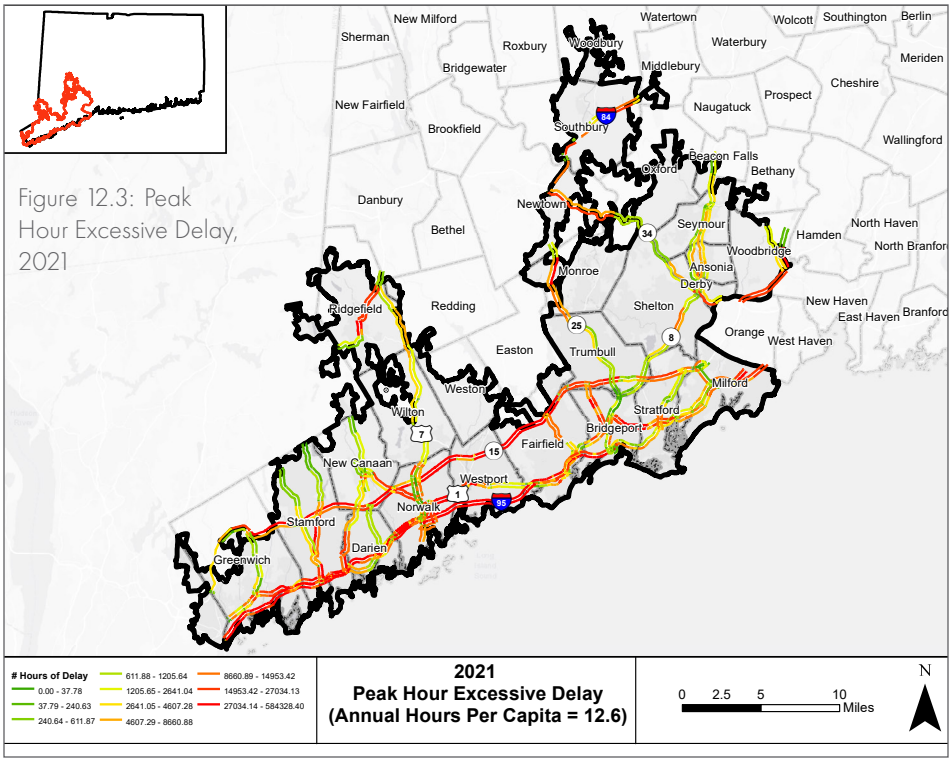


Figure 12.3: Peak Hour Excessive Delay, 2021

Strategies

The Congestion Management Process is a data driven approach to develop strategies to mitigate congestion. The performance measures indicate that recurring and non-recurring congestion heavily impact the Region, especially in the western half. The following mitigation strategies are designed to improve travel in the Region that will improve the performance measures in the next CMP by:

- Increasing Non-Single Occupancy Vehicle usage
- Increasing Level of Travel Time Reliability
- Increasing Truck Travel Time Reliability
- Decreasing Peak Hour Excessive Delay

The strategies were broken down into the four following categories:

- Demand Management Strategies
- Public Transportation Strategies
- Traffic Operations Strategies
- Road Capacity

These strategies can all be found in the full CMP in Appendix F.

PROGRAMMING & IMPLEMENTATION OF CMP STRATEGIES

Each MPO will incorporate this CMP into their respective Metropolitan Transportation Plans (MTPs) and will use it to prioritize projects. Future corridor planning studies will emphasize congestion mitigation strategies. Currently, many of the CMP proposals have been derived through planning studies. The MPO will continue to program short, medium, and long term projects, as well as spot improvements.

Evaluate Strategy Effectiveness

To assess strategy effectiveness, annual performance from 2017-2021 was monitored. System-level performance and strategy effectiveness were evaluated for each year from 2017 to 2021, based on the process created in the 2018 CMP for Greater Bridgeport and Valley MPO.

The strategies in this CMP are designed to reduce congestion by:

- Increasing Non-Single Occupancy Vehicle Usage
- Increasing Level of Travel Time Reliability
- Increasing Truck Travel Time Reliability
- Decreasing Peak Hour Excessive Delay

Non-Single Occupancy Vehicle Usage: Non-SOV travel increased from 28.36% in 2017 to 32.93% in 2021, meeting the objective.

Level of Travel Time Reliability: LOTTR increased from 70.6% in 2017 to 79.25% in 2021, meeting the objective.

Truck Travel Time Reliability: The TTTR index increased from 2.4 in 2017 to 2.5 in 2021, meeting the objective.

Peak Hour Excessive Delay: PHED decreased from 13.8 hours in 2017 to 12.6 hours in 2021, meeting the objective.

While the performance measures have all improved since 2017, the pandemic significantly impacted travel in the TMA. All the performance measures improved in 2020. Non-SOV usage was the only performance measure that continued to improve in 2021. LOTTR, TTTR, and PHED all regressed but not to 2017 levels. The next CMP will

be critical to assess if these were sustainable trends or just a reduction due to reduced travel during the pandemic.

STRATEGY EFFECTIVENESS

Several projects from the 2018 GBVMPO CMP have been completed. The full list of projects can be found in the full CMP in Appendix F. While it is difficult to assess if any of these specific strategies had a direct impact on the performance measures, due to the pandemic, it is still important to note the projects completed to improve congestion.

MONITORING

This is the first CMP for the entire Bridgeport-Stamford TMA and thus establishes a baseline to monitor performance measures moving forward. As projects are completed, the measures will be compared in the project area to gauge their effectiveness. The MAP-21 widget provides a quick and effective way to calculate LOTTR, TTTR, and PHED on demand. In addition, as the 5-year ACS is updated, Non-SOV travel in the TMA will be calculated.

Note: Revisions are in bright blue, some text has been removed ~~(indicated by cross outs)~~

13 | FUNDING

Transportation Funding in Connecticut

In Connecticut, transportation funds come from a variety of sources including the federal government, state government, and local governments. Federal funds for transportation play a critical role in Connecticut and are determined by federal surface transportation authorizations. The Infrastructure Investment and Jobs Act (IIJA) (Public Law 117-58, also known as the "Bipartisan Infrastructure Law" or BIL) was signed into law on November 15, 2021 and authorizes $1.2 trillion over FY2022-2026 for infrastructure, including roads, bridges, mass transit, water infrastructure, resilience, and broadband. USDOT will receive $567.5B (billion) in BIL funds – a significant increase in funding compared to the FAST Act's $305B (2016 through 2020).

Federal transportation program funds are apportioned by formula using program-specific factors, as well as through discretionary (competitive) programs. Under IIJA/BIL, Connecticut will receive an estimated $5.38B in formula funding for transportation (FY2022-2026). Approximately a third or $50.8B of BIL's $154B in grant funds are formula and two thirds are discretionary, meaning over $100B is available through competitive grant programs, each with their own eligibility requirements. Explanations of the transportation funding programs most relevant to this Region are discussed later in Appendix B.

In Connecticut, state funding for transportation is provided through the Special Transportation Fund (STF) and Special Tax Obligation (STO) Bonds. Based on state law, the STF is required to pay the debt service on STO bonds for transportation infrastructure, other transportation related debt and for operations at both CTDOT and CTDMV. The major sources of STF dollars are the motor vehicle fuels tax and the petroleum products gross earning tax (PGET). As of January 1, 2023, revenue from a highway user fee on certain heavy, multi-unit motor vehicles will also support the STF.

Previous versions of the MTP have emphasized federal and state funding uncertainties, and it is very difficult to estimate anticipated resources for 25 years based on past and current activities. While BIL funds and a more robust source of transportation funds in Connecticut are causes for optimism, recovery from a global pandemic, inflation and crises at the national and international scale will continue to impact transportation revenues and expenditures. Therefore, the following '"financially constrained plan" is an approximate, but realistic, estimate of total program cost, which would be supported by the estimate of revenues that the Region can currently expect to receive over the next 25 years.

Federal Allocation

CTDOT calculated the total estimated FHWA funds for Connecticut ($53,570,365,877) for the period 2023-2050 by compounding the estimated federal funds for federal fiscal year 2023 ($1,600,000,000) at 1.5% for 28 years. $17,632,713,000 was deducted from this total for "major projects of statewide significance".

Of the balance of the total estimated funds ($35,937,652,877), CTDOT's Office of Statewide Coordination and Modeling, STIP Unit allocated 60% for System Preservation ($21,562,591,726), and 40% for System Improvement ($14,375,061,151). System Preservation projects include repaving roadways, bridge repair or

Table 13.1: Anticipated Revenues & Project Costs, FHWA

TYPE	YEARS 1-4	YEARS 5-10	YEARS 11-27	TOTAL
Federal & State Revenues				
Improvements	$197,139,132	$318,621,096	$1,073,855,700	$1,589,615,928
Preservation	$230,388,789	$372,360,006	$1,254,973,131	$1,857,721,926
Major Projects	$192,406,296	$214,694,444	$409,259,259	$816,360,000
Total	$619,934,217	$905,675,547	$2,738,088,090	$4,263,697,854
Project Costs				
Improvements	$196,973,769	$314,729,651	$741,224,043	$1,252,927,462
Preservation	$124,533,401	$164,023,736	$128,224,696	$416,781,834
Major Projects	$192,406,296	$214,694,444	$409,259,259	$816,360,000
Total	$513,913,466	$693,447,832	$1,278,707,998	$2,486,069,296

replacement, and any other form of reconstruction in place. System improvement projects are projects that enhance safety, improve mobility, increase system productivity or promote economic growth.

Five percent of the System Preservation funds and 3.8% of the System Improvement funds were distributed equally to each of the MPOs and the RPOs. This provided each of the 10 planning organizations with a minimum allocation of funds. Weighted variables were used to distribute the remainder of the funds. The variables used were Vehicle Miles of Travel (VMT), Average Travel Time Index (AVR TTI), and Lane Miles (LM).

- **For System Improvement funds:** .25 weight for VMT and .75 weight for AVT TTI.
- **For System Preservation funds:** .25 weight for VMT and .75 for LM.

The amounts allocated to these variables for each category were then distributed to each MPO/RPO in proportion to its respective percentage to the total of the variables.

CTDOT is the designated recipient for most of the state's FTA funded programs. Funds are reallocated to bus operators for capital projects based on annual needs, rather than by formula. Bus operations are typically not eligible for federal funding, and fares do not cover the total cost of operations. The STF provides a subsidy for bus operations. Rail operations are subsidized similarly.

CTDOT, in coordination with FTA developed the anticipated revenues to maintain the transit system in a state of good repair and implementation of the TAM plan, which requires the use of all transit funds for this timeframe. Local priorities for bus and rail not included in CTDOT's program are included as illustrative projects in Appendix C.

ESTIMATED FHWA & FTA ALLOCATIONS FOR THE GBVMPO

FHWA: Based on these calculations, the Greater Bridgeport and Valley Planning Region can anticipate $1,589,615,928 in System Improvement funds and $1,857,721,926 in System Preservation funds from 2023-2050. $816,360,000 is estimated for major projects of statewide significance. These funds total to an FHWA investment of $4,263,697,854 in the region through 2050 (See Table 13.1). Revenue is sufficeint to meet the plan-identified project costs during all time periods of this plan. Preservation ($416M) and Improvement ($1.25B) projects in this plan total $1.67B: ~~In years 1-4, revenue is sufficient to meet~~

Figure 13.1: Highway Improvements, Revenues & Project Cost

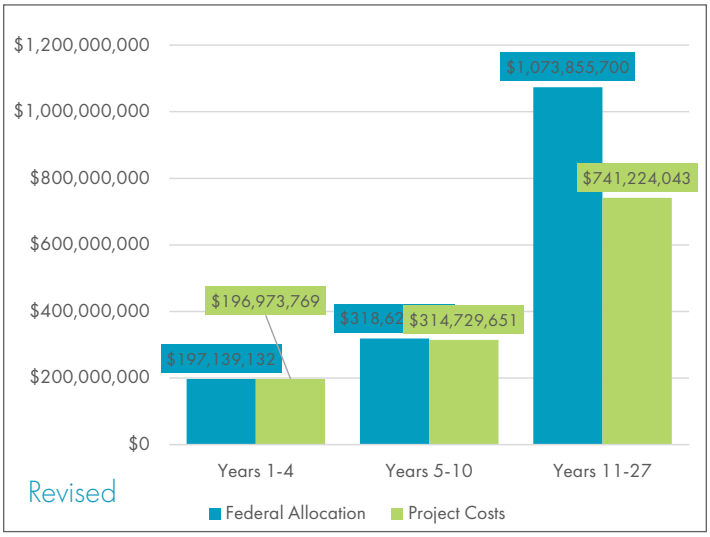
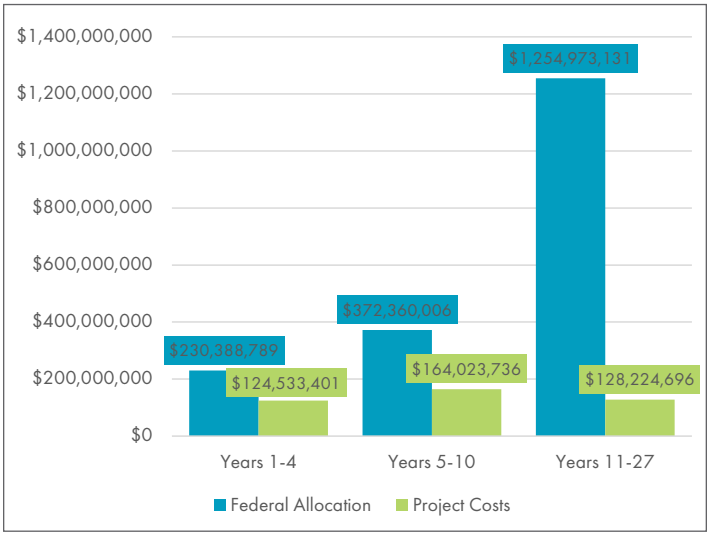


Figure 13.2: Highway Preservation, Revenues & Project Cost



~~projects costs. In years 5-10, estimated costs of improvement projects total to greater than the allocations anticipated for the period. However, the total improvement and preservation projects for the 5-10 year time period is lower than the total federal allocation, as preservation costs are lower than the planned allocation. Further,~~ Years 11-27 provide a significant surplus (See Figures 13.1 and 13.2 for a comparison of costs and revenues for each time period). Overall, even with the inclusion of the $816M (million) in major projects, this is well below the estimated FHWA allocation.

All preservation and improvement projects were calculated to include interest for their targeted time period. The same rate of 1.5% utilized by CTDOT was compounded for three years for projects that would occur in years 1-4, eight years for projects that occur in years 5-10 and 19 years for projects that occur in years 11-27.

FTA: The needed $5.09B in transit funds were estimated from existing capital plans and coordination with transit districts. Rail makes up a significant amount of the future needs: $4.81B is anticipated for improvements to the New Haven Line (NHL), Waterbury Branch Line (WBL) and the freight rail network, as well as some statewide improvements (Table 13.2). This does not include $305M of the locally/regionally identified projects, which have been included in Appendix C as illustrative projects.

Table 13.2: Anticipated Transit Project Costs

MODE	YEARS 1-4	YEARS 5-10	YEARS 11-27	TOTAL
Bus	$36,476,852	$52,727,778	$138,132,870	$227,337,500
Rail	$2,133,722,222	$1,628,833,333	$1,046,444,444	$4,809,000,000
Commuter	$28,367,000	$28,367,000		$56,734,000
Total	$2,198,566,074	$1,709,928,111	$1,184,577,315	$5,093,071,500

Table 13.3: Anticipated Rail Costs & Sources

LINE	FEDERAL*	STATE	TOTAL
New Haven Line - Main**	$2,833,000,000	$27,000,000	$2,860,000,000
New Haven Line - System	$1,150,000,000	$719,000,000	$1,869,000,000
Waterbury Branch Line		$80,000,000	$80,000,000
Total	$3,983,000,000	$826,000,000	$4,809,000,000

** Includes State Match ** Includes all NHL entries for GBVMPO/MetroCOG*

Table 13.4: Anticipated Bus/Demand Response Costs (Federal/State)

SERVICE	YEARS 1-4	YEARS 5-10	YEARS 11-27	TOTAL
Greater Bridgeport Transit	$32,501,852	$48,752,778	$138,132,870	$219,387,500
Valley Transit District	$3,975,000	$3,975,000		$7,950,000
Total	$36,476,852	$52,727,778	$138,132,870	$227,337,500

CTDOT has programmed a total of $227M for the Greater Bridgeport Transit and the Valley Transit District. This does not include $80M in locally/regionally identified priority projects, which have been included in Appendix C as illustrative projects. $56M in transit funding will be utilized for improvements to park and ride lots and shelters. (Table 13.4).

14 | RESOLUTIONS

GREATER BRIDGEPORT AND VALLEY METROPOLITAN PLANNING ORGANIZATION

Ansonia●Bridgeport●Derby●Easton●Fairfield●Monroe●Seymour●Shelton●Stratford●Trumbull

RESOLUTION 2023-05

ENDORSEMENT
METROPLITAN TRANSPORTATION PLAN: 2023 ~ 2050
FOR THE GREATER BRIDGEPORT AND VALLEY PLANNING REGION

WHEREAS, the Greater Bridgeport and Valley Metropolitan Planning Organization (GBVMPO) is designated by the US Department of Transportation as the transportation planning agency for the Greater Bridgeport and Valley Planning Region, and conduct the transportation planning process in accordance with Section 34 of Title 23 of the United States Code, as amended by the ***Bipartisan Infrastructure Law (BIL)*** and related US Department of Transportation planning regulations;

WHEREAS, the ***2023-2050 Metropolitan Transportation Plan*** was prepared by the GBVMPO in 2022 and 2023 and endorsed by the Greater Bridgeport and Valley Metropolitan Planning Organization at its ***March 30th, 2023,*** meeting,

WHEREAS, the ***FAST Act*** requires MPOs to prepare and develop long range transportation plans every four years that reflect at least a 20-year planning horizon, are financially constrained, comply with federal planning guidelines, consider ten planning factors, consider six livability principles and conform to the ***Clean Air Act Amendments of 1990*** and Connecticut's ***State Implementation Plan for Air Quality***, as revised;

WHEREAS, the GBVMPO completed an update of its existing long range transportation plan and the new ***Plan*** was prepared through the transportation planning process and in conformity with ***Bipartisan Infrastructure Law*** planning guidelines;

WHEREAS, the GBVMPO conducted a proactive public involvement process that followed the procedures set forth in the GBVMPOs ***Public Participation Program*** handbook, as revised, including making the draft plans available to the public electronically (on the web), notifying the public of the new plans and soliciting review and comment, providing at least a 30-day review period, holding public information meetings (March 21st 2023 at the MetroCOG offices, with an option for virtual attendance), recording comments from the public and considering and responding to comments;

WHEREAS, the proposed program of projects recommended in the Metropolitan Transportation Plan was assessed for its impacts on air quality and the State's ability to attain ***8-Hour Ozone and $PM_{2.5}$ National Ambient Air Quality Standards***;

WHEREAS, the regional emissions assessments demonstrate that the proposed projects will not have an adverse impact on air quality.

continued

NOW, THEREFORE BE IT RESOLVED that the Greater Bridgeport and Valley Metropolitan Planning Organization, after reviewing the final draft ***2023-2050 Metropolitan Transportation Plan*** find that the ***Plan*** and all Amendments conform to air quality requirements of the U.S. Environmental Protection Agency (40 CFR 21 and 93), related U.S. Department of Transportation guidelines (23 CFR 450) and with Title 42, Section 7506 (3) (A) and hereby endorses these plans as the MPO's official long range transportation plans for the Greater Bridgeport and Valley Planning Region, respectively contingent upon no major adverse comments being received during the 30-day public comment period.

This resolution shall become effective as of ***March 30th, 2023.***

We, the undersigned co-secretaries of Greater Bridgeport and Valley Metropolitan Planning Organization (GBVMPO), Connecticut, do hereby certify that the resolution adopted by the GBVMPO at a public meeting held on ***March 30th, 2023***, at which a quorum was present and that the same is a correct and true transcript from the original thereof.

Respectfully submitted,

Matt Fulda, Executive Director
MetroCOG – MPO Co-Secretary

Richard T. Dunne, Executive Director
NVCOG – MPO Co-Secretary

Date: March 30th, 2023

GREATER BRIDGEPORT AND VALLEY METROPOLITAN PLANNING ORGANIZATION

Ansonia●Bridgeport●Derby●Easton●Fairfield●Monroe●Seymour●Shelton●Stratford●Trumbull

RESOLUTION 2023-06
RESOLUTION ON CONFORMITY WITH THE CLEAN AIR ACT PM 2.5

WHEREAS,

the ***Greater Bridgeport and Valley Metropolitan Planning Organization (GBVMPO)*** is required to submit an Air Quality Conformity Statement to the US Federal Highway Administration (FHWA) and to the US Environmental Protection Agency (EPA) in accordance with the final conformity rule promulgated by EPA (40 CFR 51 and 93) when adopting an annual Transportation Improvement Program (TIP) or when effecting a significant revision of the Metropolitan Transportation Plan (MTP); and

WHEREAS,

Title 42, Section 7506 (3) (A) states that conformity of transportation plans and programs will be demonstrated if:

1. the plans and programs are consistent with recent estimates of mobile source emissions;
2. the plans and programs provide for the expeditious implementation of certain transportation control measures;
3. the plans and programs contribute to annual emissions reductions consistent with the Clean Air Act of 1977, as amended; and

WHEREAS,

It is the opinion of the ***GBVMPO*** that the plans and programs approved on ***March 30, 2023*** and submitted to FHWA and EPA conform to the requirements of Title 42, Section 7506 (3) (A) as interpreted by EPA (40 CFR 51 and 93); and

WHEREAS,

The Connecticut portion of the New York – Northern New Jersey – Long Island, NY-NJ-CT area is designated a PM 2.5 attainment/maintenance area; and

WHEREAS,

The State of Connecticut has elected to jointly assess conformity in all PM 2.5 attainment/maintenance areas in Connecticut (Fairfield County and New Haven County) and

WHEREAS,

The results of the required emissions analysis performed by the Connecticut Department of Transportation on the 2023-2050 MTP and the FFY 2021-2024 TIP and Amendments show that the implementation of the projects contained therein will result in emissions of PM2.5 in each analysis year that are less that the emissions of the baseline year; and

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continued

Now, **THEREFORE BE IT RESOLVED,**

That the **GBVMPO** finds that the 2023-2050 MTP and the FFY 2021-2024 TIP and Amendments conform to air quality requirements of the U.S. Environmental Protection Administration (40 CFR 51 and 93), related U.S. Department of Transportation guidelines (23 CFR 450) and with Title 42, Section 7506 (3) (A) and hereby approves the existing Ozone and PM2.5 Air Quality Conformity Determination dated February 2023 contingent upon no major adverse comments are received during said period.

CERTIFICATE
The undersigned duly qualified and acting Secretary of the **GBVMPO** certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the **GBVMPO** on ***March 30, 2023.***

Respectfully submitted,

Matt Fulda, Executive Director
MetroCOG – MPO Co-Secretary

Richard T. Dunne, Executive Director
NVCOG – MPO Co-Secretary

Date: March 30, 2023

GREATER BRIDGEPORT AND VALLEY METROPOLITAN PLANNING ORGANIZATION
Ansonia●Bridgeport●Derby●Easton●Fairfield●Monroe●Seymour●Shelton●Stratford●Trumbull

RESOLUTION 2023-07
RESOLUTION ON CONFORMITY WITH THE CLEAN AIR ACT OZONE

WHEREAS,

the ***Greater Bridgeport and Valley Metropolitan Planning Organization (GBVMPO)*** is required to submit an Air Quality Conformity Statement to the US Federal Highway Administration (FHWA) and to the US Environmental Protection Agency (EPA) in accordance with the final conformity rule promulgated by EPA (40 CFR 51 and 93) when adopting an annual Transportation Improvement Program (TIP) or when effecting a significant revision of the Metropolitan Transportation Plan (MTP); and

WHEREAS,

Title 42, Section 7506 (3) (A) states that conformity of transportation plans and programs will be demonstrated if:

1. the plans and programs are consistent with recent estimates of mobile source emissions;
2. the plans and programs provide for the expeditious implementation of certain transportation control measures;
3. the plans and programs contribute to annual emissions reductions consistent with the Clean Air Act of 1977, as amended; and

WHEREAS,

it is the opinion of the ***GBVMPO*** that the plans and programs approved today, ***March 30, 2023*** and submitted to FHWA and EPA conform to the requirements of Title 42, Section 7506 (3) (A) as interpreted by EPA (40 CFR 51 and 93); and

WHEREAS,

The State of Connecticut has elected to assess conformity in the Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT Ozone Nonattainment area (Fairfield, New Haven and Middlesex Counties) and the Connecticut Department of Transportation has jointly assessed the impact of all transportation plans and programs in this Nonattainment area (Ozone and PM2.5 Air Quality Conformity Determination February 2023); and

WHEREAS,

The Connecticut Department of Transportation's assessment (above) has found that plans and programs jointly meet mobile source emission's guidelines advanced by EPA pursuant to Section 7506 (3) (A).

Now, **THEREFORE BE IT RESOLVED** by the ***GBVMPO***

That the ***GBVMPO*** finds that the 2023-2050 MTP and the FFY 2021-2024 TIP and all Amendments conform to air quality requirements of the U.S. Environmental Protection Administration (40 CFR 51 and 93), related U.S. Department if Transportation guidelines (23 CFR 450) and with Title 42, Section 7506 (3) (A) and hereby approves the existing Ozone and PM2.5 Air Quality Conformity Determination, dated February 2023, contingent upon no major adverse comments are received during said period.

CERTIFICATE
The undersigned duly qualified and acting Secretary of the ***GBVMPO*** certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the ***GBVMPO*** on ***March 30, 2023.***

Respectfully submitted,

Matt Fulda, Executive Director
MetroCOG – MPO Co-Secretary

Richard T. Dunne, Executive Director
NVCOG – MPO Co-Secretary

Date: March 30, 2023.

Acknowledgements

GREATER BRIDGEPORT & VALLEY METROPOLITAN PLANNING ORGANIZATION

Ansonia	Mayor David Cassetti
Bridgeport	Mayor Joseph P. Ganim
Derby	Mayor Richard Dziekan
Easton	First Selectman David Bindelglass
Fairfield	First Selectwoman Brenda L. Kupchick
Greater Bridgeport Transit	Doug Sutherland
Monroe	First Selectman Kenneth Kellogg
Seymour	First Selectwoman Annmarie Drugonis
Shelton	Mayor Mark Lauretti, Vice-Chair
Stratford	Mayor Laura Hoydick, Chair
Trumbull	First Selectman Vicky Tesoro
Valley Transit District	Mayor Mark Lauretti

METROCOG
Connecticut Metropolitan Council of Governments

Patrick Carleton, AICP, Deputy Director
Lawrence Ciccarelli, Administrative Services Director
Devin Clarke, Senior Transportation Planner
Matthew Fulda, Executive Director
Mark Hoover, GIS Director
Colleen Kelleher, Finance Director
Robert F. Kulacz, P.E., Engineer
Lindsay Naughton, Regional Planner
Hannah Reichle, Regional Planner
Meghan A. Sloan, AICP, Planning Director

NAUGATUCK VALLEY COUNCIL of GOVERNMENTS

Drew Baklik, Director of Municipal Affairs
Trish Bauer, Office/Financial Manager
Desira Blanchard, Communications & Community Engagement Manager
Aaron Budris, Senior Regional Planner
Arthur Bogen, Environmental Planner-Brownfields
Ken Byron, Communications & Community Engagement Associate
Richard Crowther Jr., GIS Planning Assistant
Jack DeOliveira, Transportation Planner

NAUGATUCK VALLEY COUNCIL of GOVERNMENTS

John DiCarlo, Municipal Shared Services Director
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Rick Dunne, Executive Director
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Mark Nielsen, Assistant Director
Eyitayo Olaleye, Transportation Planner
Christine O'Neill, Regional Environmental Planner
Mark Pandolfi, Transit Capital Administrator
Steven Perry, Environmental Planner
Glenda Prentiss, GIS Program Coordinator
Lauren Rizzo, Administrative Services Coordinator
Ricardo Rodriguez, Brownfields Manager
Joanna Rogalski, Senior Regional Planner/ Emergency Management
Keith Rosenfeld, Regional Municipal Planner
Katie Schlick, Environmental Planner
Karen Svetz, P.E., Regional Transportation Engineer
Michael Szpryngel, Finance Director
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Elliot Wareham, Transportation Planner