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Preliminary Draft

Metropolitan Transportation Plan

Long Range Transportation Plan for the Metro-Hartford Capitol Region





Prepared in cooperation with the U.S. Department of Transportation (including its participating agencies) and the Connecticut Department of Transportation. The opinions, findings, and conclusions expressed in this publication are those of the Capitol Region Council of Governments and do not necessarily reflect the official views or policies of the Connecticut Department of Transportation and/or the U.S. Department of Transportation.

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Purpose of the Capitol Region Council of Government's Metropolitan Transportation Plan – 2019

As the designated Metropolitan Planning Organization (MPO) for the Greater Hartford Metro area, the Capitol Region Council of Governments (CRCOG) is excited to present this update of its Metropolitan Transportation Plan (MTP). This plan identifies how the Capitol Region will manage and operate a multi-modal transportation system (including transit, highway, bicycle, pedestrian, and accessible transportation) to meet the region's economic, transportation, development and sustainability goals, among others, within a planning horizon to 2045, within a fiscally constrained environment. The effective date of this plan is_____.

This document is required by federal code 23 CFR 450§324 Subpart C, and per these procedures may be revised at any time without a requirement to extend the horizon year. The law requires that the MPO review and update its transportation plan at least every four years in air quality nonattainment and maintenance areas. CRCOG is within the Greater Connecticut area classified as a nonattainment area for air quality (ozone levels rated moderate), under conformity rules provided by the U.S. Department of Environmental Protection (EPA).

Much of this plan's focus is similar to the previous plan (Capitol Region Transportation Plan – Minor Update, April 2015), and like the previous plan, a Comprehensive, Cooperative, and Continuing (3-C) planning process was employed. However new areas of focus are included to comply with federal requirements for Performance Based Planning and Programming. In addition, chapters on Innovative Financing and Emerging Technologies address key elements related to financing strategies and future transportation development. The discussion regarding Bicycles, Pedestrians, and Sustainability has been updated considerably since 2015 in anticipation of policies associated with the upcoming completion of a CRCOG Complete Streets Plan.

Also of note since the 2015 update is that MPO boundaries in Connecticut have changed. In 2013, the State of Connecticut initiated a process to reorganize its regional planning organizations (RPOs, who have traditionally been the hosts of the state's MPOs). The result of this process was that the Capitol Region RPO gained eight new municipalities. Four of the municipalities (Berlin, New Britain, Plainville, and Southington) joined the Capitol Region from the Central Connecticut Regional Planning Agency (CCRPA), and four (Columbia, Coventry, Mansfield, and Willington), joined from the Windham Council of Governments (WinCOG). Along with this reorganization, the towns clearly indicated their desire to change the MPO boundaries to match the RPO boundaries. Similarly, the Town of

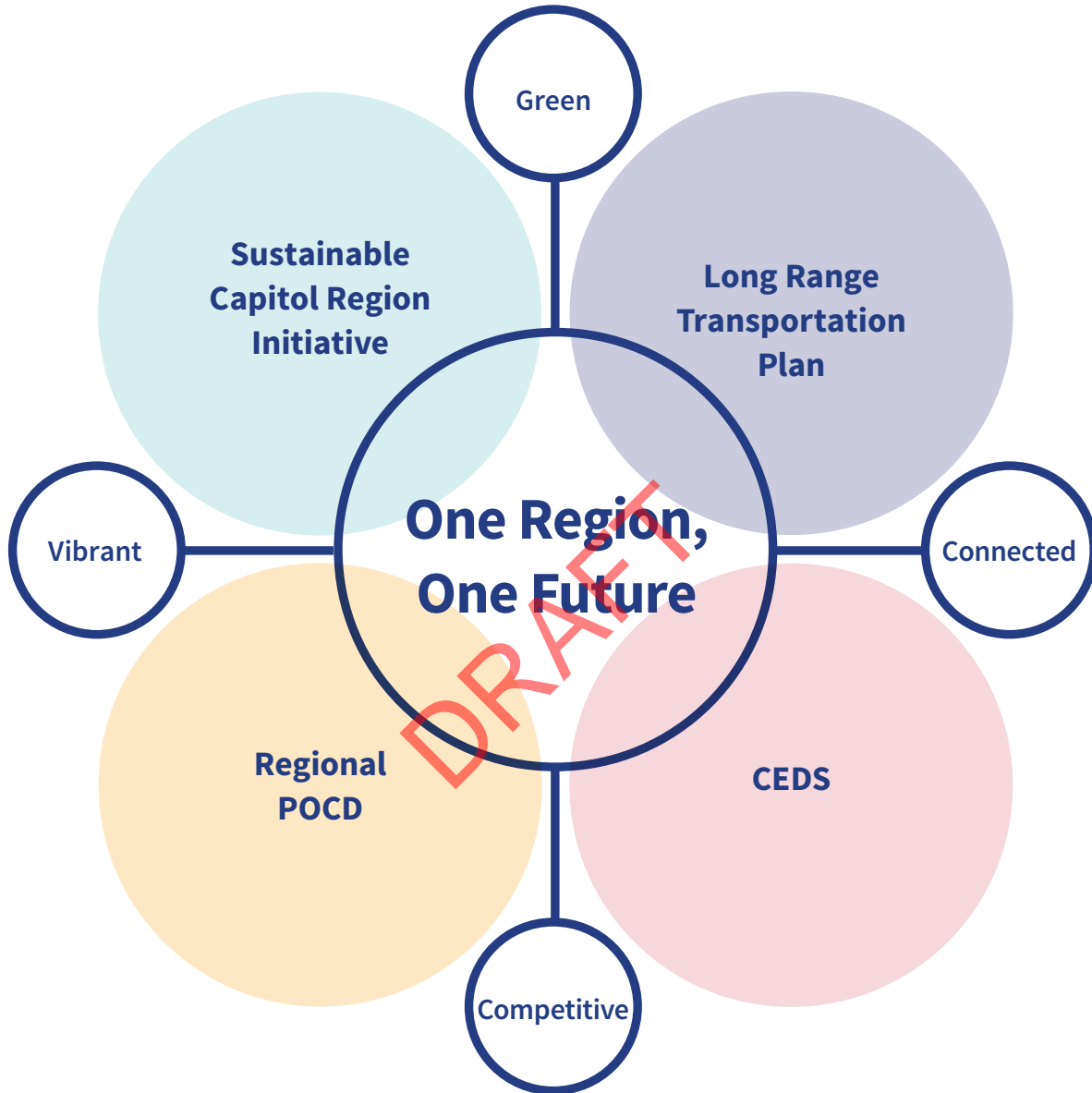


Figure 01.1 — A Sustainable Future for the Capitol Region
This plan was developed through a comprehensive coordination effort aimed at integrating CRCOG’s three key policy documents. The coordination of these three pillars of policy drives CRCOG’s emphasis on creating a Sustainable Region.

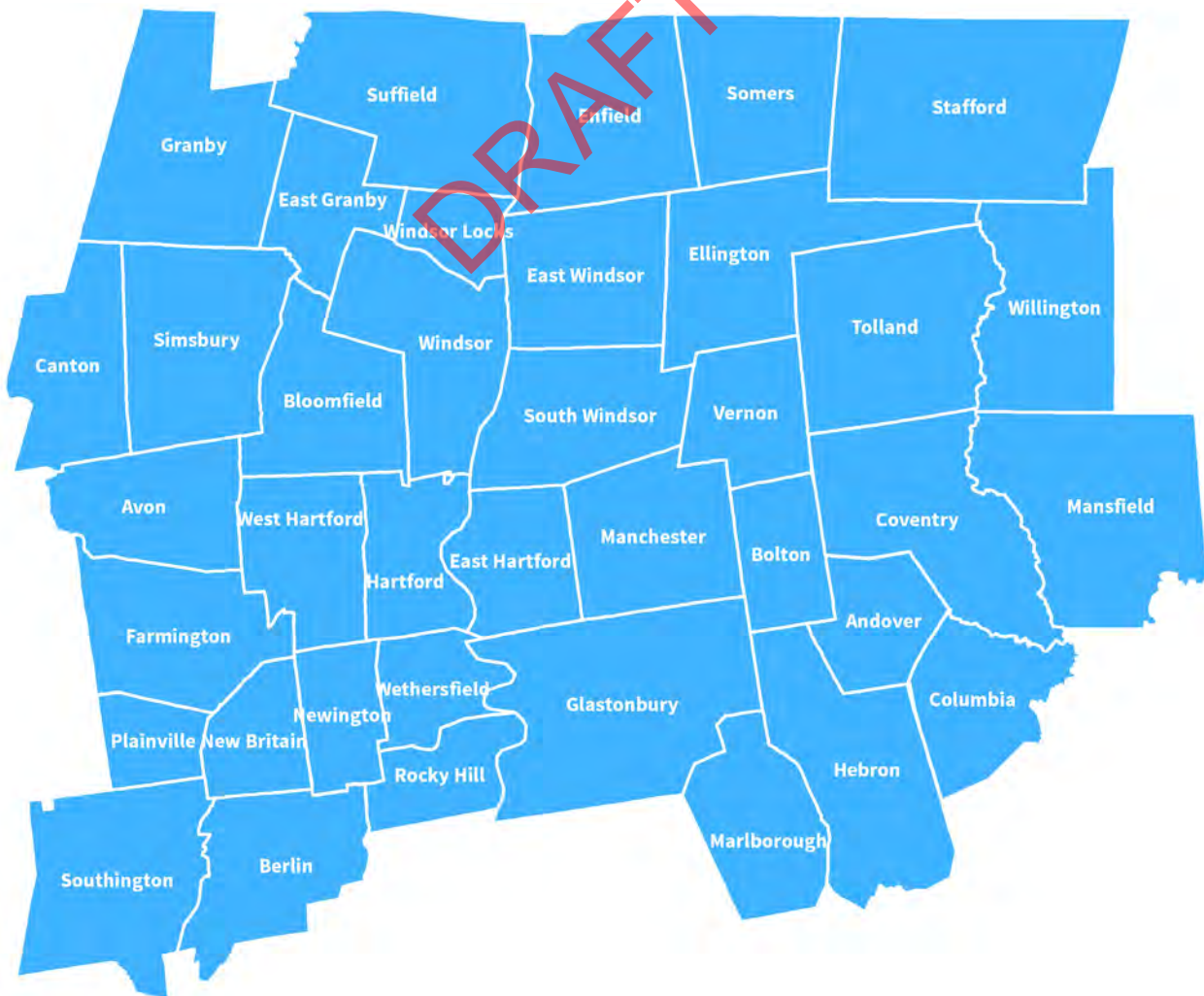
Stafford, which had joined the RPO in 2010, expressed their desire to join the MPO.

While the RPO re-designation process was completed in January 2015, the MPO re-designation process was not completed until July 2015. As shown in the maps below, the result was that the Capitol Region MPO grew from 29 municipalities to 38.

The CRCOG Region

CRCOG is located in north central Connecticut and is the largest of the MPOs in the state, with a population of well over 970,000. It is bordered by the state of Massachusetts to the north and the metro area of Springfield. Running through the center of the Capitol Region from north to south, the Connecticut River forms a highly developed and densely populated river valley. This river valley region, along with the surrounding CRCOG suburban areas, the Springfield metro area and beyond, forms a major part of

Figure 01.2 – CRCOG Member Communities

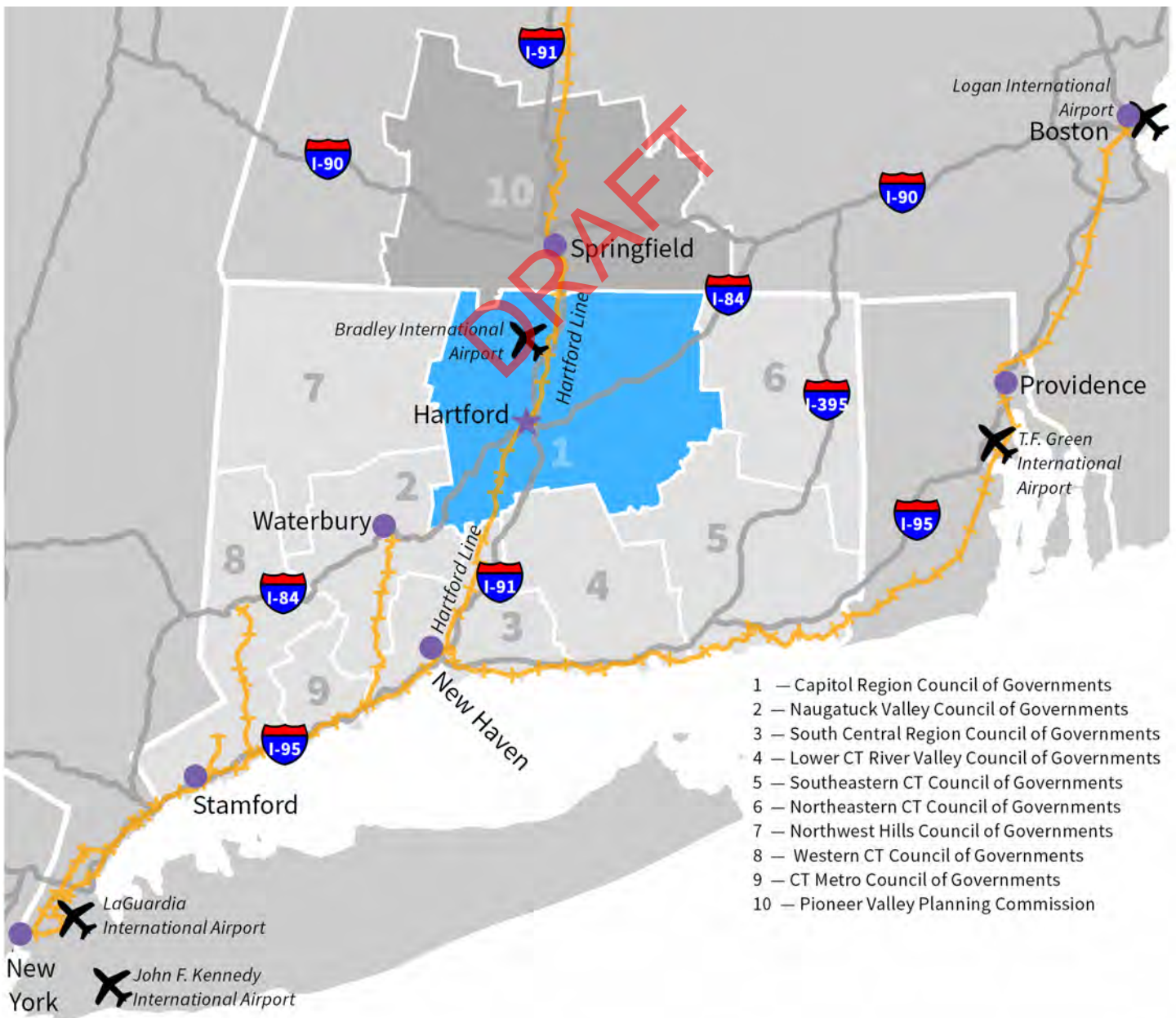


the New England Knowledge Corridor— an interstate partnership of regional economic development, planning, business, tourism and educational institutions that work together to advance the region’s economic progress.

CRCOG lies within the northeast region of the U.S, comprised of the New England and the NY Metro Area, one of the most heavily populated regions of the U.S. The area is further part

of a greater “mega” region stretching from Washington DC through Philadelphia, New York and Boston. Residents within the CRCOG region enjoy the benefits and challenges of being part of a region with continually improving and expanding transportation options. The map below shows CRCOG’s location relative to the adjacent major metropolitan areas of New York and Boston.

Figure 01.3 – CRCOG Northeast Regional Context Map



Chapter 01

Sustainable Transportation System

The 2019 Metropolitan Transportation Plan (MTP) is one of three main guiding bodies of policy for the Capitol Region, with the other two being the Capitol Region's Plan of Conservation and Development (POCD) and Metro Hartford Future, the region's Comprehensive Economic Development Strategy (CEDS). The coordination of these three pillars of policy drives CROCOG's emphasis on creating a Sustainable Region. The 2019 MTP promotes sustainable development by creating a sustainable transportation system that integrates land use, economic development and the preservation of the natural environment in the decision making process to help shape a region with first class mobility. To ensure coordination with key agencies, a draft of this plan was distributed for input from land-use management, natural resource, environmental protection, conservation, and historic preservation agencies at the local and state level.



The benefits of a coordinated approach to planning transportation, land use, and economic development are many, and can help achieve the goals of the MTP.

This plan was developed through a comprehensive coordination effort aimed at integrating CRCOG’s three key policy documents. A team consisting of CRCOG’s Executive Director, agency transportation and regional planners, and key stakeholders met regularly throughout preparation of this plan to establish consistency among the three plans and how they can be integrated with each other.

Below is a summary of key interrelated elements of the CEDS and the POCD that are relevant to the preparation of the 2019 MTP:

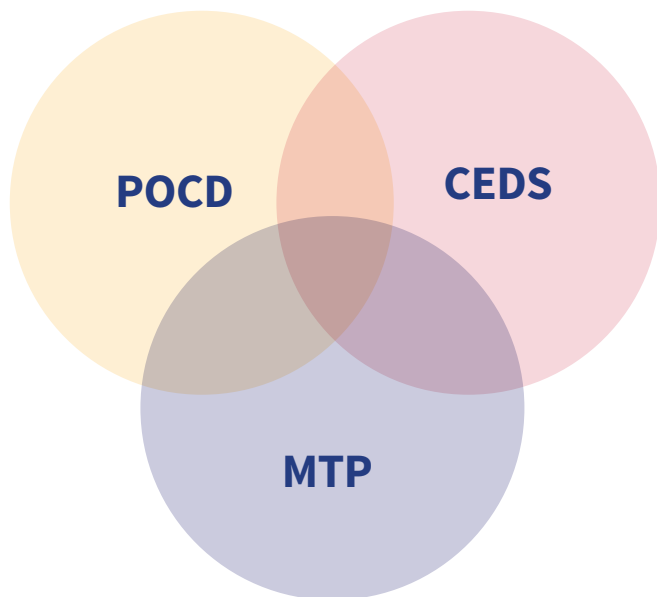
Economic Development Strategy

Overall, transportation infrastructure in the CRCOG region needs to be ready to meet the needs of businesses that want to

expand or locate in the region. For example, freight rail development is limited due to infrastructure constraints (such as a lack of rail track infrastructure that limits freight capacity, and aging rail bridges such as the Connecticut River Bridge). There is a continued need to improve connectivity between the Metro-Hartford region, Boston, New Haven and New York City by improving and expanding the newly launched commuter rail service, the Hartford Line. Additionally, congestion along I-91 and I-84 greatly inhibits commuter and trucking operations within and through the region, making it less attractive for economic development.

This transportation plan proposes development of seamless connections to key destinations, like Bradley International Airport, as a priority for fostering regional economic growth. Mega-projects such as the proposed reconstruction of the I-84 Viaduct or the I-84/I-91 Interchange are being developed to reduce congestion for all vehicles traveling within and through the region, thereby improving traffic flow and truck freight delivery schedules. These projects also have the potential to turn as much as 15-20 acres, in the case of the I-84 Viaduct, in close proximity to Hartford's Union Station into developable land.

Expansion of freight operations at Bradley International Airport, including greater access and truck and rail freight capacity will support regional economic development, as would development of public/private partnerships to attract Transit Oriented Development projects to existing and potentially new stations along the Hartford Line and CT**fastrak**. Improvements in bus service can also



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greatly expand the pool of available talent. These are just some of the ways economic development and transportation strategies are interrelated and need to be coordinated.

Plan of Conservation and Development

Transportation and mobility themes cut across a vast array of the goals and policies in the CROCOG Regional Plan of Conservation and Development. In the areas of Climate Change, Food Systems and Food Security, Sustainable Land Use and Zoning, Housing and Transportation, the Regional POCD states goals related to the region's transportation system:

- Continue to work towards greater transportation options in the Capitol Region in an effort to mitigate the largest source of greenhouse gas emissions from fossil fuels in the state.
- Guide growth to regional centers and areas of established infrastructure.
- Provide a range of viable transportation options within the region.
- Improve interregional and interstate transportation system.
- Coordinate land use, environmental, and transportation efforts.
- Anticipate and plan for future transportation needs.
- Continue to improve the Capitol Region transportation system in order to better link housing, jobs, and services; thus expanding housing choices.

Working toward and accomplishing these goals will ensure a sustainable future for the Capitol Region.

Goals of the MTP

The primary goals of the CROCOG 2019 Metropolitan Transportation Plan (MTP), also referred to as the region's Long Range Transportation Plan, are:

- **Mobility and Access:** Identify key transportation investments and strategies to meet long-term (through 2045) access and mobility needs for the CROCOG Region
- **Performance-based Planning:** Incorporate a publically transparent performance-based data-driven process for selecting and implementing investments
- **Innovative Funding:** Identify innovative funding mechanisms to help finance the region's important transportation priorities
- **Fiscally Constrained Priorities:** Develop a fiscally-constrained implementation plan for the region's priority transportation projects

In conformance with the Federal guidelines 23 CFR450.324(c) for preparing Metropolitan Transportation Plans, the CROCOG Plan will consider:

- Economic vitality
- Safety
- Security
- Accessibility and mobility of people and freight
- The environment (including land use)
- Enhanced connectivity
- Efficient management and operation

- Preservation of the existing transportation system
- Resiliency
- Performance Based Approach

Mobility and Access

At the heart of the CRCOG transportation planning process is a focus on improving mobility and access for CRCOG’s approximately one million residents. In simple terms, CRCOG’s MTP is focused on improving the ability to get people and goods from place to place within the CRCOG region, as well as to connect to places outside of the region. While the automobile remains the dominant transportation mode in the region, CRCOG’s mobility focus addresses all modes and the region’s transportation system in its entirety to determine how best to improve mobility for everyone.

The CT Household Transportation Survey,

published in 2016, shows there were approximately 3.2 million individual trips on an average weekday in the CRCOG region. These trips were made by 900,000 persons in 400,000 households. What is surprising is that the number of trips by single occupant vehicles is less than 50% (approx. 48%). This means approximately 52% of the region currently travels by modes other than this, with 34% using either family or other forms of carpooling to make daily trips. Public transit accounts for 4.5% of daily trips in the region, while nearly 9% of all trips are by walking or biking. The graphic below shows the breakdown by all modes in the region based on this survey. The data collected from the CT Household Transportation Survey differs from travel data collected as part of the United States Census. The former collects all travel information for a 24-hour workday period while the latter asks respondents how they commuted to work in the prior week and restricts them

Figure 01.4 – Mode Share within CRCOG Region

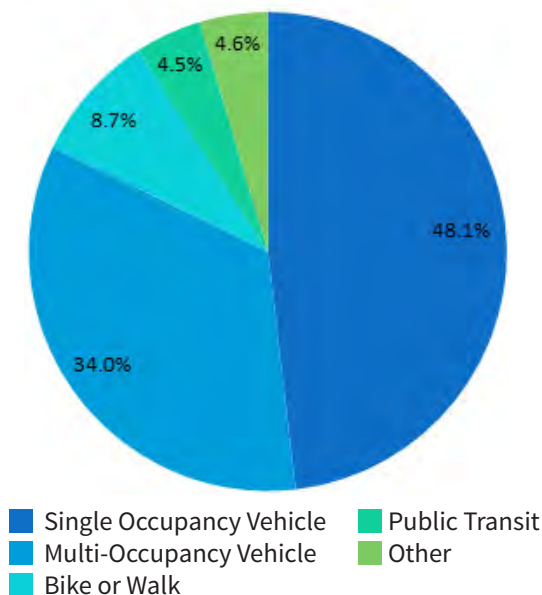
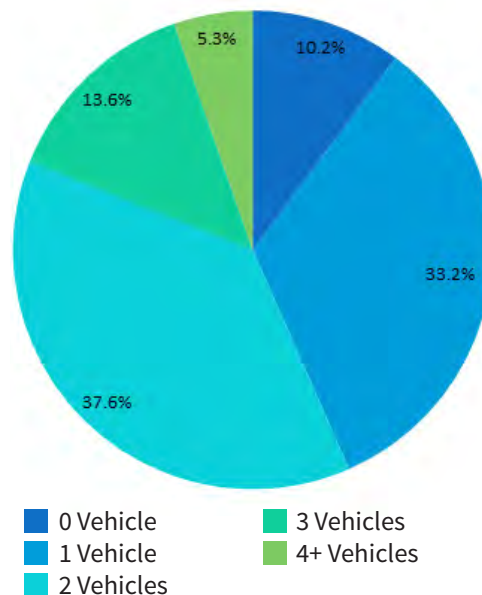


Figure 01.5 – Household Vehicle Availability within CRCOG Region



to identifying only one mode of travel.

The largest city in the region and the capitol of Connecticut, Hartford, shows a much different mode split for daily commuters. Of those who work in Hartford, more than 15% commute by transit, a number considerably higher than the regional average. Regionally, more than 10% of households have no vehicle, with the highest percentages of zero car households in New Britain and Hartford (approximately 7% and 17% respectively). Region-wide statistics on mode share and household vehicle availability can be found in Figure 01.4 and Figure 01.5.

Performance Based Planning

The Capitol Region Council of Governments supports the Connecticut Department of Transportation's statewide performance measure targets and has developed this MTP using a performance-based approach. Details of this approach and results are presented in Chapter 8 of the MTP. These are focused on the Federal Highway Administration's categories of Safety Measures, Infrastructure Conditions Measures, as well as National Highway System Performance, Freight, and CMAQ measures. In addition, the Federal Transit Administration measures are Transit Asset Management and Transit Safety.

Performance-based planning is enabling CROCG to streamline its transportation decision-making process. This approach provides CROCG with the tools and mechanisms to more effectively prioritize transportation investment strategies for projects, programs, and ultimately policies. While the breadth of competing priorities and interests can

sometimes be daunting, performance measures effectively link goals and objectives to investments by providing methods to determine how these investments meet the region's and state's goals and objectives.

Safety Measures

The key measures of roadway safety are fatalities and serious injuries. It is generally accepted that the target value for these measures should be zero, but it is also generally recognized that attaining these targets will take much time and effort. Performance management enables a data-driven strategic approach to identifying strategies and actions to improve roadway safety.

Infrastructure Conditions Measures

Substandard roadway pavement and bridge conditions have many impacts including increased safety hazards, fuel consumption and emissions, and vehicle operating costs including accelerated deterioration and increased maintenance. Improving roadway and bridge conditions is essential for maintaining roadway mobility and safety, and reducing disruptions and associated costs.

National Highway System Performance, Freight and CMAQ

Roadway congestion causes travel delays and generates costs due to lost time, decreased productivity, increased fuel consumption and emissions, and increased operating costs. Efficient traffic flow is important not only for cars and personal travel, but also for trucks

and goods movement. Increasing the time and costs of goods movement may result in higher consumer costs. Further, increased emissions and air pollution can have short-term and long-term health impacts, lost economic productivity, and decreased quality of life.

FTA Transit Asset Management and Transit Safety

The condition of public transit vehicles may affect their reliability and on-time performance, which may affect customer satisfaction and the attractiveness of transit as a travel option. In addition, vehicles in poor condition may present safety hazards, greater fuel consumption and emissions, and higher maintenance costs. The condition of transit facilities also is important for the safety and convenience of passengers, as well as the efficient operations of maintenance and administrative functions.

Innovative Funding

Traditional sources of funding are critical to the region's success in identifying and planning for funding in a fiscally constrained transportation plan. Long term transportation planning for the Capitol Region can be enhanced by new and innovative financing strategies.

Five strategies were identified as potential options to expand funding sources for future transportation projects in the region, including:

- Debt financing through the federal Transportation Infrastructure Finance and Innovation Act (TIFIA) and the Railroad Rehabilitation and Improvement Financing

(RRIF) loan programs

- State legislation enabling regional transportation sales tax referenda
- Joint Development at rail and bus rapid transit stations
- District Value Capture strategies, including tax increment financing
- Public-Private Partnerships to deliver specific transportation projects or components

This list is by no means exhaustive, but is intended to outline alternative financing strategies that could enable CROCOG to expand mobility options for the region.

Fiscally Constrained Priorities and Unmet Needs

CROCOG has developed a fiscally constrained implementation plan for future transportation programs and projects in the MTP. The plan recognizes that there are multiple and competing priorities that feed into the development of a fiscally constrained plan. These include both the need to maintain existing transportation assets, and the recognition that congestion, capacity issues, as well as economic and population changes will require expanding mobility options in the future.

This plan includes mention of projects that are not currently part of the fiscally constrained plan. These projects are identified as 'unfunded needs,' where the need has clearly been identified but funding sources have not yet been determined. These projects are in various stages of planning and include projects like the I-84/I-91 Interchange reconstruction project. This project is related

to the I-84 Viaduct program. It has been identified as a key element within overall efforts to relieve congestion through the I-84 corridor. Various preliminary options are under consideration, the most significant of which would involve substantial tunneling under the Connecticut River. Additionally, six transit priority corridors were identified through the Hartford Comprehensive Service Analysis, but funding for implementation of these plans has not yet been identified.

It should be noted that a robust and inclusive public involvement process was implemented throughout preparation of this plan. This included stakeholder interviews, focus groups, and public meetings to gain input from CROCOG's 38 member communities. In addition, CROCOG worked closely with state and local transportation agencies and authorities. In-depth technical reviews and analyses of transportation data – including regional demographics, land use, socio-economic, environmental and policy inputs were also implemented. A number of focus group meetings were held, exploring in depth the following subjects: Complete Streets, Finance, Highway System and Congestion, New and Emerging Technologies; Transit System and Mobility; Underserved Population groups and Environmental Justice. This extensive process culminated in the ability to identify priority projects and develop a fiscally constrained plan to move forward towards implementation over the 25 year planning horizon.

Environmental Considerations

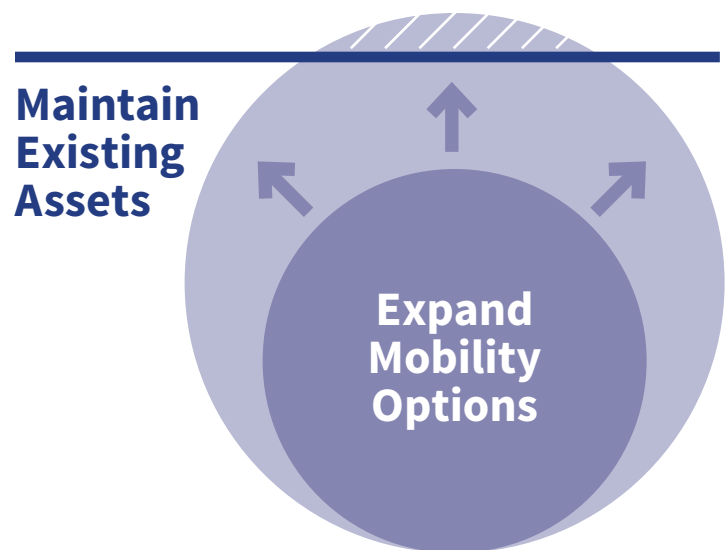
Air Quality Conformance

As the Capitol Region's planning agency, CROCOG is required to demonstrate that their MTP and Transportation Improvement Program (TIP) do not violate the federal Clean Air Act. This demonstration requires regular testing for several types of pollutants in different analysis areas or districts as explained below. The State then performs a statewide analysis, with all MTPs and TIP projects in the state analyzed together.

Pollutants Tested. The air quality analysis includes calculations of vehicle emissions of two types of pollutants:

1. Hydrocarbons (HC or VOC-Volatile Organic Compounds)
2. Nitrogen Oxides (NOx)

Emissions Test. Under conformity rules provided by the U.S. Environmental Protection



Agency (EPA), a test is applied to determine if the TIP or the MTP violate the Clean Air Act. In December 2010, the EPA informed the CT Department of Environmental Protection that the 2009 Motor Vehicle Emissions Budgets (MVEB) were adequate determiners of future transportation conformity. Therefore, the future year emissions are compared to the 2009 MVEB to determine compliancy.

Test: VOC and NOx emissions from transportation sources must be less than the 2009 motor vehicle emissions budgets

2009 emissions budget:

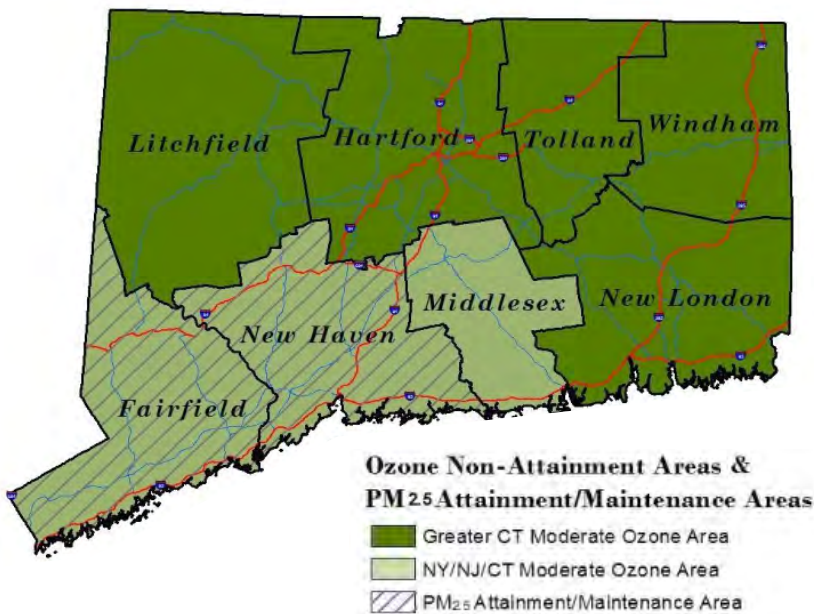
- VOC 26.30 tons/day
- NOx 49.20 tons/day

Air Quality Analysis Districts. The federal air quality districts for ozone are shown in Figure 01.6. For ozone analysis purposes, CRCOG is part of the Greater Connecticut Moderate Ozone Area. The Greater Connecticut district

includes other planning regions in addition to the Capitol Region. It uses county boundaries and includes the following counties: Hartford, Tolland, Litchfield, Windham, and New London. The Greater Connecticut district is classified as a "moderate" nonattainment area. Previously it was a "marginal" nonattainment area. The designation changed in 2016 due to not meeting 2008 ozone standards prior to the July 20, 2015 deadline.

Since the air quality districts overlap many regional planning districts, the emissions analysis must be coordinated to include the TIPs and MTPs of several regions. The Connecticut Department of Transportation performs this coordination role. Each region submits its draft TIP and MTP to the DOT. The DOT in turn combines the TIPs and the MTPs for all appropriate regions to analyze the emissions impacts on each air quality district. CRCOG recieved CTDOT's Air Quality Conformity determination in February 2019. See Appendix 1 for report.

Figure 01.6 – Status of Federal Air Quality Districts in Connecticut



Climate Change

An important element of CRCOG’s Metropolitan Transportation Plan (MTP) is to be more cognizant of climate change and how the region’s transportation system can impact or be impacted by it. The MTP, CRCOG’s Plan of Conservation and Development (POCD), and Comprehensive Economic Development Strategy (CEDS) as well as the Natural Hazard Mitigation Plan work together to address this issue, while creating a more accessible, connected, equitable, and economically strong CRCOG region.

According to the most recent Intergovernmental Panel on Climate Change (IPCC) report released in October 2018, global average temperature is likely to surpass pre-industrial levels by 1.5°C (2.7°F) between the years 2030 and 2052 if temperatures continue to increase at the current rate. This increase in global temperature will mean long-term changes in the climate system as well as higher probability for climate-related risks for natural and human systems. Acknowledging regional climate vulnerabilities will be critical in working toward adapting to a changing reality and mitigating emissions.

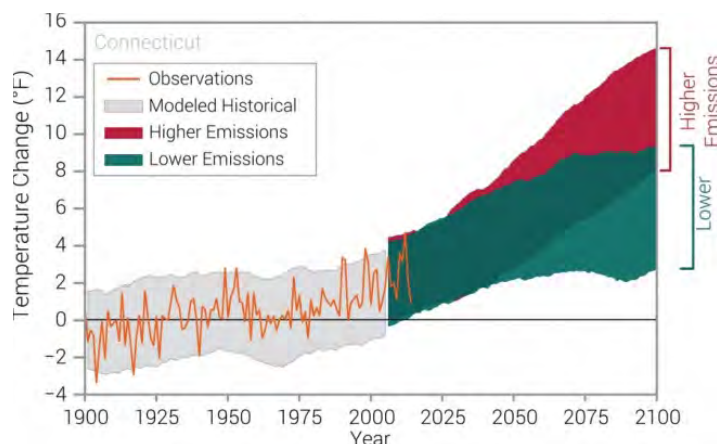
On a state scale, Connecticut has already made strides to reduce emissions. Along with eight (8) other northeastern states, Connecticut is part of The Regional Greenhouse Gas Initiative (RGGI), which employs a market-based approach to tackling climate change through a cap and trade program for fossil fuel-fired power plants. CROCOG, with support from the Connecticut Institute for Resilience and Climate Adaptation (CIRCA), recently updated their Natural Hazards Mitigation Plan for years 2019-2024. The plan offers detailed information about climate-related risks to the region and its assets, including transportation infrastructure.

Climate change will impact individual transportation assets across all modes, with ramifications for economic vitality and mobility, particularly for vulnerable populations and urban infrastructures. For Connecticut, even in a lower greenhouse gas emissions scenario, the average temperature

is projected to increase enough to affect the state's climate system, resulting in several potential impacts to assets in the CROCOG region. See Figure 01.7.

With its expansive fluvial system, the CROCOG region will be particularly susceptible to inland flooding due to projected increase in total precipitation and number of extreme precipitation events (e.g., storms). Additionally, extreme cold weather (below 0°F) is projected to decrease, which can actually prove beneficial since it would alleviate stress to roads from freeze-thaw cycles, and increase the number of days of ice and snow-free navigation. At the same time, heat waves are projected to become more intense, with a greater frequency of days above 90°F, which can cause rutting in roads and public transit delays, among other things. Chapters within this plan reflect efforts to reduce transportation-related greenhouse gas emissions, (such as the Transit and Rail and New and Emerging Technologies chapters) as well as prepare

Figure 01.7 —
Observed and Projected Temperature Change



Source: NOAA technical report NESDIS 149-ct, 2017, Connecticut state climate summary.

transportation systems for climate events such as flooding and extreme heat (adaptation).

Climate change mitigation requires decarbonizing the transportation sector. To do this, the MTP is looking to expand public transportation and, through strategies such as transit-oriented development (TOD), discourage the use of personal vehicles. CROCG is a supporter of the statewide transportation demand management (TDM) program *CTrides*. *CTrides* is a service provided by the Connecticut Department of Transportation (CTDOT) whose role is encourage Connecticut commuters to avoid traveling by single-occupancy vehicles by assisting them (individually or through programs sponsored by their employers) in trip planning using modes like carpooling, transit or walking and biking.

Improving bicycle and pedestrian access and emphasizing livable communities and complete streets are other ways to get people out of their cars and reduce CO₂ emissions. Additionally, new and emerging technologies like micro-mobility, smart cities, and connected and automated vehicles also have the potential to decarbonize the transportation sector (see Chapter 7, New and Emerging Technologies).

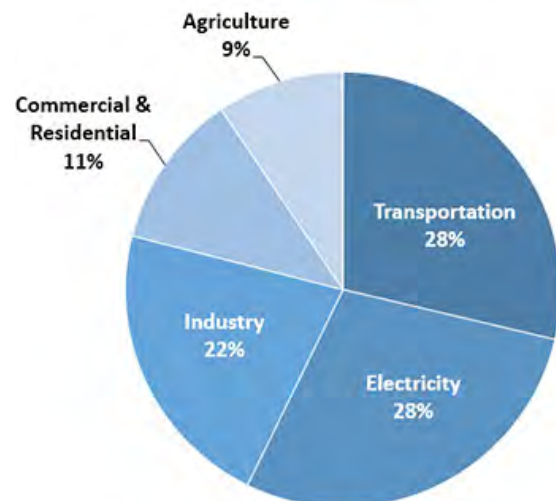
In terms of adaptation, transportation assets consist of multiple components with unique vulnerabilities, and are often codependent with other infrastructure like energy and water systems, making adaptation tricky as new designs need to work seamlessly with these other systems. In 2016, the transportation

sector became the top greenhouse gas emitter in the U.S., surpassing electricity production for the first time since the 1970s. Ironically, however, there are few national or statewide transportation design standards that incorporate climate change.

To effectively respond to climate change challenges for transportation, policy changes need to be implemented. An example is the emergence of climate resilience design guidelines in Connecticut. In 2015, for example, the CTDOT Office of Engineering put out a bulletin (number EB-2015-2) directing that updated precipitation frequency estimates from the National Oceanic and Atmospheric Administration (NOAA) be used in planning and design.

Many of the drainage systems in the CROCG region were likely designed using outdated climate information. This means that culverts, drainage systems and levees may not be able to protect against more intense future flooding

Figure 01.8 —
Sources of Greenhouse Gas Emissions in 2016



Source: U.S. Environmental Protection Agency (2018). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016*

events. The East Hartford and Hartford levees, for example, are outdated in several ways; first, due to their age, the state of these systems are currently categorized as unacceptable (Hartford) and minimally acceptable (East Hartford); second, they were not designed with climate change in mind, which could lead to breach in the future. Breaches in these levees would result in tens of feet in flooding and millions of dollars in damage. Additionally, culverts that are too narrow could increase the risk of flooding upstream, risk of erosion downstream, and risk of road failure, resulting in additional costs. Updating these systems using new design standards that account for climate change could reduce CRCOG’s vulnerability to future flooding events.

These updated designs must become the new standard, and mitigation and adaptation should be highlighted. Green infrastructure and Low Impact Development (LID) could help to reduce the region’s vulnerability to floods while also mitigating climate change. Some green infrastructure designs that CRCOG has been exploring are bioswales, pervious

pavements, rain gardens, and green spaces. These designs are often more sustainable and cost-effective than their hard infrastructure counterparts, and work well with natural systems instead of working against them.

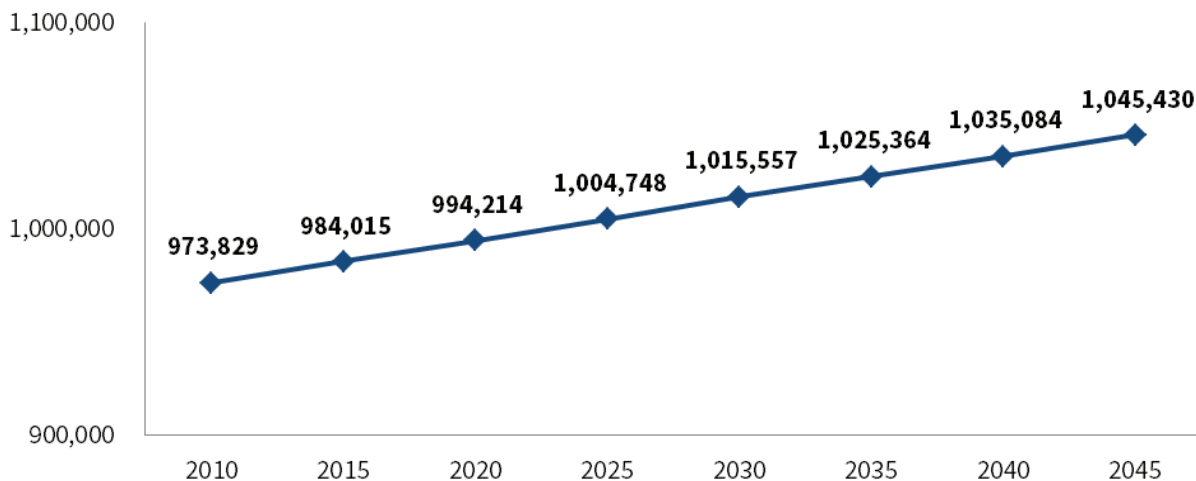
Since considerable changes in climate are expected to take place in the CRCOG region, design standards will need to be adjusted to compensate for them.

Key Demographic Assumptions for the Capitol Region’s MTP

Employment and population data for the CRCOG region reveal a region that has been relatively flat in terms of population growth and economic development. However, while the average annual population growth rate is projected to be approximately 0.2%, changes in the composition of the population are projected to be significant, requiring considerations when planning the region’s transportation future.

Between 2010 and 2045 the population is expected to grow by 71,601 or 7.3%.

Figure 01.9 – Regional Population Trends 2010–2045



Source: CT State Data Center UConn 2015-2040. 2045 based on an average annual growth rate of 0.2%.

This rate is more than three times greater than the state projected growth of 2.2% growth over the same period. Amongst the nine Connecticut Councils of Government (COGs) CRCOG is projected to have the largest growth in population for both percentage and discrete counts.

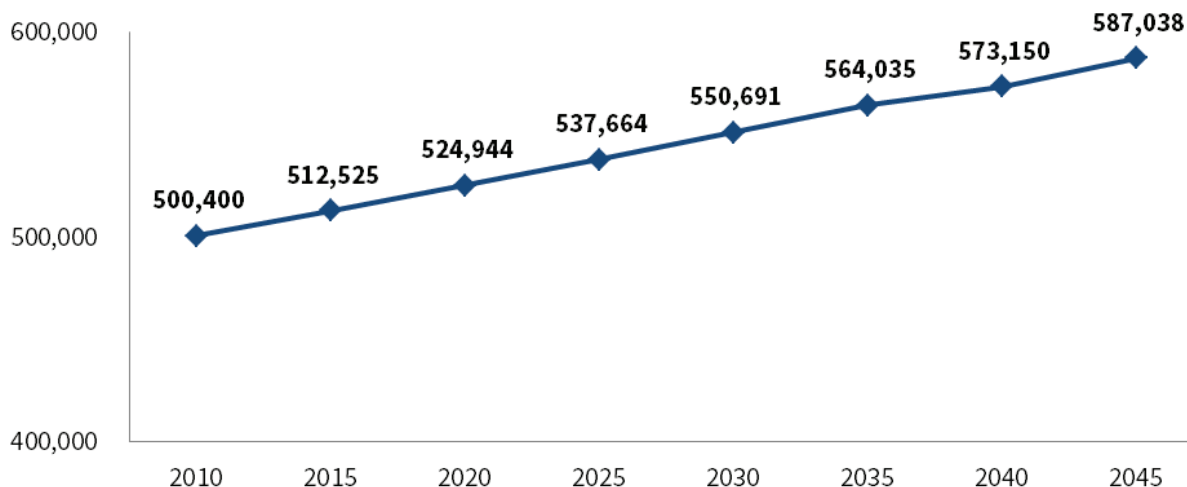
One major trend in population growth that is important to incorporate into the region’s MTP is the continued growth of an aging population. In 2015, the number of persons over age 70 in the region was slightly over 100,000 (while senior citizen discounts typically start at age 65, in the look ahead, trends show that many persons continue to work past 65; for the MTP, the age when the Social Security Administration will no longer credit employment for benefits was used for the elderly population). By 2040, that is projected to grow by nearly 25,000, or nearly a 25% increase in the elderly population, while the population between 25 and 55 years of age is expected to grow by only 9% over the same period. The region’s plan to improve transportation services

for the growing elderly population is one of the key elements of the MTP. Projections for the population in the 50-69 age bracket – typically considered the higher wage earners – show a population decline of approximately 8% over the same period – a trend that could impact the region’s tax base.

The region’s employment projections show a relatively flat growth trend – a 17% growth in the number of jobs by 2045, or growth of less than 1 percent per year, but one that far exceeds population growth. CRCOG recognizes, however, that these are only projections and many factors can influence whether the region exceeds these estimates or not.

The region is currently a net importer of employees. There are 70,000 more individuals who are employed in the region but live outside of it than those who live in the region, but travel outside of it for work. With employment increasing at a faster rate than population growth, it will put an even greater stress on the region’s transportation network as the region becomes a greater net importer of employees.

Figure 01.10 – Regional Employment Trends 2010–2045



Source: CT State Data Center UConn 2015-2040. 2045 based on an average annual growth rate of 0.485%.

The MTP addresses these key trends in several ways:

- Overall improvements in mobility and access include increased transit services, better integration of shared rides, and implementation of mobility as a service (MaaS) into programmed transportation improvements.
- Implementation of public private partnerships in transportation, and in particular transit oriented development projects along the region’s transit priority corridors, to bolster economic development.
- Improve connections to other regions to support passenger and freight transportation.

Implementation Plan

As a continuous planning process, the work of implementing this plan is already underway. Dozens of construction projects listed in this document are being prepared for inclusion in the region’s Transportation Improvement Plan (TIP). Work is underway to better understand

performance measure targets and respond to them. In some ways, the projects in this plan that are nearing construction were set in motion by previous iterations of this plan.

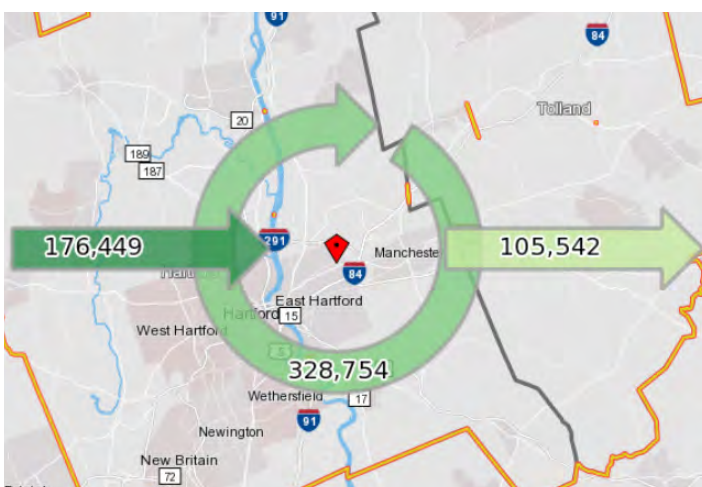
To achieve the broader vision for CRCOG in 2045, policies and procedures will need to be amended. Primarily this will be achieved through policies related to project selection and funding. CRCOG has the ability to influence how infrastructure gets built in four interrelated ways: studies; selection of projects for funding; approval of the state’s use of federal funds; and advocacy for new innovative ways to address transportation issues.

Studies

As the region’s transportation planning agency, CRCOG undertakes studies to address regional transportation concerns. These studies are done in cooperation with the Connecticut Department of Transportation, which asks each of the regions to submit study proposals on a semi-annual basis. Traditionally these studies have taken the form of corridor studies, which usually examine transportation issues in a single road corridor, often in a single municipality. For example, the Route 5 study is focused on State Route 5 in East Windsor. Corridor studies have been a successful way of identifying localized transportation issues and innovative solutions. They can be limited, however, in their ability to address broader issues.

Broad issues like safety, congestion, and the condition of bridges, requires a different kind of study. Using new data sources, CRCOG

Figure 01.11 — Regional Inflow and Outflow of Workers



Source: ONTHEMAP US Census Bureau

has the ability to complete broader scans of the region to identify “hotspots” related to certain performance measures. For example, data from the UConn Crash Repository is available to identify locations where certain kinds of crashes occur more frequently. A follow-up study focused on those locations can then be undertaken with the goal of moving the needle on regional safety targets.

CRCOG has started to take this approach with its complete streets work. CRCOG is in the process of taking a big picture look at the region’s roads and analyzing them for certain characteristics that either make them more or less suitable for bicycle infrastructure. The plan will then specify a prioritization methodology along with potential typical treatment options. This allows the identification of a connected network of facilities that will enhance connectivity and mobility throughout the region.

Both kinds of studies, big-picture, and corridor-level, are important for the region. They provide different kinds of information about conditions of the regional transportation network, and different kinds of solutions. As issues arise it will be important for CRCOG to determine which approach can best address a given issue.

Recommendations

- Identify a list of big picture studies that respond to adopted performance measures.
- Identify potential corridors where multiple issues intersect and would be best served by a corridor-level study.
- During the annual call for study proposals, select one big picture study and one corridor study for submission to CTDOT.

Project Selection

As the region’s MPO, CRCOG has varying levels of control over certain federal and state funding sources. Selection of projects for state sources, such as the Local Transportation Capital Improvement Program (LOTICIP), is almost entirely at CRCOG’s discretion. Other sources, such as the Federal Congestion Mitigation and Air Quality (CMAQ) program, are influenced by CRCOG; the Policy Board determines which projects to submit for CTDOT’s periodic competitive funding process, though the board does not directly choose which projects get funded.

Since every program has a different set of goals and eligibility criteria, it will be important to carefully craft selection criteria. For example, the Local Road Accident Reduction Program (LRARP) has crash reduction as its primary goal. CRCOG is permitted to submit three projects to CTDOT annually and can apply its own criteria for doing so. To be competitive on a statewide basis, however, the projects must meet the program goals. The same is

true of CMAQ, which prioritizes air quality improvements. Other programs, like LOTCIP, allow more freedom. While sources of funding such as LOTCIP are not federal, they can help to achieve federal performance targets.

Recommendations

- Develop model selection criteria for regional funding programs. Selection criteria should consider goals related to mobility, accessibility, and progress toward reaching performance targets.
- Continue to reevaluate selection criteria as more information about progress toward performance targets is available.

Coordination with CTDOT

All federal transportation funding that is spent in the region must be done so in consultation with CRCOG. For a project to receive federal funding, CRCOG must vote to put it into the regional Transportation Improvement Program. This necessitates a cooperative approach to selecting projects for funding. This applies to a number of funding programs, most notably the Surface Transportation Block Grant Program (STBGP). A portion of these funds are specifically allocated to projects in the Hartford Urbanized Area.

While CRCOG and CTDOT coordinate on project selection and advancement at various times in a project’s lifecycle, one of the most critical points is during the creation of CTDOT’s 5-year Capital Plan. This plan is created annually and includes a schedule for spending available funds over the next five years.

CTDOT Capital Planning Process

The process begins by gathering relevant plans and studies. Corridor studies, the MTP, state studies, state plans, and data from the state asset management system are consulted to determine what the region’s needs are. Specific projects are looked at to determine their ability to address needs. Maintenance, repair, and replacement needs are also

Figure 01.12 – CTDOT/MPO 5-Year Capital Plan Consultation Process



determined through an analysis of asset management data (though these projects are primarily funded with state sources). CTDOT then develops a draft capital plan, allocating projects to available funding sources. As this is a statewide process, CTDOT must balance the needs of each region with available funding. MPOs are then given an opportunity to review the draft plan and provide input. Based on this input a second draft is developed and shared with MPO boards. After this consultation, a final plan is developed.

It is important to note that inclusion in the capital plan does not guarantee that a project will proceed. The MPO or the state can still choose not to advance a project, and the MPO can choose not to adopt related amendments to the Transportation Improvement Program.

Given the importance of the capital plan process, it is essential that MPO staff are directed to advance the region's goals and policies. Many of these are shared by CTDOT (such as performance targets). The amount of emphasis placed on certain aspects of the transportation system can differ. For example, a region could choose to prioritize on-street bicycle infrastructure over off-road trail development. A region could also choose to prioritize projects located in designated "development areas" (included in the region's Plan of Conservation and Development) which conflict with state priorities. What is essential, however, is that regional priorities be clearly articulated in policies that can inform staff actions.

Creating a documented process for CROCOG staff will allow them to more effectively

argue for advancement of regional priorities. By identifying points along the project development process where CROCOG can most effectively advance its priorities will create a smoother pipeline of projects with greater collaboration. Early and effective communications will give CTDOT the chance to choose projects that advance regional priorities. This minimizes the possibility of disruptive conflict later in the process. Early collaboration between CROCOG and CTDOT has proven productive. The collaboration process should be continued and strengthened where possible.

Recommendations

- Continue to work closely with CTDOT during the capital plan development process.
- Gather current adopted policies and compare to current plans, such as the MTP, the Plan of Conservation and Development, and the Comprehensive Economic Development Strategy. A list of conflicts or missing policy elements should be created and presented to the Policy Board.
- Adopt policies or supporting resolutions that advance goals in major plans such as the MTP.
- Develop a process to be used by staff when consulting with state agencies on the development or selection of projects. The process should identify key points during the project development process where CROCOG staff can influence projects so that they better reflect regional priorities.

Advocacy For Innovation

It is important for all organizations to consistently search for more innovative and smarter ways to provide services. For transportation, this has never been truer than now, a time when funding is constrained and technology is quickly advancing. However, responding to these challenges requires an approach that values exploration of new ideas and processes in a focused way. Therefore, CRCOG proposes working with regional municipalities and partner agencies to implement demonstration projects that test these new ideas and allow for refinement before they are implemented more broadly. Some of the major ideas the region intends to test appear in the recommended demonstration projects to the right.

Recommendations

1. TOD–Complete Streets Demonstration

Project for CTfastrak station: including sidewalk, bicycle and station improvements to improve neighborhood connectivity

- Identify one station and look at a ½ to 1 mile buffer to provide sidewalk and bicycle connections to the station. In addition the project should include more robust bicycle parking facilities such as covered parking or bike lockers.

2. New Rail Station on the Hartford Line:

Innovative Financing approach to engage Developer in planning and financing a new rail station for a location like Enfield or West Hartford as example

- Engage a developer using innovative financing options to construct, operate and maintain a new rail station. The idea would be to integrate a train station into a multiuse building with commercial and residential uses.

3. Transit Priority corridor improvements: single demonstration project on one of the six transit priority corridors selected as part of the Hartford Comprehensive Transit Service Plan.

- Create pilot project for extending CTfastrak service to the east as an example, highlighting branding of CTfastrak and BRT service to connect to Buckland Hills Park-n-Ride.

4. Mobility as a Service for public transportation and access to Bradley Airport to meet the CAA goal of improved “home-to-plane” services

- To improve the traveler’s experience to and from Bradley Airport, implementation of Mobility as a Service (MaaS) could provide customers with a one-stop shopping approach to their trip, linking travel from their point of origin to the airport and even linking to final destination ground transportation. This could be launched as a pilot program in partnership between *CTtransit*, CAA and CROCOG.

5. TNC/Transit connection from new Bradley Airport Ground Transportation Center to rail stations on the Hartford Line – Transit/TNC partnership to provide service from rail station to airport.

- Launch a pilot program as a partnership between a TNC and *CTtransit* to provide public transportation service to meet trains stopping at Hartford Line stations.

Chapter 02

Transit and Rail System

While the private automobile remains the dominant mode of travel in the Capitol Region, alternative modes have continued to improve and take on greater importance for CRCOG's nearly one million residents. The primary alternative travel modes include local and express bus service; commuter and intercity rail service; bus rapid transit (BRT); paratransit services provided for the elderly and persons with disabilities; and the more recent addition of rideshare services provided by Transportation Network Companies (TNCs). There has also been a recent resurgence of active transportation modes, including bicycles, scooters, and pedestrian options. This section of the Metropolitan Transportation Plan (MTP) focuses on transit and passenger rail options – two modes that have undergone major improvements through more than \$1.5 billion in investment over the last decade.



Passengers boarding the Route 101 bus at the New Britain CTfastrak station

Existing Conditions

Transit services, which include bus, BRT, and passenger rail, play a growing role in meeting the travel needs of individuals who live and work in the Capitol Region. They serve the basic mobility needs of the region’s transit-dependent population: the elderly, persons with disabilities, and families that do not own a car, while also serving the commuting needs of a small but significant portion of the region’s workers. The number of transit users is growing, unlike many other parts of the state or the country for that matter. However, according to recent data, only three percent of all workers in the region take the bus to work (2016 ACS 5-year estimates). Hartford residents commute by transit at a much higher rate, 15.1 percent or five times the regional average. In total, almost 16.5 million trips a year are served by the region’s primary bus system (CTtransit ridership data 2017) in Hartford and Tolland Counties, 200,000 by the Windham Regional Transit District in Windham County, and half a million by the paratransit system (Greater Hartford Transit District ridership data 2017). The bus and rail systems also remove cars from the roads during the most congested periods of the day and in some of the most congested areas.

The Council of Governments recognizes that while transit is a small part of a much larger transportation system, it is a critical part nonetheless and there is a continuing need for improvement. CRCOG has increasingly sought to place more emphasis on transit improvements as a way to improve mobility

Commutes to work within the CRCOG Region



of all workers in the CRCOG Region commute by bus.



of those who work in Hartford commute by transit.

In total, over  16.5 million trips a year are served by the region's primary bus system.

CTtransit ridership data

for those who rely on transit, to provide viable travel choices for everyone, and to reduce congestion. CTDOT, in initiatives that were championed by CROCOG, have successfully implemented two new transit options with the opening of CT**fastrak** BRT service in 2015 and commuter rail service on the CT**rail** Hartford Line in 2018. Both of these corridors were identified and supported by CROCOG as key corridors for investment over the past several decades.

Issues and Deficiencies

Input from stakeholders and transit users in the region as well as the technical analysis conducted for CROCOG's Comprehensive Transit Service Analysis identified the following issues and deficiencies to be addressed in order to further improve transit in the region:

- Insufficient regional rail connectivity, especially to Boston
- Limited crosstown bus service and direct connections between suburban destinations
- Need for expanded service span, frequency, and coverage – fixed-route, rapid, and flexible options
- Insufficient transit access to Bradley International Airport

Recommended Transit Improvement Program

To develop recommendations to address the region's transit issues and deficiencies, CROCOG's recommended transit and rail improvement program is based on: the 2001 Regional Transit Strategy (RTS), the recently completed Comprehensive Service Analyses (CSA) of the Hartford (2017) and New Britain/Bristol (2018) Divisions of CTtransit, and recommendations from previous regional and statewide transportation plans.

Rapid Transit Services

The Capitol Region's 2001 Regional Transit Strategy (RTS) identified several potential corridors for the development of rapid transit to improve mobility, livability, and economic viability in the region. Since the inception of the RTS, subsequent studies have been undertaken to further analyze these corridors, resulting in the construction and opening of two new transit services.

CT**fastrak** (formerly New Britain – Hartford Busway) is a bus rapid transit (BRT) system connecting New Britain to Hartford along a 9.4-mile bus-only guideway. The service opened in March 2015. CT**fastrak** incorporates all seven elements of a BRT system, as established by the U.S. DOT Federal Transit Administration with 1) dedicated running ways; 2) 10 stations; 3) low-floor, branded, articulated vehicles; 4) off board fare collection; 5) Intelligent Transportation System (ITS) elements such as Transit Signal Priority (TSP), automatic vehicle location (AVL), computer aided dispatch,

automatic passenger counters (APC), real-time vehicle arrival information at the stations, and in-vehicle automatic annunciation of stops; 6) high level-of-service; and 7) unique branding.

In addition to the two routes which operate along the entire guideway, stopping at all stations, CT**fastrak** has a broad geographic reach with four commuter express buses using the system, five local routes which utilize the guideway for part of their alignment, and ten feeder routes which do not use the guideway but service at least one station. When the service launched, the corridor averaged 14,200 passenger trips per weekday. Since then, weekday ridership on all buses which

use the corridor has grown by 31% to 18,642 passengers, exceeding the projections of 16,000 passenger trips per day. These ridership numbers are possible because of the high frequency of service – every 7-8 minutes during the peak commute times – and a 21-hour service span from 4:00 AM to 1:00 AM.

Not only does CT**fastrak** provide mobility options for travelers and relieve congestion along Interstate 84, but it has also spurred economic development along the corridor by encouraging Transit Oriented Development (TOD) and helping to transform the local economy and neighborhoods into more appealing places to live and work.

Figure 02.1 – New Britain CT**fastrak** station



CTrail Hartford Line (New Haven-Hartford-Springfield line)

is the second corridor that was identified in the RTS and has since come to fruition. The line connects New Haven, Hartford, and Springfield with commuter rail and was launched on June 16, 2018 after \$769 million in upgrades to the line. Service along the Hartford Line builds on existing Amtrak service and consists of:

- Seventeen round trip commuter trains daily (5 terminate in Hartford, the remaining 12 operate the full line)
- 27 miles of additional double track on existing single-track sections
- 2 miles of new passing sidings
- 5 new interlockings (so trains can change tracks)
- Installation of positive train control
- The repair, rehabilitation and/or replacement of bridges and culverts
- Crossing upgrades
- Full reconstruction of four stations and major improvements at two others
- Operating speeds of up to 110 MPH

Ridership on the line is growing at a faster rate than anticipated with 1,860 passengers per day, an increase of 300 passengers per day from its initial launch in June 2018. Part of the success of the system has been the collaboration with Amtrak. Amtrak accepts all CTrail Hartford Line tickets onboard regional and shuttle trains between New Haven and Springfield except for the Vermonter, thereby offering more options for commuters. The launch of the service

was Phase 1 of a larger program to improve rail service in the region; work still needs to be done on key infrastructure elements north of Hartford. The major infrastructure pieces still requiring advancement are:

- Renovating and upgrading the Hartford Rail Viaduct and the Connecticut River Rail Bridge in Windsor Locks to modern design standards.
- Integrating rail freight into passenger rail operations.
- Increasing weight limits to 286,000 pounds per freight rail car and removing height restrictions to accommodate modern high capacity freight rail cars.
- Construction of the second track between Windsor and Springfield
- New train equipment
- Additional long-term parking at stations
- Construction of stations and platforms in Enfield, West Hartford, Newington and North Haven.

Ridership Growth

1,860 passengers per day, an increase of 300 passengers per day from its initial launch in June 2018

The rail infrastructure improvements implemented through 2018 are one phase of a set of inter-related projects that will ultimately result in the development of intercity high-speed passenger rail service throughout New England. CTDOT has been working closely with the Massachusetts Departments of Transportation and the Vermont Agency of Transportation to extend High Speed Intercity Passenger Rail service (HSIPR) northward to Montreal, Canada and eastward from Springfield to Boston. A 2030 Vision for High Speed, Intercity, and Regional Rail Service in New England is collectively being developed by the Departments of Transportation in the six New England states. This vision includes double tracking and station improvements along the Hartford Line portion of the rail corridor, as well as improvements to the East-West Rail corridor between Boston and Springfield, which would provide high-quality rail service between Hartford and Boston. These improvements represent the foundation for a regional rail network.

Figure 02.2 – Infrastructure upgrades to the New Haven–Hartford- Springfield line



DRAFT

Figure 02.3 – A CTrail Hartford Line engine waiting to depart at the Hartford Station



Improvements for a Regional Rail Network

Double tracking and station improvements along the Hartford Line portion [...] as well as improvements to the East-West Rail corridor between Boston and Springfield

CTfastrak Expansion Study – CTDOT initiated this study in 2016 to evaluate options for expanding bus rapid transit service east of Hartford. The recommendations are a two-phase approach to implementing the service. Phase 1 was completed in 2017 with enhancements to local bus service (expanded hours of service) and the creation of the Route 913 express bus between Hartford, Buckland Hills, and UConn. Phase 2 would create BRT service along Silver Lane and/or Burnside Avenue in East Hartford with limited stop service, branded vehicles, on-board Wi-Fi, enhanced shelters, real time bus arrival information, intersection and roadway treatments to speed up service, and off-board fare payment.

Enhanced Transit Corridors – CROCG's Metro Hartford Comprehensive Transit Service Analysis recommends creating Enhanced Transit Corridors along Albany Avenue, Farmington Avenue, Franklin Avenue, Main Street, and Park Street in Hartford as well as along Burnside Avenue in East Hartford. These corridors would have a high frequency of service with a bus every 5 to 10 minutes during the peak. High frequency service coupled with capital improvements such as transit priority treatments (TSP), stop consolidation, and passenger amenities would enhance the transit experience and reinforce the image of each corridor as an enhanced transit corridor.

NEC FUTURE – NEC FUTURE is the Federal Railroad Administration's (FRA) comprehensive

Figure 02.4 – Passengers in line to board the local 39W bus to Westfarms Mall



plan for improving the Northeast Corridor (NEC) from Washington, D.C., to Boston, MA. Due to the geographic location of the Capitol Region within the northeast passenger rail network, CROCOG will continue to work with CTDOT and other stakeholders to emphasize the importance of an alignment that builds upon the current improvements in the Hartford Line corridor and that will help establish better transit connectivity between Hartford and Boston. Massachusetts DOT launched a study at the end of 2018 to evaluate the feasibility of implementing increased passenger rail service connecting Boston to Springfield and subsequently to Hartford and New Haven via the Hartford Line. With improvements to this alignment, Hartford would become a major hub in New England for regional and long-distance passenger rail transportation with the opportunity to significantly improve access to the region and to the New York and Boston metropolitan areas. CROCOG will continue to emphasize the needed interaction of federal planning efforts with regional transit, CT**fastrak**, and CT**Trail** planning efforts to ensure that passengers will have efficient local access to long distance passenger rail services (first mile/last mile connections, reduction of transfer and wait times, optimizing access modes).

“ CROCOG will continue to work with CTDOT and other stakeholders to emphasize the importance of an alignment that builds upon the current improvements in the Hartford Line corridor [...] With improvements to this alignment, Hartford would become a major hub in New England for regional and long-distance passenger rail transportation with the opportunity to significantly improve access to the region and to the New York and Boston metropolitan areas.”

Recommendations

- 1. Regional Transit Strategy** – Update the 2001 Regional Transit Study to reflect current regional transit goals.
- 2. CTfastrak Expansion** – Advance the second phase of CTfastrak expansion east of Hartford.
- 3. Enhanced Transit Corridors** – Create high frequency transit along each of the six corridors described in the Hartford CSA with transit signal priority, stop consolidation, and enhanced passenger amenities.
- 4. Bradley Airport Connection** – Support the extension of CTfastrak service to Bradley Airport as well as the implementation of a shuttle bus connection to Bradley Airport from the Windsor Locks rail station. (This recommendation is discussed further in Chapter 5: Airport System and Access.)
- 5. Upgrade the CTrail Hartford Line with infrastructure improvements from Windsor to Springfield** – Reinstate full double track alignment, remove height restrictions, and increase weight limits to accommodate 286,000 pound cars
- 6. Passenger Rail Stations** – Support the development of new CTrail Hartford Line stations in Newington, West Hartford, Windsor, Windsor Locks, and Enfield.
- 7. Expand Commuter Rail Services**
 - North** – Building upon the vision for the New England High-Speed and Intercity Rail Network collectively developed with other New England states, work to support connections between Springfield and Boston and to Montreal.
- 8. Support NNEIRI** – Support planning activities for the Northern New England Intercity Rail Initiative (NNEIRI) for implementation of improved passenger rail service between Boston – Worcester – Springfield with alternating extensions to Montreal and New Haven.
- 9. Coordinate with Massachusetts for a better rail connection between Hartford and Boston** – Support efforts in Massachusetts to develop the East-West connection between Boston and Springfield and coordinate service plans to provide seamless connections between Hartford, Springfield and Boston.

Better Bus & Paratransit Service

Even with significant investments in a rapid transit or fixed guideway system, the local bus service and paratransit services will continue to provide the fabric that ties the transit system together. The region needs to prioritize how to invest in local transit moving forward; frequency or coverage. How to prioritize is based on the goals for the region and transit. High frequency corridors maximize ridership but at a cost of decreasing or eliminating service in less dense areas. Coverage oriented networks provide service to everyone but at the cost of thinning it out and providing infrequent service which does not attract as many riders (See Table 02.1).

Since the development of the last Long Range Transportation Plan, CRCOG has conducted comprehensive evaluations of the region’s local transit systems. The following recommendations, which are based on the recent CSAs and other regional transit policies, are intended to ensure that the existing services are both properly maintained and improved to meet identified needs.

Hartford Comprehensive Service Analysis (CSA) – This effort, which was conducted from 2014 to 2017, examined the effectiveness and efficiency of the existing system and inventoried the transit needs and potential within the service area of CTtransit’s Hartford Division. It provides a blueprint to improve local bus service, complement new transit investments (CT**fastrak** and the C**Trail** Hartford Line), and operate an efficient service. The CSA found that overall the “footprint” of the service is correct with most dense residential and employment areas having some level of service and transit dependent groups having access to relatively extensive transit coverage. At the same time, however, there are some gaps in the system, as pockets of high transit need are without service. The CSA recommends that six existing strong transit corridors – Albany Avenue, Farmington Avenue, Franklin Avenue, Main Street, and Park Street in Hartford as well as Burnside Avenue in East Hartford – would benefit from enhanced service and complementary capital improvements. The study further recommends increasing weekend service,

Table 02.1 – Frequency and Coverage Goals

Frequency Goals	Coverage Goals
High ridership	Ensure that everyone has access to some transit
Lower public subsidy	Provide lifeline services to those who don’t have access to a personal vehicle
Reduced environmental impact through lower vehicle miles travelled	Provide access to those with severe needs. “lifeline” service
Promotes transit oriented development	Political equity

restructuring the routes to create radial and crosstown routes, connector routes to provide “first mile/last mile” connections to transit hubs, regional loop service linking key destinations on the periphery, CT**fastrak** service to Bradley Airport, and improved circulation through the Buckland Hills retail area. Projections show that implementing the proposed recommendations and overhauling the system would increase weekday revenue hours by 8% and ridership by 9%.

The proposed network requires investments and additional resources to develop strong transit corridors while eliminating fixed-route service in some low-density residential areas where there is very low transit demand. To service these low demand areas and create first-mile/last-mile connections, subsidized flexible service options utilizing taxis, demand-response transit, and/or transportation network companies (TNCs) could be implemented, as has been demonstrated across the country.

Transportation Network Companies (TNCs), e.g. Lyft and Uber, have grown exponentially over the past five years. In 2018, the number of TNC generated trips in the United States will exceed the total number of trips taken on all bus transit systems nationwide. TNCs can help solve first mile/last mile connections with transit and help pare down fixed routes in low-density areas. To be incorporated into transit systems, however, changes in TNC operations will be required, as they need to meet ADA and FTA requirements if federal funding is to be used. In the long term, TNCs can be part of the solution to mobility management for the CROCOG region. For this to occur, state and local transit providers and TNCs need to meet and work together on developing a collaborative approach to mobility management.

“ TNCs can help solve first mile/last mile connections with transit and help pare down fixed routes in low-density areas. To be incorporated into transit systems, however, changes in TNC operations will be required, as they need to meet ADA and FAT requirements if federal funding is to be used. ”

New Britain-Bristol Comprehensive Service Analysis (CSA)

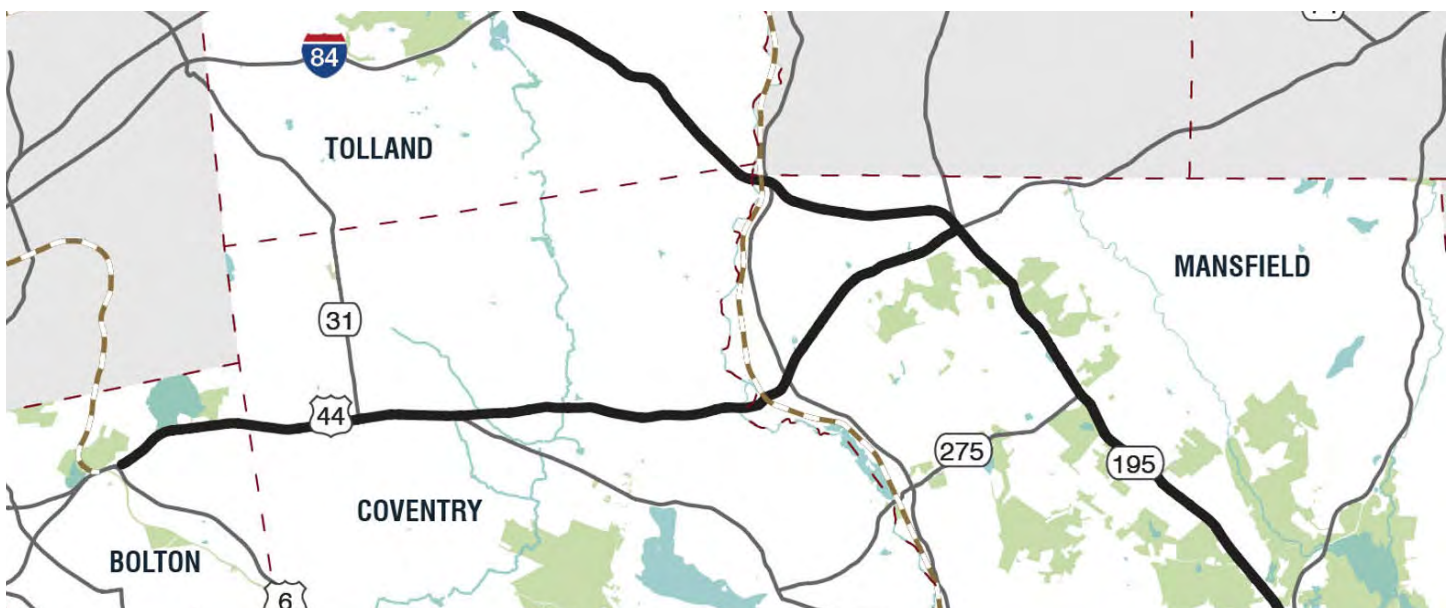
– As a result of New Britain, Berlin, Plainville, and Southington joining the region, CRCOG’s CSA was expanded to include the New Britain-Bristol Division of CTtransit. Through analysis of the existing system, as well as a market analysis and public outreach, a preferred scenario was developed to identify opportunities for service improvements. Recommendations include simplifying duplicative and circuitous routes, creating crosstown service options, and introducing local bus service into Southington.

The preferred scenario is broken out into three phases. Phase 1 would be cost neutral with no additional peak vehicles required and an increase in revenue hours of only 1% weekly. It would extend a route into the northern portion of Southington and would be accomplished by redistributing existing resources. Phase 2 would increase service by 11% over the existing system and would require two additional vehicles. It would expand service

hours and further extend a route into Southington. Phase 3 would increase service by 16% over the existing system by adding a new route to Unionville and expanding weekend service. Each of the phases would also include expanded paratransit coverage areas; the service increase for which is not reflected in the percentages above.

Eastern Gateways Study – From 2015-2018, CRCOG undertook the Eastern Gateways Study. The purpose of this Study was to develop an implementation and strategy plan to address current and long-range intermodal travel and community quality of life issues along the sections of Route 195 and Route 44 corridors that lead to and from the UConn-Storrs campus through the towns of Bolton, Coventry, Mansfield and Tolland. The study’s recommendations related to transit include increasing the Windham Region Transit District’s (WRTD) service span and frequency; expand existing express bus service; and extend existing services to underserved areas.

Figure 02.5 – Eastern Gateways Study map of the Rt 44 and 195 corridors



Locally Coordinated Human Services

Transportation Plan – In cooperation with CTDOT and various human services agencies and transportation providers, CRCOG provided input into the statewide Locally Coordinated Human Services Transportation Plan (LOCHSTP) in 2007 and in the 2009 update. This plan, overseen and managed by CTDOT with input from the MPOs, outlines how each region will seek to meet the transportation needs of low-income residents, the elderly, and persons with disabilities. This planning process was required by previous federal legislation (SAFETEA-LU) in order to access federal funds in the following programs: Section 5310 (van purchase program), Section 5316 (Jobs Access Reverse Commute, JARC), and Section 5317 (New Freedom funding). The latest federal transportation legislation, FAST Act, requires that projects selected for funding under 5310 (elderly) must be included in a locally developed, coordinated public transit-human services transportation plan. CRCOG remains available to support CTDOT on future LOCHSTP updates.

Connecticut Statewide Bus Study – This statewide study, completed by CTDOT in early 2018, assessed travel needs, evaluated the performance of the fixed-route bus systems in Connecticut, and provided recommendations to create a more interconnected, user-friendly transit network to meet the needs of the state’s residents and employees. A two-stage evaluation process was used to measure the effectiveness of the network coverage, operational efficiency, on-time performance, route and schedule

design, route productivity, and service delivery. In addition to service performance recommendations, the study recommended the development of new data collection processes, identified future transit studies, and encouraged increased system integration.

Other Services – Within the CRCOG region, additional transit services include CT*transit*’s dash shuttle through downtown Hartford and the Town of Enfield’s Magic Carpet Service. Such services support the broader transit system and offer additional mobility options for travelers.

Recommendations

- 1. Bus Stop Consolidation** – Evaluate bus stop locations and consolidate stops to create at least 1,000 feet between stops. Stop consolidation creates faster, more reliable, and more comfortable service while allowing resources for stop improvements such as amenities and accessibility to be focused.
- 2. Prioritize Goals for Transit System** – In order to improve local transit, the region needs to set goals for how to provide transit as funding is limited and it is impossible to invest in both frequency and coverage given the existing budget constraints.
- 3. Better Bus Service in the Hartford Division Area** – Improve the existing bus system by working with CT*transit* and municipalities to implement the routing recommendations and capital

improvements recommended in CROCOG's Hartford CSA to create a more connected, efficient, and accessible local transit system for the region.

4. Better Bus Service in New Britain-Bristol

Division Area – Improve the existing bus system by implementing Phase 1 of CROCOG's New Britain-Bristol CSA and work to secure the funding for future phases.

5. Better Bus Service in Windham Region

Transit District Area – Improve the existing bus system by implementing the recommendations from CROCOG's Eastern Gateways Study.

6. First Mile/Last Mile Connections

– Work with state and local transit providers and Transportation Network Companies (TNCs) to develop collaborative service options to improve mobility management in the CROCOG region.

7. Alternative Service Models – Identify alternative service models to serve low density areas in the Capitol Region and create first-mile/last-mile connections. Work with the state legislature to create a regulatory framework for TNCs.

8. Locally Coordinated Human Services

Transportation Plan - Work with CTDOT to update the 2009 LOCHSTP.

9. Integrated Fare Payment – Work with transit districts, *CTtransit*, and *CTrail* to create a seamless fare media across modes and providers.

10. Update Bus Service Guidelines

– Encourage transit operators to adopt

bus service guidelines for route design, schedule design, route productivity, service delivery and financial performance that are in-line with CTDOT's Statewide Bus Study.

11. Passenger Advisory Committees

– Encourage transit operators to each create a passenger advisory committee to provide a forum for passengers to provide input on existing bus service and plan for the future. A passenger advisory committee typically acts as an independent representative and advocate for bus riders. CROCOG staff would be available to support and serve on such committees as appropriate.

12. Develop Partnerships

- Develop partnerships with businesses and colleges/universities to help offset the cost of providing transportation in less dense or hard to reach areas.

13. Customer Satisfaction Surveys

– Encourage transit operators to develop an online customer satisfaction survey to be issued annually. A customer satisfaction survey will provide a mechanism for the broader public and bus users to provide feedback on bus system performance. Regularly issued surveys comprised of core questions will enable benchmarking on performance to understand where service has improved or degraded.

14. Downtown Circulator

- Continue to support the dash service in downtown Hartford.

15. Enfield – Continue to support operational funding for Enfield's Magic Carpet Service.

Enhanced Transit Technology

The operational efficiency of existing transit, rail, and paratransit services can be improved by integrating advanced technologies into operations, maintenance, and management functions. Using technology to enhance local bus service can augment the transit experience of all transit riders, but especially the transit dependent. Technologies such as global positioning systems (GPS), advanced vehicle location systems (AVL), electronic fare payment, electronic next bus arrival signs, and next stop announcement systems can improve service reliability and make it easier for riders to use the bus. Transit priority added to traffic signals can help keep buses on schedule, and computer-aided dispatch can improve efficiencies for both fixed-route and dial-a-ride services. Many of these systems have recently been introduced in the Hartford area, as described below.

Automatic Vehicle Location (AVL) and Automatic Passenger Counter (APC) –

Within the transit industry, AVL technology is becoming an essential element of a quality transit system. AVL is used as a planning tool, to relay information to the public, and to monitor operations in real-time. By tracking buses using AVL along their routes, transit providers can analyze the data collected to monitor performance, improve service, adjust schedules, and create more reliable and convenient service. Expanding AVL to all transit systems in the state by 2025 is a recommendation in the Connecticut Statewide Bus Study. Within the CRCOG region, CTtransit has completed deploying

this technology. Windham Region Transit District (WRTD) utilizes Ride Systems for AVL but it is used on the back-end by dispatch and does not have front-end passenger facing capabilities to provide real-time information.

CTtransit finished deploying AVL technology on their entire fleet in late 2017. This technology provides real-time schedule information to passengers via mobile apps and dynamic station signs along the CTfastrak guideway. AVL technology also allows dispatch to monitor vehicle location to reduce bus bunching, observe on-time performance, and improve incident response time.

AVL technology integrated with Automated Passenger Counter (APC) systems accurately record where and when passengers get off and get on the bus. This data is used to monitor trends in ridership, improve scheduling, adjust bus service to meet actual demand, determine where to add or eliminate service, and to analyze data at finer levels of detail. Expanding AVL to all transit systems in the state by 2025 is a recommendation in the Connecticut Statewide Bus Study. CTtransit deployed APC technology at the same time they installed AVL, WRTD does not have APC technology.

Figure 02.6 – New Greater Hartford Transit District buses waiting for inspection



Paratransit Bus Service – The Greater Hartford Transit District (GHTD) operates paratransit service for elderly and persons with disabilities in the greater Hartford area. GHTD uses a mobile computing and AVL system that is integrated with its scheduling and dispatch software system. With mobile computing, the drivers receive in-vehicle electronic manifests and get turn-by-turn navigational prompts to their destination. Automated data collection eliminates the need for manual data entry. Real-time status of vehicles allows dispatchers the flexibility to make last minute changes. Emergency alarms are also installed on all vehicles.

GHTD is working on adding real time passenger information to their ITS program. This will include automated customer services, including trip confirmation, cancellation, and arrival alerts. In addition, GHTD is working to install the “Real Time Module” so that dispatchers know where vehicles are at all times. The software will be in place by summer 2019. The biggest hurdle faced is the compatibility of the software with the on-board hardware. GHTD utilizes Trapeze version 15 and to install these features requires upgrading to version 18.

Go CT Card – In Fall 2018, CT*transit* released the Go CT Card, a smart tap and go fare card that can be used on all CT*transit* and CT*fastrak* buses. The card is an account-based system that allows individuals to deposit funds onto it. The card can be reloaded online or at one of the 200 7-Eleven and CVS stores statewide. A leader in advancing public transit, CT*transit* has taken the card a step further and will become the third system in the nation to adopt fare capping across all pass types (1-day, 3-day, 5-day, 7-day, and 31-day). This system tracks a card holder’s trips and guarantees the rider will not pay more than the lowest authorized fare for any period of travel, without having to pay the full cost of a pass in advance. By partnering with local retail outlets and introducing fare-capping, CT*transit* has removed the traditional barriers faced by individuals without bank accounts or with limited income.



Figure 02.7 – CTfastrak ticket vending machines in downtown Hartford

Capitol Region ITS Strategy – CROCOG has developed a strategic plan to advance transportation technology in the Capitol Region with goals to reduce congestion, stimulate economic growth, increase transit ridership, improve traffic signal management, operations and maintenance, advance sustainable transportation operations, and enhance roadway safety. The objectives related to public transportation include building on the success of CT**fastrak**, enhancing the seamlessness of the public transportation network, and increasing the user friendliness of the transit system. The plan calls for these objectives to be achieved using the 11 strategies listed below. Many of these strategies are woven into and recommended in other plans as well.

1. Establish centralized transit information database for regional sharing
2. Integrate CT**fastrak** and other available bus traveler information with external resource sites and across the regional transit systems

3. Conduct a study to evaluate the efficacy of Integrated Corridor Management on the CT**fastrak** corridor and surrounding transportation network
4. Include ITS capabilities in any expansion of the CT**fastrak** system
5. Implement transit signal priority for CT**fastrak** signals at congested intersections
6. Integrate all transit schedules into Google Transit using General Transit Feed Specifications (GTFS)
7. Implement integrated fare payment system on transit systems within the state
8. Implement QR codes at bus stations
9. Reduce dwell times by separating ride payment systems from public transportation vehicles on heavily used corridors
10. Implement Wi-Fi on highly-utilized Bus Routes
11. Implement Next Bus arrival signs at all major transfer points in Hartford and the surrounding region

Figure 02.8 – The 913 Express Bus heading to the Buckland Hills Park & Ride Lot



Recommendations

1. **Electronic Fare Collection** – Support the continued deployment of the Go CT Card while looking ahead to the adoption of mobile payment technology. CROCOG should support the development of a unified pass program to enable seamless travel across bus and rail systems.

2. Next Bus Arrival Signs at All Major Transfer

Points – Enhance the user-friendliness of transfer points and park and ride facilities within the regional transit network by implementing Next Bus traveler information systems and security enhancements.

3. On Bus Wi-Fi Implementation – Add

Wi-Fi service to all buses to improve existing customer comfort and provide an opportunity to attract new customers.

4. Centralized Transit Information Database for Regional Sharing –

Establish a centralized repository with uniform data reporting to allow for broad sharing capabilities and consistent performance evaluation.

5. Implement TSP on Signals within

Hartford – Upgrade and coordinate traffic signals on the five enhanced transit corridors identified in Hartford.

6. On-time performance (OTP) Data

– Work with CT*transit* to collect OTP data at the route level to aid in route performance evaluation.

7. Automatic Vehicle Location (AVL) and Automatic Passenger Counters (APC) –

Work with WRTD to deploy passenger facing AVL and APC technology on their fleet.

8. Schedule Integration – Integrate all transit schedules into a central repository with a single location for trip planning.

9. Procurement Collaboration – Work with transit districts and CT*transit* on collaborative procurements on the purchase of technology, software, and capital items. This would aid in the integration of software and technologies and more cost effective procurements.

10. Continue to support ITS Projects for

Transit – As ITS projects for transit services are implemented in the Region, CRCOG should continue to work with CTDOT, CT*transit* and GHTD to monitor performance, keep up with knowledge about new technology, and recommend upgrades as appropriate. These efforts will help to ensure that both transit-dependent passengers and choice riders are afforded the best possible service.

11. Support Maintenance for Implemented

Transit ITS - ITS elements installed throughout the Region will require maintenance and potential upgrading through the next 25 years. CRCOG should support the maintenance and upgrading of implemented transit ITS elements.

12. General Transit Feed Specification

– Work with transit providers who do not already have General Transit Feed Specifications (GTFS) implemented to develop and maintain a GTFS dataset to integrate trip planning with other transit systems in the state.

Infrastructure and Capital Improvements

Union Station – GHTD completed a master plan for the Union Station Transportation Center Complex. The plan identified short, medium, and long-term opportunities such as mechanical upgrades, building improvements, wayfinding, parking strategy, traffic improvements, marketing strategy, and aesthetic changes to improve the station. The final plan includes a schedule for the improvements and estimated costs. Following the construction of a new multimodal transportation center, it will be important to ensure thoughtful repurposing of Union Station so that this historic building continues to be used and maintained.

New Multimodal Transportation Center – The Lowered Highway Alternative being advanced by the planned I-84 Hartford project would require the relocation of the railroad, which means that the railroad tracks would no longer lead to Union Station. As such, a new station would need to be built roughly 1,000 feet west of Union Station at the new track location. Plans for the multimodal station include ADA-accessible facilities for Amtrak and **CTrail**, **CTtransit**, **CTfastrak**, inter-city buses, bicycle and vehicle parking, taxis, and car/ride-share. CRCOG staff serve on the effort's Public Advisory Committee and Technical Transit Committee to ensure that the planning reflects the needs of the region.

Figure 02.9 – Passengers waiting for the CT rail Hartford Line on Track 1



New GHTD Facility – On September 13, 2017 GHTD completed the construction of a new operations and maintenance facility. The 37,000 square foot facility consists of a training room, dispatch area, reservations area, scheduling area, conference room, server and communication rooms, quiet room for drivers, lunch room, restrooms/ locker room (with shower access), and a fitness room. The maintenance area consists of four maintenance bays, a storage area, parts room, mechanics room, wash bay with water/oil separator, vehicle parking, restrooms/ locker room (with shower access), and a fueling station.

Hartford Bus Maintenance Facility

Upgrades – CTDOT received a \$7,000,000 grant under the FY18 FTA Buses and Bus Facilities Infrastructure Investment Program. The funding will be used to rehabilitate the Hartford bus maintenance facility's mechanical and electrical systems that are at the end of their useful life.

Transit Asset Management (TAM) – TAM Plans are mandated by the FTA under MAP-21 and were required to be completed by October 1, 2018 for agencies that own, operate, or manage capital assets used for public transportation and receive federal funding. The TAM Plan uses asset condition coupled with performance measures to guide how to manage capital assets and prioritize funding to improve or maintain a state of good repair. TAM Plans must be updated every four years, and the performance measures must be accepted by the corresponding MPO. CTDOT prepared a Tier 1 TAM Plan for CT**transit** and a Tier II group plan which includes Windham Regional Transit District. Greater Hartford Transit District prepared their own TAM Plan.

Buckland Hills – The improvement of the Buckland Hills park-and-ride to create a transit hub has been identified in several studies, including CROCOG's most recent Comprehensive Transit Service Analysis. Using a phased approach, low cost options can be implemented immediately by changing circulation through the park-and-ride lot, adding signage, and installing a new shelter. This would allow for improved service while more extensive and costly alternatives are developed and funded.

Passenger Amenities – Bus stops with amenities such as shelters, benches, real-time passenger information, and easy access that integrates into the surrounding development can enhance the passenger experience and contribute to increased ridership. A thorough inventory of all bus stops is needed in order

Figure 02.10 – Passengers waiting at one of the CT**transit** shelters with a bench



to confirm existing data, create a database of amenities at stops, and develop a plan on how to invest in stops moving forward. Analysis of amenities, including wayfinding signage, at park and ride lots should also be conducted.

Electric Buses – CTDOT was awarded a grant through FTA’s Low or No Emission Vehicle Program in FY17 to purchase four (4) 40’ Proterra E2 Max electric buses and associated charging equipment. While all of the vehicles will go to Greater Bridgeport Transit (GBT), CT*transit* is helping GBT write the specs and are serving as consultants on the project. The project is part of the state’s initiative to minimize the carbon emissions of Connecticut’s bus fleet.

Bus Shelter Program – CROCOG in conjunction with GHTD, CT*transit*, and municipalities have been working together to implement a regional bus shelter program. The program is used to install bus shelters, and funding is provided through federal transit enhancements funds with local matches from participating towns and CTDOT. CROCOG is assisting in the coordination of the program to transfer the responsibility of shelter from the municipalities to CT*transit*.

Recommendations

1. Stop Amenities - Install benches and shelters at stops with high ridership based on the Sign and Shelter Policy developed by CROCOG. Consider wayfinding improvements at major bus stops and park and ride lots.

2. Bus Shelters – Continue working with CT*transit*, GHTD, and municipalities to implement a cohesive and coordinated regional bus shelter program.

3. Buckland Hills Park and Ride – implement the low cost options for improving the park and ride. Continue to develop more extensive alternatives.

4. TAM Plan – Continue to review CTDOT’s updated State of Good Repair Performance Targets to determine whether they should be adopted as the regional performance targets for the MPO.

5. Union Station Enhancement - Continue to support efforts to improve, upgrade, and enhance Union Station as the major multi-modal transportation center in the region and as the central station for the region’s rapid transportation system until a new station is constructed.

6. Alternative Fuel Deployment - Monitor electric bus technology nationwide and support the move towards sustainable fuel source equipment.

7. New Multimodal Center – Continue to support the planning and development of a new multimodal transportation center as part of the I-84 Hartford project. Ensure that bus, rail, and BRT services are linked in a convenient way while encouraging bicycle and pedestrian connectivity.

Transit Oriented Development

As far back as 2001, the region made a major commitment to giving travelers more choices by improving the existing bus system and developing a new rapid transit system. If these proposals are to realize their full promise, they must be adequately funded, properly designed, and strongly connected to economic and community development. Proper station area planning and active encouragement of transit-oriented development (TOD) are needed to assure that these new transit investments achieve their full potential.

TOD means development that is not only close to transit, but “oriented” to it. TOD is relatively dense and compact in comparison to surrounding areas, and ideally includes a mix of uses. This mix is important, both for community vibrancy and for the efficient use of transit service. If a station area contains a range of housing options, jobs, and services, it will be both an origin and a destination, attracting transit riders in both directions in the morning and evening commutes and on weekends. TOD is located within walking distance (¼ to ½ mile) and bicycling distance (2 miles) of transit, and the public realm of streets, sidewalks, bike lanes, ground-floor

businesses, wayfinding, and amenities is inviting to pedestrians and cyclists as well as automobiles. Today, highways and roadways tend to be a stronger determinant of land use and urban form, which has resulted in dispersed development and travel patterns that are difficult for transit to serve. CRCOG is committed to using transit as a tool to shape urban form and encourage land use planning that can support additional transit investments in the region’s transit corridors.

TOD is fundamentally important to Greater Hartford for six reasons:

1. It generates higher levels of ridership and farebox revenue for the transit services in question—rail and bus rapid transit, as well as the regular bus lines connecting to those stations.
2. TOD enables the transit system to reduce congestion on the region’s roadways. For most people, the ability to commute by transit requires that at least their workplace, and ideally their home as well, have convenient access to the system.
3. TOD enables the transit system to provide affordable job access to the region’s workforce, especially those households that do not own cars or that have two working members but can afford only one car.

“CRCOG is committed to using transit as a tool to shape urban form and encourage land use planning that can support additional transit investments.”

4. Transit-oriented, walkable communities, with a mix of everyday activities close at hand and convenient access to Downtown Hartford and other regional destinations, will tend to attract Millennial households and retiring Baby Boomers—the two age cohorts that are growing in most Northeastern cities and regions. Along with job access, this is a key factor in population growth, business recruitment, and regional economic competitiveness.
5. TOD is a core ingredient of smart, sustainable growth. It reduces vehicle miles traveled (VMT) and greenhouse gas emissions. Its compact footprint helps communities and regions grow without continued sprawl and sacrifice of open space. Compact, walkable, mixed-use development can typically be built and operated with greater energy efficiency, lower infrastructure costs, and less parking (a key driver of land use and construction costs) than development in non-transit settings.
6. Finally, TOD can create real estate value around a station. As described elsewhere in this Plan, that value can be “captured” to help pay for the station itself or other essential infrastructure in the station area. Beyond the intrinsic efficiency of TOD helping to fund its own platform, value capture is a major “plus” in several of the federal government’s funding and finance programs.

With funding from the HUD Sustainable Communities Regional Planning Grant mentioned previously, CROCOG undertook several projects to further TOD planning and implementation in the region. The report, *Making it Happen: Opportunities and Strategies for Transit-Oriented Development in the Knowledge Corridor*, identifies the types of businesses that can generally be attracted to the corridors and evaluates market conditions on a station by station basis. Another product of this funding was a Mixed Use/Transit-Oriented Development Model Zoning Regulation for communities to utilize as they continue to prepare for future development opportunities in the region’s transit corridors.

Several Knowledge Corridor communities with **CTfastrak** or **CTrail** stations have conducted TOD studies, laid the groundwork, and begun to develop residential, commercial, and green space around the stations in line with TOD principles. Many of the development sites are mixed use and redeveloped unused industrial/commercial spaces. As a result of this work on transit-oriented development, CROCOG partnered with regional, state and municipal leaders to establish a Corridor Advisory Committee (CAC), a forum to share ideas and progress on TOD on the Hartford Line and **CTfastrak** corridors. The CAC has been meeting on a quarterly basis since 2013 to hear updates from CTDOT and municipal leaders on each of the transit stations. A **CTfastrak** sub-committee of the CAC also meets to discuss similar issues related solely to **CTfastrak**.

CTfastrak TOD – In 2013, CRCOG published, “Making it Happen: Opportunities and Strategies for TOD in the Knowledge Corridor,” which highlighted the development potential around each station. CRCOG undertook studies with each member town to assess the opportunities and potential site capacity for TOD around each station. In 2016 New Britain received a state grant to conduct TOD studies at each of its three stations. The downtown station was found to be the strongest redevelopment candidate and could support 35,000 SF of retail and up to 500 rental residential units. The first building to be redeveloped is the Berkowitz building, an abandoned former apartment building that will be turned into retail space and 27 residential units. Development is underway. In West Hartford, the city changed the zoning code around the stations to allow for mixed-use development. This led to the redevelopment of an old Pontiac dealership at 616 New Park Avenue and conversion to a \$20 million transit-oriented development with 56 units of mixed-income housing, which was completed in 2018. In Newington, the Planning and Zoning Commission is evaluating TOD overlay districts at the stations.

CTrail TOD – Windsor Locks, Berlin, and Newington have completed TOD studies. In Windsor Locks a key first step will be relocating the train station to downtown, which is identified as a future improvement to the Hartford Line. Enfield conducted a study in advance of a station being constructed in the future in order to understand how to revise the zoning in Thompsonville, the

location of the proposed station, to align with TOD principles. In Berlin, there are plans to redevelop a vacant parcel adjacent to the station into 60 residential units and 2,500 SF of commercial space.

While not a member of CRCOG, Meriden conducted a TOD market study in 2013 which recommended redeveloping seven target areas into 600-1,000 residential units, 20,000 SF of small-scale office space and 28,000 SF of retail/commercial space. In 2014, the City released an RFP for the redevelopment of six of the locations. Since then, two projects have been completed and developers have been selected for an additional three.

Recommendations

- 1. General Support for TOD** - Support TOD along all transit lines, including traditional bus corridors, through coordinated action by CRCOG, the state, and affected municipalities:
 - Develop a long-range strategy for the region that encourages both transit and transit-supportive land use, and make station area and TOD planning a core element in the planning process for any rapid transit line or station.
 - Build support for TOD among community groups, business leaders, and other stakeholders.
 - Work with town officials and developers to integrate TOD into their plans and development projects through use

of such tools as the Making it Happen report and Mixed-Use/Transit-Oriented Development Model Zoning Regulation.

2. TOD for the CTfastrak and the Hartford

Line - As of 2019, CTfastrak between Hartford and New Britain is open and operating, and planning is underway for the CTfastrak expansion to Storrs and Buckland Hills. The bi-state Hartford Line passenger rail service is open and operating at nine stations (four of them in the Capitol Region). In the coming years, CTDOT plans to add two entirely new Hartford Line stations (West Hartford and Enfield) and to replace three existing shelter stops with full-service, high-platform stations (Newington, Windsor, and Windsor Locks); all five of these new or replacement stations are located in the Capitol Region. While the TOD impact of CTfastrak and the Hartford Line has thus far been minimal, CROCOG envisions corridor-scale TOD opportunities of great regional significance and will work to advance them.

- Create Station Area Plans that integrate transit, economic development, housing, and open space, with the full and coordinated participation of CTDOT, the relevant state departments, and municipal officials.
- Work with local officials and station area land owners (both public and private) to assemble a critical mass of developable land with good access to the station. Key factors will often include the availability of brownfield remediation assistance and funding, and an approach to commuter park-and-ride that avoids, to the greatest

degree possible, the long-term dedication of potential TOD sites to surface parking lots.

- Invite developers to build or improve stations through “joint development”; this could involve a competitive solicitation for developers to build on public land, or a negotiation with an adjacent land owner to fund station improvements in order to unlock the TOD value of their property. Both of these models have been used in transit systems throughout the United States.
- Explore the creation of station-area Tax Increment Finance (TIF) Districts to support transit or other key TOD infrastructure.
- Engage the region’s Anchor Institutions in discussion around the value of the region’s transit investments to major and neighborhood anchors and potential implementation actions to bolster the region’s transit corridors.

3. I-84 Viaduct / Union Station. The largest transportation project on CROCOG’s long-term planning agenda is the proposed replacement of the I-84 Viaduct in the center of Downtown Hartford. The Lowered Highway Alternative, if adopted, would produce 40-45 acres of new developable land and air rights, and the accompanying relocation of the railroad tracks would require building a new component of Union Station.

- Recognize, in all future planning for the Viaduct project, that Union Station and its walkshed represent a TOD opportunity of unique scale and centrality in the region.

- Undertake a planning, programmatic, conceptual design, and high-level pro forma analysis of potential TOD at and around Union Station. The objective would be to better understand the range of economic outcomes, the potential value of the land and air rights to be created by the Viaduct project, and the applicability of various joint development models used at other major downtown hub stations in the United States.

DRAFT

Implementation Schedule

Short-Term Recommendations

Rapid Transit Services

Regional Transit Strategy	Update the 2001 Regional Transit Study to reflect current regional transit goals.
CT fastrak Expansion	Advance the second phase of CT fastrak expansion east of Hartford.
Enhanced Transit Corridors	Create high frequency transit along each of the six corridors described in the Hartford CSA with transit signal priority, stop consolidation, and enhanced passenger amenities.
Bradley Airport Connection	Support the extension of CT fastrak service to Bradley Airport as well as the implementation of a shuttle bus connection to Bradley Airport from the Windsor Locks rail station. (This recommendation is discussed further in Chapter 5: Airport System and Access.).

Better Bus & Paratransit Service

Bus Stop Consolidation	Evaluate bus stop locations and consolidate stops to create at least 1,000 feet between stops. Stop consolidation creates faster, more reliable, and more comfortable service while allowing resources for stop improvements such as amenities and accessibility to be focused.
Prioritize Goals for Transit System	To improve local transit the region needs to set goals for how to provide transit as funding is limited and it is impossible to invest in both frequency and coverage given the existing budget constraints.
Better Bus Service in the Hartford Division Area	Improve the existing bus system by working with CTtransit and municipalities to implement the routing recommendations and capital improvements recommended in CROCOG's Hartford CSA to create a more connected, efficient, and accessible local transit system for the region.
Better Bus Service in New Britain-Bristol Division Area	Improve the existing bus system by implementing Phase 1 of CROCOG's New Britain-Bristol CSA and work to secure the funding for future phases.
Better Bus Service in Windham Region Transit District Area	Improve the existing bus system by implementing the recommendations from CROCOG's Eastern Gateways Study.
First Mile/Last Mile Connections	Work with state and local transit providers and Transportation Network Companies (TNCs) to develop collaborative service options to improve mobility management in the CROCOG region.

Implementation Schedule

Short-Term Recommendations *(continued)*

Better Bus & Paratransit Service (continued)

Alternative Service Models	Identify alternative service models to serve low density areas in the Capitol Region and create first-mile/last-mile connections. Work with the state legislature to create a regulatory framework for TNCs.
Locally Coordinated Human Services Transportation Plan	Work with CTDOT to update the 2009 LOCHSTP.
Integrated Fare Payment	Work with transit districts, CTtransit, and CTrail to create a seamless fare media across modes and providers.
Update Bus Service Guidelines	Encourage transit operators to adopt bus service guidelines for route design, schedule design, route productivity, service delivery and financial performance that are in-line with CTDOT's Statewide Bus Study.
Passenger Advisory Committees	Encourage transit operators to each create a passenger advisory committee to provide a forum for passengers to provide input on existing bus service and plan for the future. A passenger advisory committee typically acts as an independent representative and advocate for bus riders. CROCOG staff would be available to support and serve on such committees as appropriate.

Enhanced Transit Technology

Electronic Fare Collection	Support the continued deployment of the Go CT Card while looking ahead to the adoption of mobile payment technology. CROCOG should support the development of a unified pass program to enable seamless travel across bus and rail systems.
Next Bus Arrival Signs at All Major Transfer	Enhance the user-friendliness of transfer points and park and ride facilities within the regional transit network by implementing Next Bus traveler information systems and security enhancements.
On Bus Wi-Fi Implementation	Add Wi-Fi service to all buses to improve existing customer comfort and provide an opportunity to attract new customers.
Centralized Transit Information Database for Regional Sharing	Establish a centralized repository with uniform data reporting to allow for broad sharing capabilities and consistent performance evaluation.
Implement TSP on Signals within Hartford	Upgrade and coordinate traffic signals on the five enhanced transit corridors identified in Hartford.
On-time performance (OTP) Data	Work with CTtransit to collect OTP data at the route level to aid in route performance evaluation.

Implementation Schedule

Short-Term Recommendations *(continued)*

Enhanced Transit Technology (continued)

Automatic Vehicle Location (AVL) and Automatic	Work with WRTD to deploy passenger facing AVL and APC technology on their fleet.
Schedule Integration	Integrate all transit schedules into a central repository with a single location for trip planning.
Procurement Collaboration	work with transit districts and CTtransit on collaborative procurements on the purchase of technology, software, and capital items. This would aid in the integration of software and technologies and more cost effective procurements.

Infrastructure and Capital Improvements

Stop Amenities	Install benches and shelters at stops with high ridership based on the Sign and Shelter Policy developed by CROCOG. Consider wayfinding improvements at major bus stops and park and ride lots.
Bus Shelters	Continue working with CTtransit, GHTD, and municipalities to implement a cohesive and coordinated regional bus shelter program.
Buckland Hills Park and Ride	implement the low cost options for improving the park and ride. Continue to develop more extensive alternatives.
TAM Plan	Continue to review CTDOT's updated State of Good Repair Performance Targets to determine whether they should be adopted as the regional performance targets for the MPO.

Long-Term Recommendation

Rapid Transit Services

Upgrade the CTrail Hartford Line with infrastructure improvements from Windsor to Springfield	Reinstate full double track alignment, remove height restrictions, and increase weight limits to accommodate 286,000 pound cars.
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Implementation Schedule

Ongoing Actions

Rapid Transit Services

Passenger Rail Stations	Support the development of new CTrail Hartford Line stations in Newington, West Hartford, Windsor, Windsor Locks, and Enfield.
Expand Commuter Rail Services North	Building upon the vision for the New England High-Speed and Intercity Rail Network collectively developed with other New England states, work to support connections between Springfield and Boston and to Montreal.
Support NNEIRI	Support planning activities for the Northern New England Intercity Rail Initiative (NNEIRI) for implementation of improved passenger rail service between Boston – Worcester – Springfield with alternating extensions to Montreal and New Haven.
Coordinate with Massachusetts for a better rail connection between Hartford and Boston	Support efforts in Massachusetts to develop the East-West connection between Boston and Springfield and coordinate service plans to provide seamless connections between Hartford, Springfield and Boston.

Better Bus & Paratransit Service

Develop Partnerships	Develop partnerships with businesses and colleges/universities to help offset the cost of providing transportation in less dense or hard to reach areas.
Customer Satisfaction Surveys	Encourage transit operators to develop an online customer satisfaction survey to be issued annually. A customer satisfaction survey will provide a mechanism for the broader public and bus users to provide feedback on bus system performance. Regularly issued surveys comprised of core questions will enable benchmarking on performance to understand where service has improved or degraded.
Downtown Circulator	Continue to support the dash service in downtown Hartford.
Enfield	Continue to support operational funding for Enfield's Magic Carpet Service.

Enhanced Transit Technology

Continue to support ITS Projects for Transit	As ITS projects for transit services are implemented in the Region, CROCG should continue to work with CTDOT, CTtransit and GHTD to monitor performance, keep up with knowledge about new technology, and recommend upgrades as appropriate. These efforts will help to ensure that both transit-dependent passengers and choice riders are afforded the best possible service.
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Implementation Schedule

Ongoing Actions *(continued)*

Enhanced Transit Technology (continued)

Support Maintenance for Implemented Transit ITS	ITS elements installed throughout the Region will require maintenance and potential upgrading through the next 25 years. CRCOG should support the maintenance and upgrading of implemented transit ITS elements.
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General Transit Feed Specification	Work with transit providers who do not already have General Transit Feed Specifications (GTFS) implemented to develop and maintain a GTFS dataset to integrate trip planning with other transit systems in the state.
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Infrastructure and Capital Improvements

Union Station Enhancement	Continue to support efforts to improve, upgrade, and enhance Union Station as the major multi-modal transportation center in the Region and as the central station for the Region's rapid transportation system until a new station is constructed.
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Alternative Fuel Deployment	Monitor electric bus technology nationwide and support the move towards sustainable fuel source equipment.
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New Multimodal Center	Continue to support the planning and development of a new multimodal transportation center as part of the I-84 Hartford project. Ensure that bus, rail, and BRT services are linked in a convenient way while encouraging bicycle and pedestrian connectivity.
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Transit Oriented Development

General Support for TOD	Support TOD along all transit lines, including traditional bus corridors, through coordinated action by CRCOG, the state, and affected municipalities: a) Develop a long-range strategy for the Region that encourages both transit and transit-supportive land use, and make station area and TOD planning a core element in the planning process for any rapid transit line or station. b) Build support for TOD among community groups, business leaders, and other stakeholders. c) Work with town officials and developers to integrate TOD into their plans and development projects through use of such tools as the Making it Happen report and Mixed-Use/Transit-Oriented Development Model Zoning Regulation.
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Implementation Schedule

Ongoing Actions *(continued)*

Transit Oriented Development (continued)

TOD for the CT**fastrak** and the Hartford Line

TOD for the CT**fastrak** and the Hartford Line. As of 2019, the CT**fastrak** busway between Hartford and New Britain is open and operating, and planning is underway for CT**fastrak** East to Storrs and Buckland Hills. The bi-state Hartford Line passenger rail service is open and operating at nine stations (four of them in the Capitol Region). In the coming years, CTDOT plans to add two entirely new Hartford Line stations (West Hartford and Enfield) and to replace three existing shelter stops with full-service, high-platform stations (Newington, Windsor, and Windsor Locks); all five of these new or replacement stations are located in the Capitol Region. While the TOD impact of CT**fastrak** and the Hartford Line has thus far been minimal, CROCOG envisions corridor-scale TOD opportunities of great Regional significance and will work to advance them.

- a) Create Station Area Plans that integrate transit, economic development, housing, and open space, with the full and coordinated participation of CTDOT, the relevant state departments, and municipal officials.
- b) Work with local officials and station area land owners (both public and private) to assemble a critical mass of developable land with good access to the station. Key factors will often include the availability of brownfield remediation assistance and funding, and an approach to commuter park-and-ride that avoids, to the greatest degree possible, the long-term dedication of potential TOD sites to surface parking lots.
- c) Invite developers to build or improve stations through “joint development”; this could involve a competitive solicitation for developers to build on public land, or a negotiation with an adjacent land owner to fund station improvements in order to unlock the TOD value of their property. Both of these models have been used in transit systems throughout the United States.
- d) Explore the creation of station-area Tax Increment Finance (TIF) Districts to support transit or other key TOD infrastructure.
- e) Engage the region’s Anchor Institutions in discussion around the value of the region’s transit investments to major and neighborhood anchors and potential implementation actions to bolster the region’s transit corridors.

Implementation Schedule

Ongoing Actions *(continued)*

Transit Oriented Development (continued)

- I-84 Viaduct / Union Station
- The largest transportation project on CROCOG's long-term planning agenda is the proposed replacement of the I-84 Viaduct in the center of Downtown Hartford. The Lowered Highway Alternative, if adopted, would produce 40-45 acres of new developable land and air rights, and the accompanying relocation of the railroad tracks would require building a new component of Union Station.
- a) Recognize, in all future planning for the Viaduct project, that Union Station and its walkshed represent a TOD opportunity of unique scale and centrality in the Region.
 - b) Undertake a planning, programmatic, conceptual design, and high-level pro forma analysis of potential TOD at and around Union Station. The objective would be to better understand the range of economic outcomes, the potential value of the land and air rights to be created by the Viaduct project, and the applicability of various joint development models used at other major downtown hub stations in the United States.

DRAFT

Chapter 03

Highway System

Well over 90% of the region's people and freight goods travel along the region's roadway network. The main focus of this chapter is on the portion of the roadway network that is of regional significance – the freeway and arterial roadways. United States Code [§1203; 23 USC 150(b)] states that it is in the national interest to focus the federal-aid highway program on the following seven national goals: Safety, Infrastructure Condition, Congestion Reduction, System Reliability, Freight Movement and Economic Vitality, Environmental Sustainability, and Reduced Project Delivery Days. This Metropolitan Transportation Plan (MTP) outlines a plan to manage the system so that it will continue to function in a safe and efficient manner and serve future travel demand.



There is frequent congestion on I-91's ramp to the Charter Oak Bridge. A top 100 nation-wide bottleneck

The Current System

In 2018, the region had 5,148 miles of roadways with an annual vehicle-miles traveled (VMT) of over nine billion. Based on Connecticut Department of Labor population projections, CRCOG’s travel demand model predicts that VMT will increase 13.9% in the region by 2045, or just over 0.5% annually. This is significantly less than national VMT growth, which per recent long-range forecasts is predicted to increase 1.2% annually. The difference is primarily the result of the slower projected population growth associated with Connecticut, and the northeast in general. Figure 03.2 shows the statewide VMT trend and projection.

The roadway system comprises a hierarchy of road types, including freeways, major non-freeway roadways (arterials), collectors and local roadways. While the higher classification roads account for a small portion of total mileage, they carry the majority of roadway travel, as shown in Figure 03.3. The main roadway classifications are explained in greater detail as follows:

- Freeways are limited access, grade-separated facilities whose function is to serve longer distance trips and through traffic. Freeways are the most important part of the region’s roadway system. The region has 156 miles of freeways, which constitute only three percent of the total road miles, but these roads carry close to one-half of the

Table 03.1 – Federal-aid Highway National Goals

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

total VMT. The region’s two most significant freeways are I-84 and I-91, which serve as the region’s main east-west and north-south routes, respectively. The region’s other freeways include I-291, I-384, Route 2, part of Route 20 (the Bradley connector), and part of Route 15 (from I-84 to the Berlin Turnpike). These highways are critical for connecting to places outside the region, for commuting and other long-distance travel within the region, and for the region’s economic health.

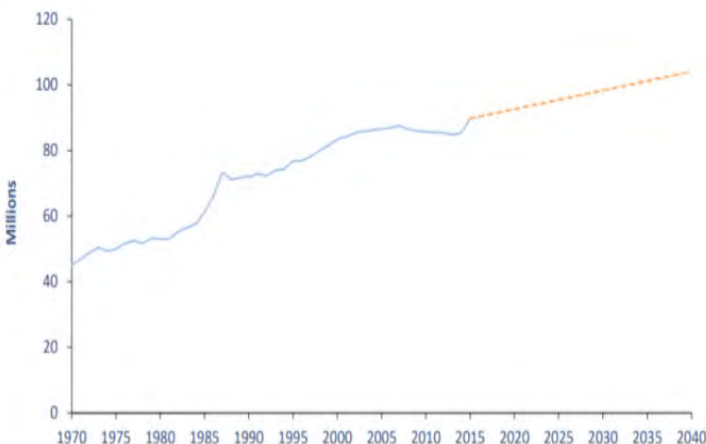
- Arterials are the second most important part of the regional roadway network. Arterial roadways serve the multiple purposes of carrying longer distance trips while also serving shorter trips and providing access to adjacent land uses. They are not limited access and generally have at-grade intersections. The arterial network comprises only 14 percent of the entire road network, but it carries 32 percent of the total traffic. In addition to many state numbered routes, the most heavily travelled

of municipally owned roadways are typically classified as arterials. Examples of arterials in the region include Route 4, Route 6, Route 44, and Route 66.

- The primary function of collector and local roads is to provide access to adjacent properties, homes, and businesses. These roadway types are typically municipally owned. They account for 83 percent of the total roadway network, but they serve a relatively small volume of traffic, or about one fifth of the total regional travel.

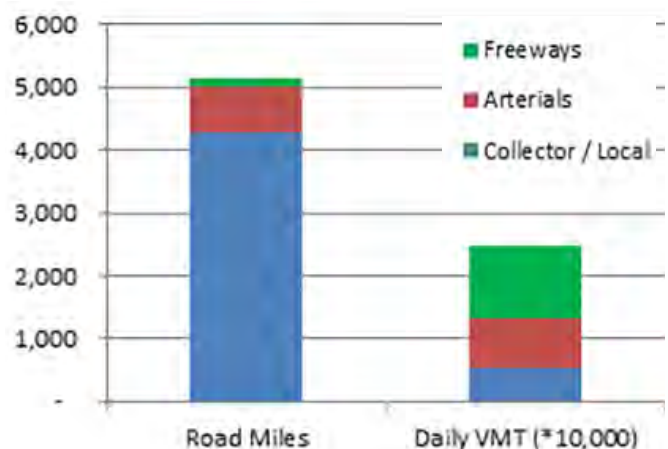
The National Highway System (NHS) is a network of strategic highways, including the Interstate Highway System and other major arterial roads serving major airports, ports, rail or truck terminals, railway stations, pipeline terminals and other strategic transport facilities. The NHS designation is intended to guide federal funding toward improving the efficiency and safety of the roads in this network. Figure 03.4 shows the NHS system in the Capitol Region.

Figure 03.1 — Statewide Vehicle Miles Traveled Trend



Source: Connecticut Department of Energy and Environmental Protection.

Figure 03.2 — Regional Roadway and Vehicle Miles Traveled, 2016

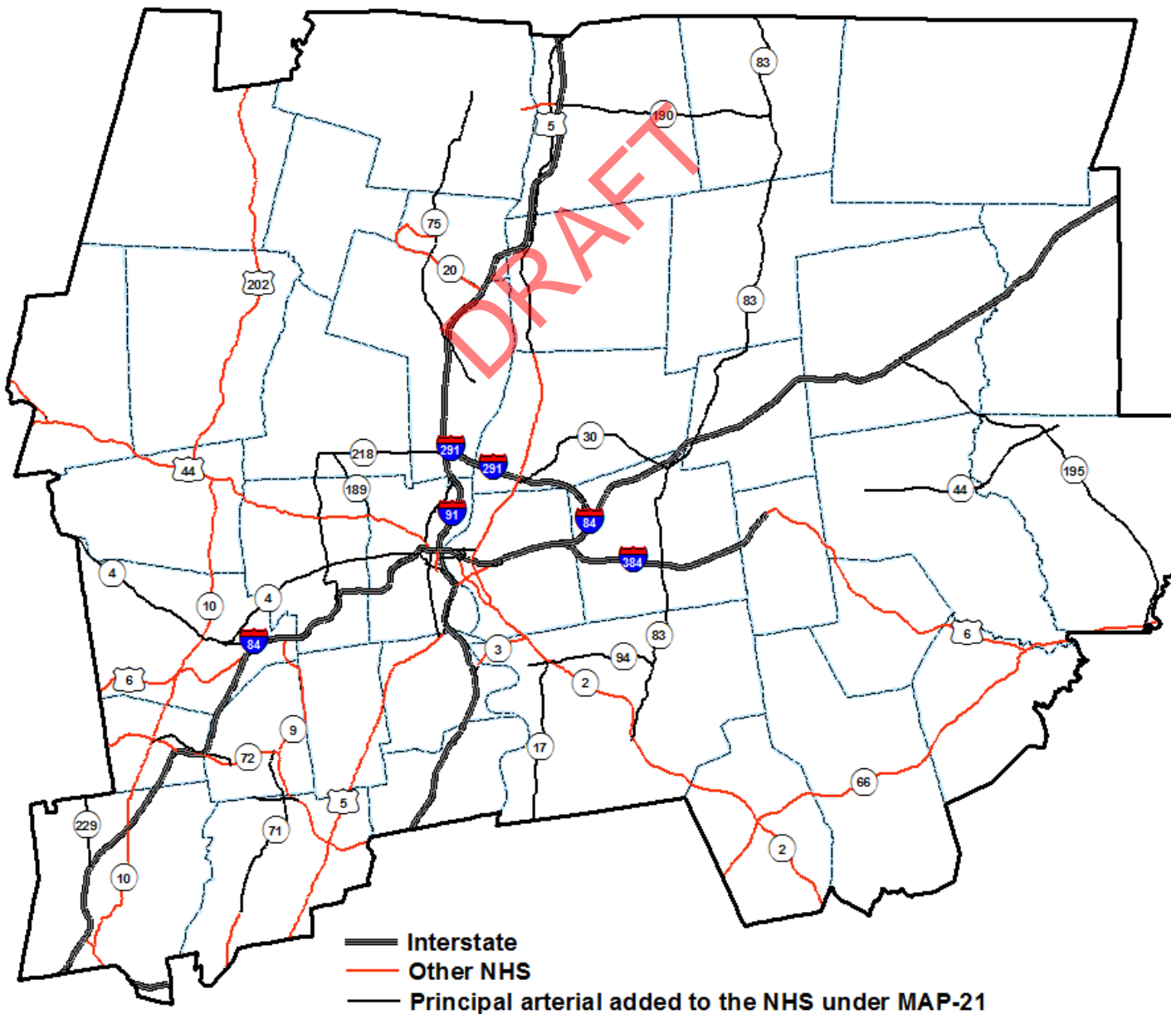


Source: CT Open Data Portal, 2016 Daily Vehicle Miles Traveled By Town and Roadway Classification.

A review of the figure shows a roadway system with major routes radiating out from the City of Hartford, including I-84 and I-91 which form an interchange within the city. These interstates are the region’s two most important for travel within the region, and the primary routes to and from locations outside of the region. West of Hartford, I-84 links to Waterbury and Danbury in Connecticut, the Hudson

River Valley in New York, and northeastern Pennsylvania. To the east, I-84 links to I-90 in Massachusetts, which is a primary route to Boston. To the south, I-91 connects to I-95 in New Haven, and to the north, I-91 connects to I-90 in Springfield, Massachusetts, and is also a primary route for destinations further north in Vermont and New Hampshire.

Figure 03.3 – National Highway System in Capitol Region



System Conditions, Issues and Deficiencies

Along with analysis related to various CRCOG programs (Congestion Management, Safety, etc.), CRCOG has assessed the current performance of its roadways for federally-required performance measures. A summary is provided below, however additional details can be found in the Performance Management chapter:

Safety

The number and rate of serious injuries within the CRCOG region have been decreasing, but the number and rate of fatalities have recently (2015 and 2016) increased. Given a similar built environment, many research efforts seem to point to more “3 Ds” driving (distracted, drunk, and/or drugged) as a major cause. Safety remains a primary focus of the region, and this recent trend only amplifies this focus.

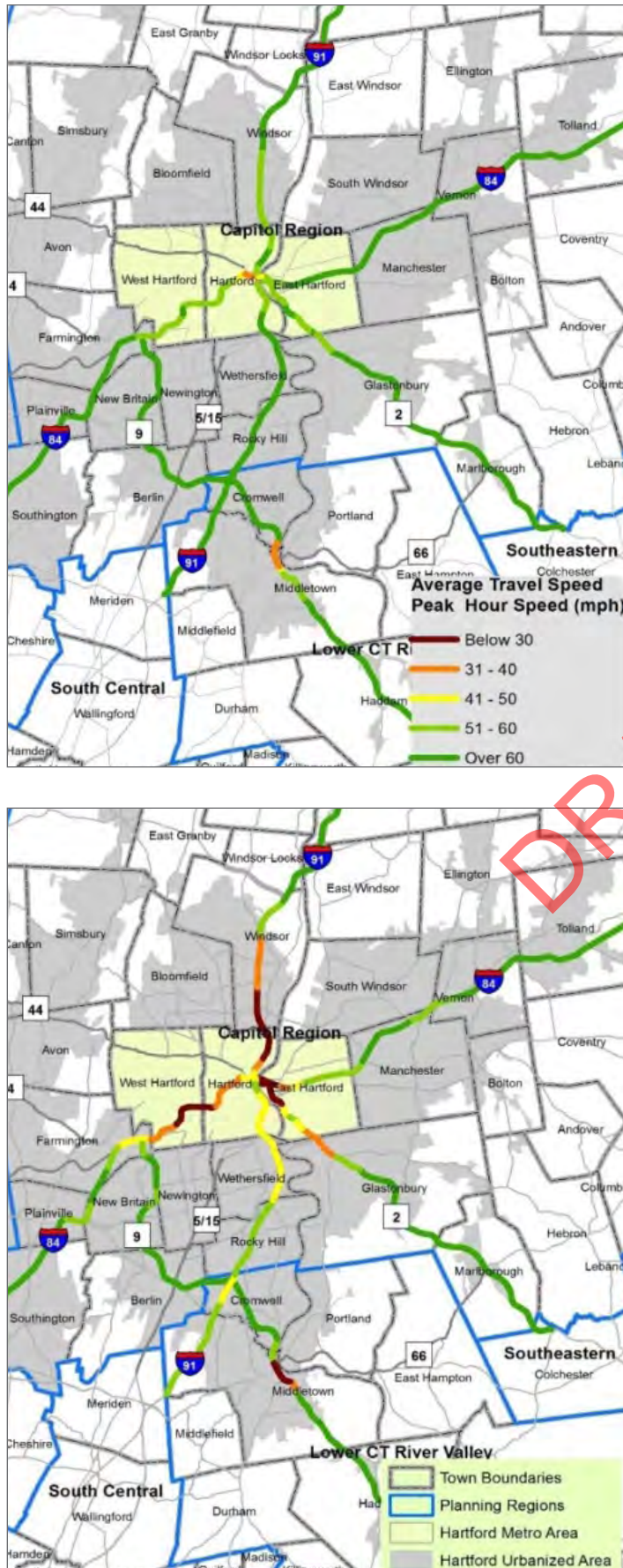
Infrastructure Condition

The region’s pavement conditions are far superior to the statewide targets and remain far from levels that would trigger federal penalty. However, the region’s bridge conditions do not meet statewide targets and the percentage in poor condition (over 15% by deck area) is expected to remain above the federally recommended 10% for at least the next four (4) years. Aging bridge infrastructure is an ongoing concern; however, a significant immediate concern is the I-84 Viaduct in Hartford, which is the prime contributor to region’s reported percent of bridges in poor condition.

Congestion Conditions

Congestion Conditions - Significant freeway congestion is experienced in the region primarily in and around Hartford during peak commuting hours. I-84 west of I-91 has been, and remains, the region’s most congested corridor, followed by I-91 north of I-84. Interstate congestion during the AM peak commuter period is generally limited to in-bound traffic (towards Hartford), however during the PM peak both inbound and outbound traffic is heavily affected. Freight is also affected, with I-84 just west of I-91, and I-91 just south of I-84 near the Charter Oak Bridge, both of which are within the top 100 truck bottlenecks in the country. Under current programming, freeway congestion for both commuters and freight is anticipated to worsen slightly within the next four (4) years. The region also experiences both spot and linear arterial congestion, and recently available performance measure data sets will greatly expand CRCOG’s congestion monitoring capabilities. The region’s morning freeway travel speeds are shown in Figure 03.5.

Figure 03.4 – Morning Peak Hour Average Travel Speeds



Overview of Proposed Strategies and Actions

CRCOG has adopted an approach that relies heavily on managing existing freeway and arterial facilities to improve safety and reduce congestion. This approach reflects a longstanding policy (first adopted in the 1994 Plan) of first attempting to address highway issues by improving the operational efficiency of the existing system before resorting to building new or wider highways. This strategy relies significantly on identification of critical improvements needed along discrete sections of the system and on implementation of Transportation Systems Management and Operations (TSM&O) policies. The Federal Highway Administration defines TSM&O as “an integrated program to optimize the performance of existing multimodal infrastructure through implementation of systems, services, and projects to preserve capacity and improve the security, safety, and reliability of our transportation system.” In this context, CRCOG strives for measuring performance, actively managing the multimodal transportation network, and delivering positive safety and mobility outcomes to the public. The strategies and actions for addressing issues relating to highway safety and congestion can generally be grouped into the following categories:

- Safety Management Program
- Congestion Management Process
- Traffic Incident Management
- Intelligent Transportation Systems

Source: Congestion Management Process, NPMRDS Update, May 2017.

- Freeway Improvements
- Arterial Improvements
- Bridge Infrastructure Improvements
- Municipal Road Management

The following sections provide a summary of proposed strategies and actions in each category.

Safety Management Program

An important objective and focus of the Capitol Region transportation planning program is assuring a reasonable level of safety for travelers who use the highways and transit systems, be they drivers, passengers, bicyclists, or pedestrians. CRCOG's long-term aspirational goal is to reach zero transportation related fatalities, ideally before 2045. However, due to the unexpected rise in fatalities in 2015 and 2016 and the short-term horizon of federal targets, CRCOG and CTDOT were hesitant to set federal performance measure safety targets that might be too aggressive and unattainable. Of immediate importance is to stem the observed fatality increases, and therefore the state adopted performance measure targets equal to the moving average of the most recent five years. The resulting target is less than the most recent annual fatality rate, and CRCOG has opted to support this statewide target. CRCOG also supports the more aggressive goals listed in the CT Strategic Highway Safety Plan with longer time horizons than the

federal performance measures. To assure a continuing and comprehensive approach to improving safety of travelers, CRCOG's safety management program contains the general components and features listed below:

- 1. Include Safety in All Studies.** Safety will be an integral element in all CRCOG studies.
- 2. Improve Safety for All Modes.** Safety is a priority in all CRCOG programs regardless of mode. Mode-specific plans, such as the regional bicycle plan, contain safety recommendations relevant to that specific mode. More comprehensive efforts, such as corridor studies, address safety issues for all roadway users - motorists, transit users, pedestrians, and bicyclists.
- 3. Monitor Regional Safety Conditions & Trends.** CRCOG will monitor safety conditions and identify emerging trends in the region. This will include regular reviews of Connecticut's Crash Data Repository and a summary of findings for all modes. Analysis completed as part of setting annual FHWA safety performance measure targets will supplement this effort.
- 4. Support Traffic Incident Management as a Safety Tool.** As detailed later in this chapter, CRCOG will continue to support traffic incident management as a valuable tool for reducing secondary crashes. CRCOG also supports the practice of procedures that ensure the safety of emergency service personnel who respond to incidents on the highway.

5. Collaborate with and Support CT

Safety Circuit Rider Program. In 2014 Connecticut, in partnership with the University of Connecticut's Technology Transfer (T2) Center, established a Safety Circuit Rider position to assist municipalities with Local Safety planning. CROCOG has and will continue to work closely with the T2 Center and the Safety Circuit Rider, including continued program support and participation on its Advisory Committee.

6. Support the CT Strategic Highway Safety

Plan. A major component of the regional safety management program is to support the CT Strategic Highway Safety Plan (SHSP), which was updated in July 2017. CROCOG served on the Steering Committee for the SHSP Update. The following summarizes the plan's six safety emphasis areas and goals over the five-year period of the plan:

- *Traffic Incident Management (TIM).* A separate section in this chapter is dedicated to CROCOG's Traffic Incident Management efforts.
- *Critical Roadway Locations.* Based on their high crash history, intersections or roadway segments will be identified needing greater scrutiny. The SHSP aims to reduce serious injuries and fatalities from crashes and roadway departures by 20% each year by 2021.
- *Driver Behavior.* The SHSP contains multiple driver behavior related goals, including reducing unrestrained occupant fatalities (-10%), alcohol-impaired ($BAC \geq 0.08$) fatalities and serious injuries (-5%), and speed-related fatalities (-8%). The plan also aims to

increase observed seat belt use from 85.4% in 2015 to 88% in 2018, and to increase the number of police agencies participating in High Visibility Enforcement (HVE) distracted driving enforcement from 50 in 2016 to 60 in 2018.

- *Motorcyclist Safety.* Motorcycles are not a large source of vehicle-miles traveled, however a large portion of fatalities are associated with motorcycles. For this group, the SHSP aims to decrease fatalities, un-helmeted fatalities, and fatalities with $BACs \geq 0.01$ by 5% each.
- *Non-Motorized Road Users.* Incidents of fatalities and serious injuries among pedestrians and bicyclists and have been increasing. The SHSP aims to decrease fatalities and serious injuries among this group by 15%.
- *Young Drivers.* Crashes involving youth drivers (aged 20 or younger) are responsible for a high number of fatalities and serious injuries. The SHSP aims to decrease the average number of youth drivers involved in fatal crashes from 23 in 2014 to 21 in 2018.

7. Assist in development of a Regional

Transportation Safety Plan. A safety plan specific to the CROCOG region is currently being prepared as part of a broader effort to formulate regional plans to supplement the state's Strategic Highway Safety Plan. CROCOG staff is working with the CTDOT assigned consultant to complete the plan, including identifying high crash locations as well as potential remedies for them. The plan is anticipated to be complete by 2020.

Recommendations

- 1. Improve Safety Management:** Improve safety management by practicing the seven principles described above.
- 2. Explore Potential Educational/Outreach Efforts:** Coordinate with AAA, CTDOT, and the T2 Center to explore potential educational/outreach efforts promoting seat belt use, combatting “3 Ds” driving, and advancing cyclist and pedestrian education.
- 3. Assist with Regional Transportation Safety Plan:** Assist with ongoing development of the Regional Transportation Safety Plan, including continued attendance at related meetings with municipalities and analysis assistance.
- 4. Promote Intersection Conversions to Modern Roundabouts:** Advance roundabout screenings within the Capitol Region to identify prime candidates for intersection conversions to modern roundabouts.

Congestion Management Process

A Congestion Management Process (CMP) is a systematic approach to measuring transportation system performance and developing proposals to manage traffic congestion. Each metropolitan area with a population over 200,000 is required to develop and implement a CMP as part of their metropolitan planning process. Hartford’s metropolitan area population exceeds 900,000, and therefore CROCOG, in concert with adjacent regional agencies, has carried out a transportation monitoring and management program since 2005.

In both 2005 and 2010, CROCOG published CMP Reports for the Metropolitan Hartford Area, assessing traffic conditions and operations on both freeway and select arterial segments. In 2015, CROCOG published a NPMRDS update, which utilized the National Performance Management Research Data Set (NPMRDS) to update the congestion monitoring and assessment report portions.

The report provides a snapshot of congestion in the region. Of primary concern is the almost 10,000 hours of congestion delay on CROCOG’s interstates within the 4 peak hours of the single average weekday. The majority of this congestion is centered around the I-84 and I-91 interchange area, with I-84 west of I-91 being the region’s most congested, followed by I-91 north of I-84. These findings are echoed by a 2015 Urban Mobility Report from the Texas Transportation Institute (TTI), listing Hartford as 29th out of 101 most congested urban areas,

with an average of 45 hours of delay per auto commuter. This translates to a 20% increase in average commuting time and an estimated \$1,038 of congestion cost per auto commuter.

A critical component of the CMP's efforts is the discussion of mitigation strategies. Many of the recommendations made in previous CMPs have already been implemented. The recommendations below include both new and ongoing efforts, including many from the prior CMP:

Recommendations

- 1. Promote Congestion Mitigation Projects.** Advance projects in the TIP that relate to congestion mitigation.
- 2. Expand Transit.** Promote **CTfastrak** and NHHS Rail Service to expand transit options and connectivity
- 3. Advance Transit System Enhancements.** Work to advance Transit System Enhancements study findings identified in the Sustainable Communities Initiative projects conducted in Enfield, Manchester and Windsor
- 4. Assist in Advancing Park and Ride.** Monitor park and ride lot usage and work with CTDOT on improvements such as expanding lots with high utilization rates, reviewing transit service access as part of the Comprehensive Service Analysis, and providing/upgrading amenities such as shelters and bike racks/lockers where appropriate
- 5. Identify Improvements on CMS Corridors.** Partner with CTDOT to identify potential improvements at locations along the Congestion Management System (CMS) corridors with a higher than expected crash rate
- 6. Encourage Transit Oriented Development (TOD).** Encourage TOD including the development of model sustainable land use regulations
- 7. Provide Multi-Modal Planning Support to Communities.** Provide technical support to communities strengthening the multimodal network and continue to build upon the regional trail system
- 8. Support educational initiatives that encourage safe bicycle and pedestrian transportation**
- 9. Update Congestion Management Plan (CMP).** Provide a CROCOG Update of the CMP in conformance with federal performance measure standards, and in coordination with the three other regions whose boundaries stretch into the Hartford TMA
- 10. Develop Additional Congestion Management Strategies.** Establish further strategies to reduce congestion and evaluating their effectiveness
- 11. Measure Impact of Transit Initiatives on Congestion Mitigation.** Evaluate the impact of implemented transit initiatives on CMP reporting, and update reporting as necessary

Traffic Incident Management



Since 1998, CROCOG has played a major role in Traffic Incident Management (TIM) activities not only in the Greater Hartford

region but also statewide. TIM provides a systematic, planned, and coordinated multi-disciplinary approach to detect, respond and clear crashes to restore traffic capacity as safely and quickly as possible.

TIM is the primary tool for reducing highway congestion that occurs when crashes, breakdowns, or other incidents result in a full or partial blockage of the highway. According to FHWA, traffic incidents on U.S. roadways account for about 25 percent of all delays, and every minute a freeway lane is blocked due to an incident results in 4 or 5 minutes of additional travel time delay. The goals of TIM are to respond sooner to incidents, clear the incidents more quickly, and manage traffic better during the crash.

TIM programs also enhance motorist and responder safety during traffic emergencies. Properly employed practices can greatly reduce time spent on-scene, and responder's exposure to on-scene hazards. The sooner motorists involved in the incident are removed from the scene; the sooner they are moved out of harm's way and can receive needed treatment, if any. Additionally, shorter clearance times significantly reduce the likelihood of secondary crashes caused by suddenly slowed or stopped traffic, lane

closures, and the movement of emergency vehicles. FHWA has determined that the likelihood of a secondary crash increases by 2.8% for every minute of roadway blockage.

A key to continuous effective TIM practices is creating and sustaining partnerships with law enforcement, fire and emergency medical services, transportation and environmental agencies, towing and recovery, drivers, the media, the insurance industry and others. To this end, CROCOG established the Greater Hartford TIM Coalition (GHTC) in January 2018. The GHTC is comprised of members that serve various stakeholder groups and has been tasked with providing guidance and direction to the TIM community to achieve new goals and strengthen the program. The program includes the development of a general framework and approach to defining and engaging regional planning organizations and municipalities, reinforce the organizational practices and requirements established within the National Incident Management System, and define the Coalition's role in TSMO. Focuses of the GHTC include:

- Training of responders is a key to providing funding resources, opportunities for responders to participate, and locations for multi-disciplinary training.
- Adopting and updating TIM policies and documents to reflect current regulations, laws, policies and guidance. These include the Regional Unified Response Manual (RURM), Enhanced Accident Response Plan (Public Act No. 15-5, Senate Bill 1502 Sec. 164), Quick Clearance Policy, and State of Connecticut Highway Incident Management Policy.

- Developing and applying TIM performance measures and targets. Although federal performance measures and safety management programs measure safety and congestion in general, data and performance metrics specific to TIM may prove valuable. These measures may specifically deal with non-recurring congestion, responder safety, and incident response and incident clearance times. Critical to this implementation will be the availability of reliable data.
- Maintaining and updating of diversion plans used to equip and guide state and local emergency responders as part of an effective TIM program. Diversion plans are critical when there is a need to implement detours during long term closures due to a traffic crash, planned events, and non-recurring incidents.

Another important TIM program has been the operation of CT Highway Motorist Assistance Program (CHAMP Service), which has been in service for over 20 years. In 2017, a new sponsorship agreement between the Connecticut Department of Transportation (CTDOT) and State Farm™ provided funding to continue the program renamed the “CTDOT State Farm Safety Patrol.” The service patrol operates each weekday from 5:30 AM to 7:00 PM throughout the Greater Hartford area, including sections of I-91, I-84, I-291 and Route 2. This service enhances highway safety by proactively patrolling and assisting stranded motorists and provides better traffic control at incident scenes to alleviate congestion and prevent secondary crashes.

Recommendations

1. Support Traffic Incident Management

Activities. Continue the planning, implementation and coordination of activities such as the adoption of a Unified Response Manual, updating of diversion plans, TIM training, and participation in the FHWA annual TIM Self-Assessment. Also work on the development and implementation of a public awareness campaign for motor vehicle laws relating to highway incidents such as the “Move It” and the “Move Over”.

2. Support Traffic Incident Management

Partnerships. Continue to support governmental, private and public stakeholders in cultivating best practices, legislation and policy, training and performance measures. Some groups include the Greater Hartford TIM Coalition, the Capitol Region Emergency Planning Council (CREPC), and Strategic Highway Safety Plan Steering Committee.

3. Support the State-operated State Farm Safety Patrol Program. .

Continue support for this Highway Motorist Assistance Program.

4. Support Performance Measures.

Continue working on data integration and collection as it relates to safety performance measures that focus on non-recurring delay/congestion, reliability, quick clearance, and reduction in secondary crashes.

Intelligent Transportation Systems

CTDOT uses Intelligent Transportation System (ITS) technology to monitor traffic conditions on all major freeways with closed-circuit video cameras and special traffic flow monitors. Operators in CTDOT's highway operations center check traffic flow and instantly report problems to the general public, motorists, transit operators, emergency service agencies, and trucking businesses. Information is distributed via e-alerts, variable message signs, highway advisory radio transmitters, commercial radio and TV stations, and the Internet.

ITS / Operations. In 1997, CROCOG adopted a strategic plan for the deployment of ITS systems in the Capitol Region. This Plan was updated in early 2015. Both ITS Plans identified applications for ITS that will benefit freeway operations, arterial road operations, and public transit operations.

ITS Architecture. In 2017, with CROCOG's assistance, CTDOT updated the statewide ITS architecture. This architecture identified existing and planned ITS systems, and additional needed improvements; information interconnects between and among the existing, planned, and needed ITS systems; and any agreements or ITS-related standards required for ITS project interoperability. The ITS architecture meets the federal ITS architecture requirements for the region.

The update of the ITS Strategic Plan for the Capitol Region harnessed the experience and energy of stakeholders from planning, design, and operational arenas. The result is a plan with the following five goals and action items:

GOAL 1: Reduce Congestion and Stimulate Economic Growth by Moving Traffic More Safely and Efficiently

- Replace Aged ITS Investments
- Improve Incident Identification and Verification Capabilities
- Expand Traveler Information Accessibility
- Integrate Third Party Detection Data

GOAL 2: Stimulate Growth of Public Transportation Ridership by Enhancing the Users' Experience

- Build on the Success of CTfastrak
- Enhance the Seamlessness of the Public Transportation Network
- Increase User Friendliness of the Public Transportation System

Figure 03.5 – Variable Messaging Sign



GOAL 3: Improve Traffic Signal Management, Operations and Maintenance by Developing a Sustainable Computerized Traffic Signal System Program

- Strengthen Existing Practices (Stage 1)
- Create Collaborative Regional Group for Computerized Signal Systems (Stage 2)
- Leverage Advanced Signal Systems to Benefit the region (Stage 3)

GOAL 4: Achieve Sustainable Transportation Operations through the Use of Technology

- Implement Technology to Reduce Impacts of the Roadway Network on the Environment
- Enhance the Sustainability of ITS Deployments

GOAL 5: Enhance Roadway Safety through the Use of Technology

- Expand Roadway Weather Situational Awareness Capabilities
- Enhance Coordination of and Access to Roadway Incident, Emergency, and Weather Event Information Among First Response Stakeholders
- Reduce Secondary Incidents and Increase the Safety of First Responders in the Field

Recommendations

1. Update of Regional ITS Strategic Plan.

Provide updates to the CROCOG regional ITS Strategic plan every 5 to 10 years.

2. Monitor Advancements in ITS Technology.

Monitor advancements in ITS technologies and continue coordination and education efforts with CROCOG municipalities.

3. Assure Modernization of the Regional ITS Architecture.

Continue to coordinate with statewide ITS activities including participation in statewide ITS architecture updates.

4. ITS Implementation.

Continue implementing ITS to update the freeway traffic management system and enhance incident management efforts.

5. Regional Traffic Signal Operations and Management.

Continue to research the benefits and impacts of providing a regional approach to operating and maintaining local traffic signal systems.

Freeway Improvements

This plan highlights the major projects planned for the freeway system through 2045. Perhaps the two most significant projects are the I-84 Hartford project in the area of the Viaduct, and the I-91 at the Charter Oak Bridge project. Other notable projects involve the reconstruction of the interchange of I-84 with Routes 4, 6, and 9, and the replacement of the Putnam Bridge over the Connecticut River. Although recently rehabilitated, the Putnam Bridge is anticipated to need replacement by 2045. In addition, various studies have suggested the potential need for improvements in other areas including I-84 at the Buckland Development Area, I-84 in the Rentschler Development Area, and I-91 at the Day Hill Development Area.

These projects do not include any new freeways. Nonetheless, CTDOT has been considering alternatives for re-building the I-84 & I-91 interchange, which eventually could lead to a proposal for a relocated alignment. Concepts for the I-84 & I-91 interchange area are in the early planning stages, and therefore even order-of-magnitude costs cannot yet be estimated. Consequently, the project has not been included in the fiscally constrained portion of this plan. However, due to its importance, the project has been included as an unfunded need.

Interstate 84 Hartford Viaduct Project

Built in 1965, the I-84 Hartford Viaduct is a $\frac{3}{4}$ mile long section of elevated highway that extends from the Sisson Avenue interchange to the Asylum and Capitol Avenue interchanges (Figure 03.7). Serving as a major truck route, enduring harsh winters, and carrying 175,000 vehicles daily, the Viaduct in Hartford is approaching the end of its useful life. Its current poor condition has resulted in a seemingly unending string of maintenance and rehabilitation projects that aim to maintain minimum bridge conditions and carrying capacity. Additionally, the size of the Viaduct's sections classified as being in poor condition significantly impacts the region's federal bridge performance measures. As challenging as the replacement of the viaduct is, it also presents a tremendous opportunity to mitigate or eliminate damage done to Hartford when the original viaduct was constructed. Built on an alignment directly through the heart of the city, the Viaduct structure splits neighborhoods, disrupts the city street network, and dramatically alters the quality of life in residential and business districts alongside the highway. The need to rebuild or replace the Viaduct offers the potential to re-knit the communities, open new parcels of land for development or an extension of Bushnell Park, bolster economic development, strengthen the

“ As challenging as the replacement of the viaduct is, it also presents a tremendous opportunity to mitigate or eliminate damage done to Hartford [...] ”

transportation network and improve the adjacent Amtrak rail corridor, improve safety, congestion, and regional bridge conditions.

Community interest in how the Viaduct structure gets rebuilt gave rise the CROCOG I-84 Viaduct Study, completed in 2010. Led by the Hub of Hartford Committee, the planning study explored a broad range of possible project alternatives that would improve the I-84 infrastructure, while considering economic development opportunities, neighborhood connectivity, community cohesion, livability, and mobility. Study findings prompted CTDOT to kick-off the I-84 Hartford project in 2013 to create a long-term solution; CROCOG participates on the state's Public Advisory Committee (PAC). The project embarked on a significant environmental planning effort including a Needs and Deficiencies Phase, which culminated with the Analysis, Needs, and Deficiencies Report in July 2015. Those efforts have been continued through a rigorous NEPA process including working towards the release of a Draft Environmental Impact Statement anticipated in early 2019. Looking forward, the currently envisioned schedule includes a 2019 Record of Decision (ROD) endorsing a preferred alternative to move forward onto final design, followed by construction in the early 2020s.

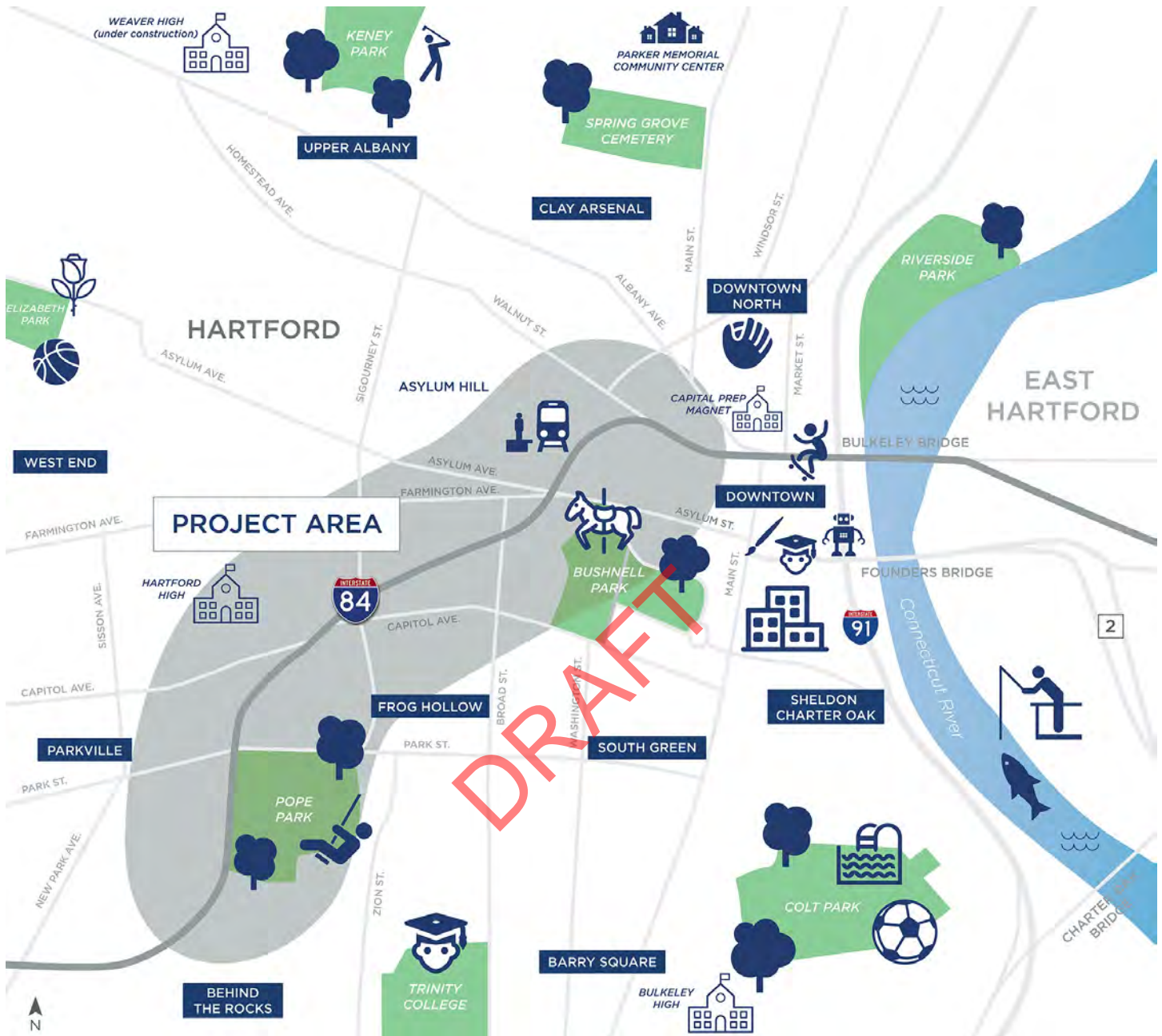
With replacement costs anticipated at approximately \$3.5 billion, replacing the Viaduct poses a major financial challenge. Its funding is included in this plan; however it will be a challenge to undertake a project of this size in the face of numerous competing needs. To advance this project, Connecticut

may need to identify additional revenue sources, including the potential for any value capture mechanisms. Given the desire and envisioned demand for development above any proposed depressed sections of I-84, appropriate planning and policies should be explored that encourage opportunities for development above the highway, including potential air-right value capture mechanisms.

Recommendations

- **Coordinate I-84 Viaduct Study with Other Regional Planning Efforts.** Coordinate study findings with ongoing planning and regional assets such as One City, One Plan (Hartford's Plan of Conservation and Development), the Hartford Line passenger rail initiative, and CTfastrak.
- **Assist in I-84 Viaduct Implementation Planning and Funding Identification.** Continue discussions and develop an overall project implementation approach and associated timeline with CTDOT and the City of Hartford. Key near-term concerns will be the identification of funding for the next phases of project development.
- **Continue to serve on the project Public Advisory Committee.**
- **Promote Economic Development Opportunities Associated with I-84 Viaduct Project.** Advocate for appropriate planning and policies that will help encourage opportunities for development above the highway, including potential air-right value capture mechanisms.

Figure 03.6 – I-84 Viaduct Project Area and Surrounding Communities



Putnam Bridge Replacement

The Putnam Bridge carries Route 3 over the Connecticut River between Glastonbury and Wethersfield. It is one of eight crossings of the River in the Capitol Region. The current structure was built in 1959 and has been identified in many recent CROCOG Regional Transportation Plans as being in need of major repair. In 2008, repairs were made to the bridge deck and the travel lanes were resurfaced. In 2015, a major rehabilitation project was completed consisting of structural steel repair, bearing replacement, and the addition of a sidewalk along the bridge's south side. This rehabilitation project is anticipated to serve the bridge's structural needs for 20-30 years, after which CTDOT staff has indicated that it will likely need replacement. Although a sidewalk has been constructed on the bridge, connections between it and the multimodal networks in Glastonbury and Wethersfield still need to be funded and constructed.

Construction of a new bridge would take years of planning, design, and construction, with the current bridge needing to serve traffic until an adjacent new bridge is completed, and therefore its funding has been included in this plan.

Recommendations

- **Promote Multi-Modal Connections to Putnam Bridge Replacement.** Continue discussions with CTDOT and the towns of Glastonbury and Wethersfield related to funding the multi-modal connections to the bridge's new sidewalk
- **Monitor Putnam Bridge Condition.** Continue to monitor the condition of the current Putnam Bridge, including the likely timeline needed for its replacement

I-91 at Charter Oak Bridge

The ramp from I-91 northbound to the Charter Oak Bridge and Route 15 eastbound experiences persistent congestion and has been routinely included in the American Transportation Research Institute's top 100 truck bottleneck routes in the country. High volumes of traffic use this single lane approach to the Connecticut River crossing. Its capacity problem is exacerbated by the curvature and grade of ramp, high volumes of truck traffic, and weaving issues between the merge at the top of the ramp and nearby diverge on the other side of the Charter Oak Bridge. To address these issues a major project involving the relocation of I-91 northbound at Interchange 29 in Hartford, and the widening of I-91 and Route 5/15 in both Hartford and East Hartford has been undertaken.

In 2014, CTDOT completed a comprehensive study that identified alternatives to address this major congestion issue. The preferred alternative involves relocating the single-lane ramp currently travelling from the east side of I-91 to the east side of Route 5/15's approach to the Charter Oak Bridge. A new two-lane ramp will be constructed travelling from I-91's east side (left exit) and carry traffic to the west side of Route 5/15's approach to the Charter Oak Bridge. New ramp grades will be appropriate for existing and anticipated truck traffic volumes, and the ramp configurations will reduce the need for much of the weaving movements currently occurring on the Charter Oak Bridge. In addition to addressing the ramp's issues, additional roadwork is

proposed along I-91 and along Route 5/15 east of the bridge to reduce congestion and improve safety. Design and bidding phases were completed in 2018 and construction is anticipated to start in the Spring of 2019.

Recommendation

- **I-91 at Charter Oak Bridge.** Monitor conditions during construction, including advocating for CROCOG member town's concerns. Utilize CROCOG Traffic Incident Management capabilities to inform first responders of the need for maintenance and protection of traffic changes during construction and facilitate any necessary coordination.

Other Operational Improvements

Physical deficiencies on freeways such as sharp curves, narrow shoulders, short ramps, substandard merge/weaving distances, and left-hand entrances can both restrict the capacity of the road and create safety problems. The objective of the proposed operational improvement program is to remove these substandard conditions so that the roadway can operate more efficiently and safely.

Figure 03.7 – Traffic near exit 29 on I-91 North



I-84 at Buckland Development Area

Access to and within the Buckland development area has gotten increasingly difficult with its continued growth. The problem was recognized in the 2004 Plan and a study was subsequently initiated by CTDOT at the request of CROCOG and the affected towns. The study evaluated operational improvements and demand management alternatives for this area that is considered one of six Economic Development Areas of Regional Significance in the Capitol Region.

Recommendation

- **I-84 at Buckland Development Area.**

Work in partnership with CTDOT and municipal officials from Manchester and South Windsor to monitor the Buckland Development area. Include an 'allotment' for Buckland Area improvements as unfunded needs list due to financial limitations but continue to recognize this as a regional need. Work to evaluate how an extension of CTfastrak to the east could assist in mitigating congestion.

I-84: Hartford to Farmington

More than half of the daily delay on freeways in the Capitol Region occurs in the I-84 corridor west of downtown Hartford. Major state transit initiatives and Transportation Demand Management (TDM) measures are being actively advanced to manage peak hour congestion and reduce vehicle miles travelled. However, even with full implementation of these initiatives, operational improvements will be necessary. Several studies have been completed to address the freeway's problems such as the Hartford West Major Investment Study, the West Side Access Study and currently underway the Interstate 84 Needs and Deficiency Study (associated with the replacement of the Interstate 84 Viaduct). Key projects that are being advanced include.

- *I-84 at Rt4/Rt6/Rt9* – Reconstruct the interchanges of I-84 at Route 4, Route 6, and Route 9. Key elements include elimination of eastbound bottleneck near Route 9, elimination of left-hand ramps, better access to Route 6, direct access from Route 4 to Route 9 southbound.
- *Operational lanes at South Main* – Construct operational or auxiliary lanes from the South Main Street interchange (West Hartford) to the Ridgewood Road interchange (exits 40–42).
- *I-84 Viaduct Replacement* – See above.

Recommendation

- **I-84: Hartford to Farmington** Work in partnership with CTDOT and municipal officials to advance the above projects.

I-84 at Rentschler Development Area

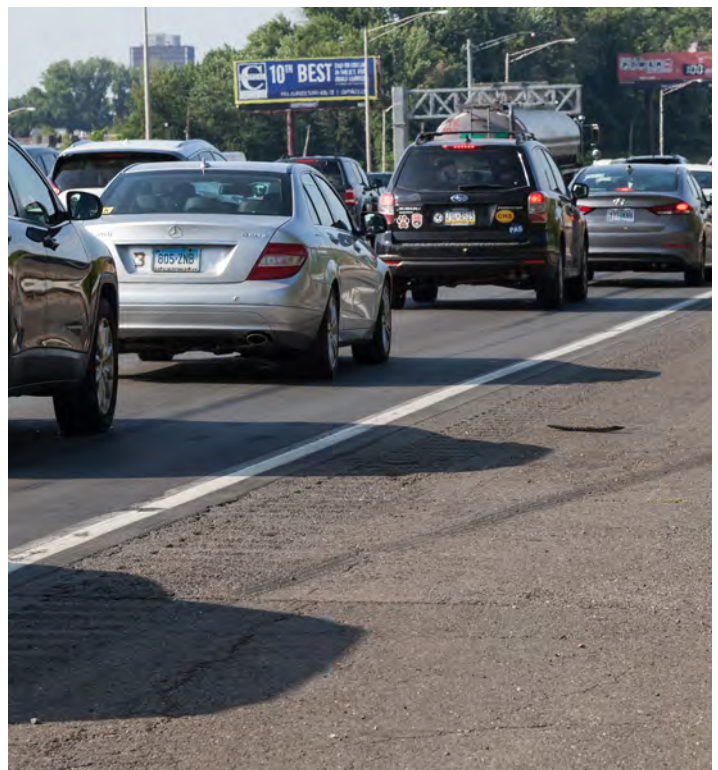
Improve access to the Rentschler Field redevelopment area in East Hartford. An interchange improvement at I-84 & Silver Lane was recommended in the Rentschler Field Access Study. A modified version of the concept was evaluated and recommended as part of an environmental assessment of the Rentschler development plan.

Recommendation

I-84 at Rentschler Development Area.

The proposed flyover connection should be assessed further as development occurs, to help facilitate redevelopment of this Economic Development Area of Regional Significance.

Figure 03.8 — **Congested exit ramp to Charter Oak**



I-91 at Day Hill Development Area

Improve access to the Day Hill-Griffin Development Area in Windsor. Access problems to this area were identified in the Bradley Area Transportation Study and a technical study that was completed in 2005.

Recommendation

- **I-91 at Day Hill Development Area.** Provide a direct connection to northbound I-91 from Day Hill Road by the construction of spans over Route 75 and I-91; and widening northbound Interstate 91 to provide an additional operational lane from the Route 75 interchange to the Kennedy Road interchange or to the Route 20 interchange. This additional northbound lane will require widening the existing bridge carrying Interstate 91 over the Farmington River.

Route 2 within the Region

The length of Route 2 within the region experiences safety and operational issues, particularly at its interchanges with I-84 and Route 3 and at multiple tightly spaced entrance and exit ramps with minimal acceleration/deceleration lane lengths.

Recommendation

- **Route 2 within the Region.** Provide safety improvements along Route 2 in East Hartford including ramp geometric improvements and roadside safety improvements.

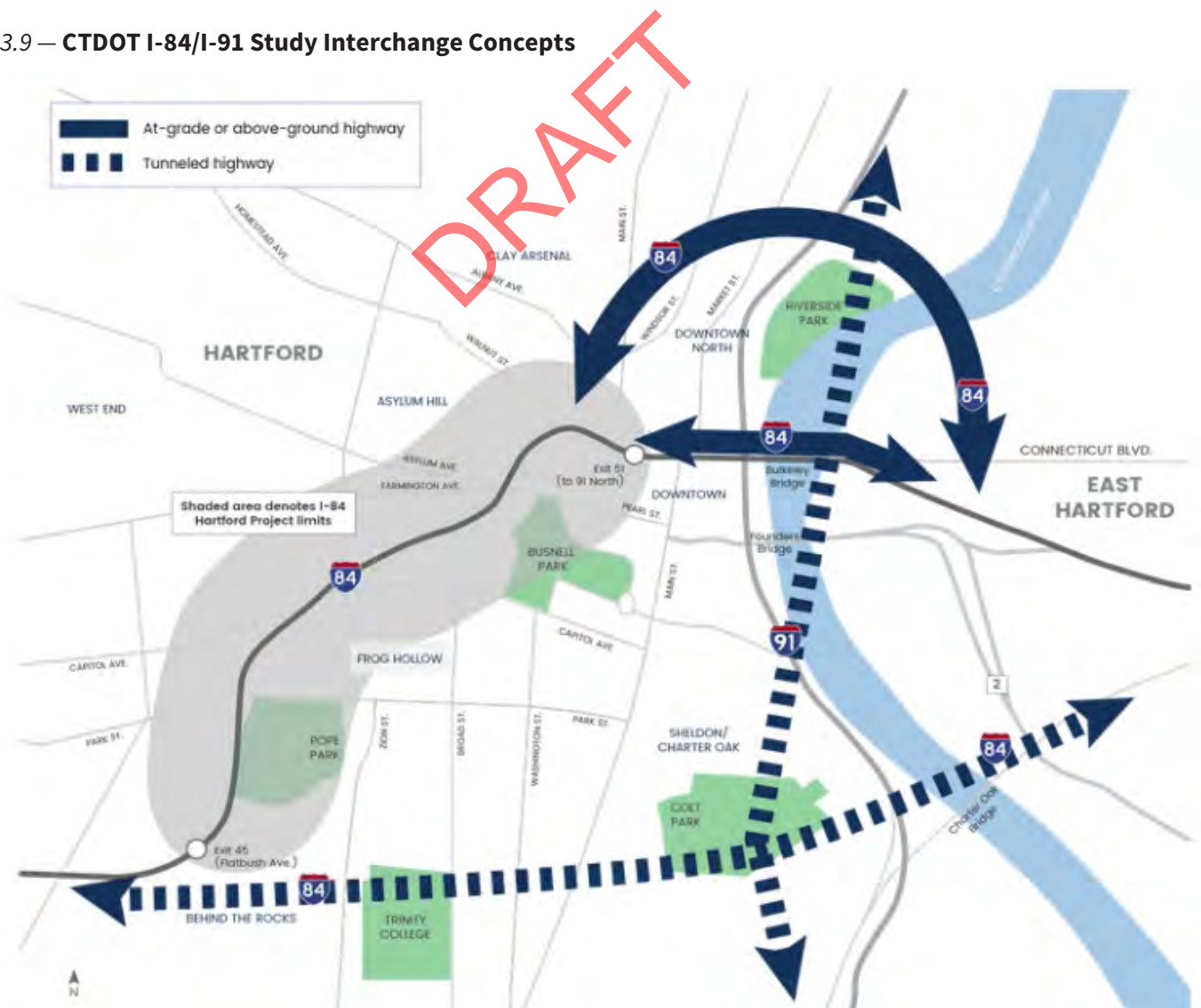
Unfunded Need: I-84/I-91 interchange

I-84 carries three lanes in each direction east and west of Hartford’s urban core. The highway, however, is limited to two lanes in each direction at the I-91 interchange and over the Bulkeley Bridge, causing considerable congestion. Therefore, in 2016, CTDOT launched the I-84 / I-91 Interchange Study. The prime objective of the study was to seek out possible congestion relief improvements in this area. As shown in Figure 03.10, three general concepts are being studied:

- 1) Modify the existing interchange
- 2) Relocate the interchange to the north
- 3) Relocate the interchange to the south

The concepts are being studied at a very broad level with the purpose of first determining if the concepts are feasible from an engineering perspective. Second, the study will broadly assess the benefits and impacts to residents, businesses, travelers, properties, neighborhoods, and the natural environment. CTDOT’s analysis has shown that none of these three concepts they have

Figure 03.9 – CTDOT I-84/I-91 Study Interchange Concepts



studied would allow for the elimination of the need to complete the I-84 Hartford (Viaduct) project, as none of the concepts identified thus far would redirect enough traffic to allow for the elimination of a freeway in that area.

Various stakeholders have noted that, due to the costs associated with addressing both I-84/I-91 interchange congestion and the nearby I-84 Viaduct condition, studies related to these projects should continue to consider other issues associated with the current system. Based on stakeholder feedback, planning and designs for these facilities should address the following:

- Reunite Hartford by removing much of the physical barrier currently created by I-84
- Open Hartford's riverfront by reducing the impediment of I-91 to the river
- Provide opportunities to reinforce the levee system, which in many areas supports I-91
- Reduce the footprint of the I-84/Route 2 Interchange in East Hartford
- Free up land for economic development and green space
- Relieve downtown congestion

Recommendations

- **Assist with I-84/I-91 Planning Efforts.**

Continue to support CTDOT's study of the interchange and act as a conduit between CTDOT, the City of Hartford, and other stakeholders to assure all voices are heard in the study process. Assist CTDOT with the review of major impacts and benefits to assure adequate consideration of the region's needs prior to any major planning decisions are made, especially relative to the screening of or alternatives or advancement of alternatives to a next phase.

- **Ensure that All Design Concepts Are**

Thoroughly Explored. Work with CTDOT to determine if all concepts have been sufficiently explored that could address some of the additional issues highlighted by stakeholders in this section.

Arterial Improvements

The arterial roadway improvement program is based primarily on recommendations developed through corridor planning studies completed by CROCOG. These studies involve detailed technical analysis and extensive community involvement to produce plans developed with an understanding of the context of the land use, cultural, historic, economic, and environmental context in which the roadway is located. The process includes the comprehensive study and evaluation of various alternate concepts, including no-build options and the application of other less disruptive improvements, such as access management and traffic signal optimization. The goal is to develop plans that both improve the traffic conditions and make the community a better place to live.

Below are brief summaries of major CROCOG corridor studies. These summaries illustrate the general nature of recommended improvements; however, each study contains a more comprehensive set of recommendations adopted by CROCOG's Policy Board.

Route 3: Rocky Hill

The Town of Rocky Hill is interested in addressing existing transportation safety, access, and operational issues within the Route 3 (Cromwell Avenue) / Route 411 (West Street) area, along with implementing transportation improvements to accommodate development at appropriately zoned locations. The "Route 3 Traffic and

Development Study" recommendations focus on accommodating transportation needs while maintaining and improving the character of nearby residential areas. Roadway related recommendations are listed below.

Route 3 (Cromwell Avenue) Corridor

- Support construction of an Elm Street to West Street Connector Roadway, parallel to Route 3, to help alleviate Route 3 traffic congestion.
- Improve operations and safety within the Route 3 corridor by implementing transportation recommendations, including traffic signal modifications and the addition of approach lanes, at intersections with New Britain Avenue, Elm Street, West Street/France Street, Brook Street, and Inwood Road.
- Implement access management strategies and provide bicycles and pedestrian accommodations.

Route 411 (West Street) Corridor

- Improve operations and safety of intersections with I-91 Ramps, including the addition of intersection approach lanes and exclusive left turn phase.
- Improve signal operations at intersection with Main Street by realigning into a conventional 4-way intersection and providing turn lanes.

Route 6: Bolton, Andover, Coventry, and Columbia

Route 6 is an undivided arterial roadway serving a major travel corridor where local access needs conflict with the needs of long-distance through traffic. Construction of new freeway paralleling existing Route 6 and connecting I-384 in Bolton Notch to the Route 6 bypass around Willimantic had been a recommendation in CROCOG's Regional Transportation Plan for many years. However, due primarily to unresolvable environmental issues the project reached an impasse in the mid-90's, and shortly after the project was dropped from CTDOT's Long Range Plans.

Even though multiple safety improvements have been completed along Route 6 over the past ten years, multiple safety issues remain along with the need to address connectivity, access management, and development potential. Therefore, in 2013 CROCOG completed a transportation study of the Route 6 Corridor that included the towns of Bolton, Andover, Coventry, and Columbia. This "Route 6 Hop River Corridor Transportation Study" resulted in recommendations that complemented those made in a cooperative Economic Development Strategy and Master Plan Study, completed in October 2010 along the same corridor. Major roadway recommendations are listed to the right.

I-384 expressway/Route 6/ Route 44 interchange

- Improve connectivity and safety at the I-384 expressway/Route 6/Route 44 interchange, including addressing the safety concerns with and connectivity of Notch Road access.

Route 6

- Support implementation of transportation improvements enabling the communities' envisioned "village node" concepts along Route 6 at Bolton Crossroads (located near Bolton Ice Palace and Munson's Chocolates), Coventry Ridge (located west of South Street), Historic Andover Center (located west of Long Hill Road), and Lighthouse Corners (located at Route 66 in Columbia). Recommendations at each of these locations included measures to reduce Route 6 travel speeds, support bicycles and pedestrians, and improve access management.
- Implement access management, multi-modal accommodations, traffic operations, and traffic safety improvements at critical locations throughout the corridor.

Route 10: Simsbury

In 2011, CROCOG completed a Route 10 Corridor Study for the portion of Route 10 in the Town of Simsbury. The study ran from Wolcott Road and Route 10 in the northern end of town to the southern municipal border of Avon and Simsbury on Route 10. The roadway recommendations are generally included in the improvements listed below.

Route 10

- Create an additional parallel roadway west of Route 10 south of the town's center to alleviate Route 10 congestion on and provide opportunity in supporting potential future development.
- Implement access management strategies particularly in the North and South gateways to the Town of Simsbury where there is potential for major redevelopment. In the northern gateway, the recommendation is to seek access to new developments through existing driveways or create intersections opposite local streets where possible.
- Improve traffic and safety at critical locations by adding new traffic signals and coordinating the signal system; introducing new left turn lanes at all signalized intersections in the Town Center from Seminary Road to Wilcox Street; extending Wolcott Road from the intersection of Route 10 to Hoskins Road in the northern gateway; and, relocating Nod Road at the Route 185 intersection to create an opportunity for widening Route 185 from Route 10 to the two eastbound lanes ascending Simsbury mountain.

- Improve conditions for bicyclists and pedestrians by encouraging Complete Streets infrastructure throughout the corridor. Concepts include reducing pavement in key intersections; reducing speed limits; restriping travel lanes to 11' to help reduce travel speeds and increase the shoulder width to better accommodate bicyclists; replacing pedestrian signals throughout the corridor; creating sidewalks and developing a sidewalk maintenance or enforcement program; installing pedestrian scale lighting.
- Improving connectivity in Weatogue Village. Expand the commuter parking lot in Weatogue Village and redesign the Route 10 intersection at Stratton Brook Road. These improvements would also include the creation of a village green and multi-modal transit area where the Farmington Canal Heritage Trail and the commuter lot meet.

Figure 03.10 – The Bulkley Bridge between Hartford and East Hartford



Route 44: Hartford To Canton

Route 44 is the primary east-west route linking the Farmington Valley with Hartford and West Hartford. In the commercial areas of Canton and Avon, safety problems related to left turns at driveways are the primary concern. Similar problems exist at Bishops Corner in West Hartford. Safety is a critical problem on Avon Mountain where steep grades, sharp curves, and high speeds result in frequent and severe crashes. In Hartford, problems include a high crash rate, speeding on residential side streets, insufficient parking, and inadequate drainage. The major roadway recommendations are listed below.

Route 44

- Avon Mountain: Continue to monitor the effectiveness of safety improvements completed in 2011.
- Avon-Canton Commercial Area: Relocate Dowd Avenue and correct left-turn crash problem by reconstructing Route 44 with a median. A wide median will allow landscaping to create an attractive, “boulevard” type appearance.
- Bishops Corner, West Hartford: Correct safety problems by redesigning, relocating, or closing commercial driveways. Install a 4-foot wide raised median to reduce left-turn related crashes.
- Hartford: Add streetscape, drainage, and signal timing improvements along Albany Avenue from Homestead Avenue to Main Street. Add traffic calming on nearby residential streets.

Route 175: Wethersfield & Newington

Congestion is the key problem in the west end of the corridor near Route 9. Speeding and safety are concerns on the remainder of the 4-lane section through Newington. There are major congestion and safety problems where Route 175 crosses under the Berlin Turnpike, at the Route 15 interchange, and at Fenn Road. In the largely residential sections through Wethersfield, there are some minor geometric and safety problems. Major roadway recommendations are shown below.

Newington

- Maintain current 4-lane cross section but provide improvements at key locations.
- Route 9 access: Realign Route 9 SB on-ramp.
- Access management & signal coordination.
- Newington Center: No improvements.
- Route 175/Route 15 Interchange: Reconstruct using an urban single-point design.
- Route 175 / Fenn Road and Fenn Road / Ella Grasso Turnpike intersection improvements.

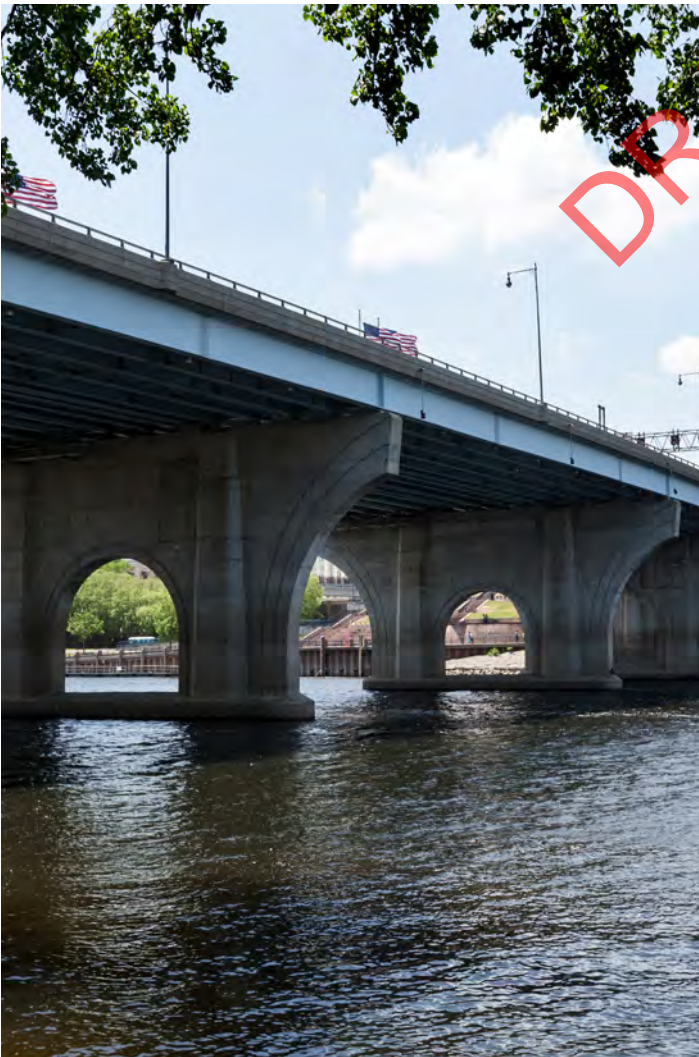
Wethersfield

- Maintain as a 2-lane roadway but provide improvements at key intersections. Route 190: Enfield & Somers.

ROUTE 190: Enfield & Somers

Route 190 is the primary east-west roadway in Enfield and Somers. Although traffic is expected to increase in this corridor over the next twenty years, no major widening of the roadway will be required. Instead improvements can be limited to intersections and short sections of road. The following projects will address safety and congestion problems, while preserving or enhancing the character of the four villages in the corridor. The major roadway recommendations are shown below.

Figure 03.11 – Founders Bridge between Hartford and East Hartford



Enfield

- Commercial area (I-91 to Palomba Dr.): Access management, minor improvements to Phoenix Avenue intersection, coordinate traffic signals, add or widen sidewalks, and construct multi-use trail
- Transition area (Palomba to Hazardville): Access management, minor widening to allow a 3-lane cross section between Palomba Dr. & Enfield Professional Park, sidewalks, and 5-foot shoulders for bicycles
- Hazardville: Streetscape improvements, and minor improvements to Maple Street intersection
- Scitico: Streetscape improvements, operational improvements at Taylor Road and Broadbrook Road

Somers

- Somersville: Operational improvements at Route 190/Shaker Road, traffic signal at Route 190/School Street, streetscape improvements, traffic calming on School Street, and other minor improvements
- Somers center: Streetscape improvements, intersection realignment at Route 83, and sidewalks

Route 195: Tolland

The Tolland community has a strong interest in making transportation improvements to the area in and around the Historic Town Green. Recommendations focus on calming traffic and improving safety and operations within the Tolland Town Green area, including the those shown below.

Route 195

- Create northern and southern gateways approaching the Green on Route 74 and Route 195, respectively. Gateway improvements include both textured and raised medians, and the introduction of a lateral shift to reduce speeds in the northern gateway.
- Reconfigure the Route 195/Route 74 intersection into two separated traditional intersections, reducing the amount of pavement utilized for the intersection and returning the balance to the Town Green.
- Intersection improvements at Route 195 and Old Post Road.
- Provide traffic calming visual cues on all roadways approaching and throughout the Town Green area including the use of period lighting, sidewalks, and special shoulder treatments.

With assistance from CROCOG, the town advocated for initiation of a project that would implement the improvements outlined above. Design has been underway and is nearing completion with the construction phase anticipated to be obligated 2020.

Route 305: Windsor And Bloomfield

The Route 305 corridor primarily serves east-west mobility between Interstate 91, the center of Windsor to the east, and Blue Hills Avenue in Bloomfield to the west. The following projects address transportation issues along the 2.5-mile segment of Route 305 from Route 187 to Interchange 37 with Interstate 91. Additionally, a Route 305 extension to Route 189 would provide additional economic development opportunities and an additional roadway link to the area network. Enhancements below consist of both localized improvements at individual intersections and longer term regional capacity improvements.

Localized Improvements

- Reconstruct the following intersections to provide improvements including turn lanes on Route 305 and/or cross streets:
 - Route 305 from Interchange 37 to Brookview Road
 - Route 305 at Sheffield Drive and Brewster Road
 - Route 305 at Addison Road
 - Route 305 at Marshall Phelps Road
 - Route 305 at Mill Brook Crossing
- Realign the following intersections to provide for improvements including more standard geometrics:
 - Route 305 at East Newberry Road
 - Route 305 at Old Iron Ore Road
- Improve pedestrian accommodations throughout the corridor and specifically at the Route 305 intersection with Route 187 (Blue Hills Avenue)

Regional Capacity Improvements

- Monitor traffic growth and assess the need to reconstruct Route 305 to provide for two (2) eastbound and two (2) westbound travel lanes between Interchange 37 and Marshall Phelps Road
- Work with the Town of Bloomfield and CTDOT to explore progressing an envisioned extension of Route 305 to Route 189 Bloomfield

Berlin Turnpike: Wethersfield & Newington

The Berlin Turnpike serves a long-established, but still growing commercial area. There are major safety and congestion problems at both the Route 175 interchange and the Prospect Street intersection. It is important to address these major problems as well as some minor problems related to commercial driveways, while still maintaining good access to businesses.

Wethersfield

- Access management & minor traffic operational improvements
- Landscaped median

Route 175/Route 15 Interchange

- Reconstruct using an urban single-point design to improve traffic flow and safety

Newington

- Realign the Route 15/Prospect/Robbins intersection
- Close or realign selected median breaks
- Improve landscaping in the corridor, particularly within the median
- Promote better access management

Unfunded Arterial Needs

The region's roadway needs are continuously evolving. Many associated projects have not been funded within this document, as the appropriate improvements have either yet to be either fully identified, vetted, cost estimated, and/or endorsed by CROCOG committees. Consequently, the state, region, and municipalities routinely fund transportation studies to fully identify and vet new projects. CROCOG typically holds an annual solicitation for these studies, which vary in focus from corridor-specific to regionwide. Arterial projects that have demonstrated significant benefits, but are not yet fully vetted include:

Monteith Drive Extension, Farmington

The Town of Farmington has indicated its desire to prioritize a new arterial network connection by extending Monteith Drive beyond Route 4 to New Britain Avenue, necessitating the construction of a new bridge across of the Farmington River. Additional environmental screening and cost estimating would likely be necessary prior to project funding.

Intersection Conversions to Roundabouts

CROCOG plans to complete and provide municipalities the results of a regional roundabout screening. The screening is anticipated to highlight locations within the region that may most benefit from a transition from their current traffic control to modern roundabouts.

Bradley Area Transportation Study

The Bradley Area Transportation Study evaluated current and future traffic conditions in the vicinity of Bradley International Airport. Recommendations focused on: (1) improving ground access to the Airport, and (2) correcting other traffic problems in the four towns adjacent to the Airport.

Airport Access (see Chapter 5 for details)

- Northside Access Improvements (Route 190 connector)
- Westside Access Improvements (Bradley Park Road extension)
- Route 75 Improvements

Improvements within Each Town

The study recommended numerous other improvements in the four towns such as traffic and streetscape improvements in Suffield center, similar improvements in East Granby's town center, and traffic improvements in the Day Hill area of Windsor. See the corridor study for details. Additionally, long-term improvements were identified for I-91 at Day Hill Road (see Freeway Operational improvements above).

Rentschler Field Access Study: East Hartford

The former Rentschler Airport is a 650-acre, prime development site located within two miles of downtown Hartford. It offers an excellent opportunity for in-fill development that supports regional 'smart growth' goals. Although development such as the UConn football stadium has opened on the site, plans call for most of the rest of the site to be developed to stimulate additional growth in the high tech sector of the region's economy. To fully realize the economic benefits of the potential development, access to the site needs to be improved from I-84 and from Route 2.

Access from I-84

- Improve access to Rentschler site from I-84 by grade separating Silver Lane/Roberts Street intersection
- Improve access to Rentschler site from I-84 by grade separating Silver Lane/Roberts Street intersection

Access from Route 2

- Improve access from Route 2 by reconstructing the Route 2/Main Street interchange to allow direct access from Route 2 to the southern end of the site

Roadway through the Site

- Construct a new town-owned roadway through the site.

Special Concern: Rocky Hill - Glastonbury Ferry

The Rocky Hill - Glastonbury Ferry is a unique element in the region's transportation system. It is the oldest continuously operating ferry in the United States, and the only ferry service within the region. As part of State Route 160, the ferry serves cars, motorcycles, cyclists, and pedestrians who want to cross the Connecticut River, the region's most prominent natural feature forming a nearly 28-mile long north-south divide through its center.

Within the region, there are only eight highway bridges that cross the river. Due to the difficulty and cost of providing additional bridges, the ferry's importance as a ninth crossing opportunity cannot be understated. By using the ferry, motorists traveling between parts of southern Glastonbury and Rocky Hill can cut nearly eight miles (one-way) off their trip. More importantly, because bicycle access on the Putnam Bridge is not allowed, the ferry is the only crossing for cyclists in the 13 miles between Hartford and Middletown. But the ferry is not only a transportation asset. As one of the very first river crossings in the region, the ferry serves to remind both residents and tourists of the regional history and strong ties to the Connecticut River.

Recommendation

1. Continue Operation of Historic Ferry.

The Capitol Region Council of Governments supports the continued operation of the historic ferry with adequate hours of operation and a reasonable fare structure.

Bridge Infrastructure Improvements

The Bridge Safety and Evaluation Section of CTDOT inspects all state bridges and all municipally owned bridges with spans greater than 20 feet on a regular basis (typically every 2 years). During the inspections, structural components, such as decks, superstructures, and substructures, are evaluated and assigned a numerical rating ranging from 0 to 9, with "9" being the best, and "0" being the worst. Based on these ratings a bridge is categorized as being in "good", "fair", or "poor" condition. If the rating of any major structural component receives a "poor" rating (a rating of 4 or less), the bridge is considered to be in poor condition. Bridges in poor condition may not be able to carry full legal loads and should be programmed for repair or replacement.

In addition, CTDOT applies a sufficiency rating to each bridge by evaluating its integrity based on its structural adequacy, safety, serviceability, and essentiality of public use. The result is a percentage with 100% representing an entirely sufficient bridge and 0% an entirely deficient bridge. The priority rating is based on the sufficiency rating as well as ratings of the main structural components and the structure's load carrying capacity. The priority rating is used to prioritize bridge projects for funding purposes, with the lowest rating being the highest priority for funding.

The prioritization, construction, and maintenance of the region's bridges along state roadways is primarily CTDOT's responsibility, with input from CRCOG.

CTDOT employs a sophisticated bridge management system that links investments to outcomes and prioritizes projects that maximize bridge conditions given assumed funding levels. This is valuable in setting, programming for, and achieving performance measure targets. Within the region, the most significant bridges affecting federal targets are associated with the I-84 Viaduct in Hartford. CTDOT is currently progressing a project through the environmental phase to address this regional issue. By 2045, another significant regional bridge, the Putnam Bridge, is anticipated to need replacement.

For bridges along town or city roadways, the governing municipality bears the prioritization, construction, and maintenance responsibilities. Recognizing the difficulty that municipalities have in meeting this responsibility, in 1984, Connecticut's General Assembly enacted a program that provides for state financial assistance to municipalities for the removal, replacement, reconstruction or rehabilitation of local bridges. Currently under this program, a municipality may qualify for a grant ranging from 15% to 50% to cover eligible project costs. Additionally, federal funding (up to 80%) is currently available through CTDOT's Local Bridge Program for qualifying municipal bridge projects. Funding is limited to municipal bridges with spans greater than 20 feet and have CTDOT sufficiency ratings less than 80% (for rehabilitation), and less than 60% (for replacement). To assist towns with the prioritizing and funding of the region's bridges, CROCOG regularly distributes lists of the municipal

bridge sufficiency ratings and informs municipalities of both federal and state bridge program solicitations opportunities. Additionally, the region has dedicated specific state funded programs solicitations as bridge only solicitations, with selection criteria aligned with sufficiency ratings.

Recommendation

- 1. Funding for Municipal Bridges.** Support funding initiatives that assist Municipalities in securing monies to address bridge repair, replacement or removal on town roadways, while placing priority on bridges that most improve regional performance measures. Continue to keep municipalities apprised of bridge conditions and solicitation opportunities.
- 2. Funding for State Bridges.** Support funding for regional Bridges that assist in meeting Bridge Condition performance targets. This MTP identifies funding for replacement of two of the most significant highway bridges in the region by 2045: The I-84 Viaduct and the Putnam Bridge. The viaduct's size and poor condition make it the region's largest contributor to its amount of bridges (by deck area) in poor condition.

Municipal Road Management

The Metropolitan Transportation Plan is a systems level plan that addresses problems on the major transportation systems: the regional transit system, the freeway system, and the arterial system. The focus on the higher-level systems is necessary but it means that problems on lower level systems, such as collector roads, have not been identified as part of this plan. While the region has not identified specific problems on collector roads, they recognize that problems do exist and that municipalities sometimes need financial assistance to correct the more serious problems.

Most of the roads in the collector system are the responsibility of municipalities. They are maintained and improved through local operating budgets and capital improvement budgets. In some cases, the cost of major reconstruction or of correcting serious geometric and safety problems can exceed a town's capacity to finance the improvement. In the past, the region has recognized these problems and allowed towns to use federal funds to correct serious problems on town-owned collector roads. This policy of allotting small amounts of federal funds to solve selected problems on town-owned collector (or arterial) roads will continue within the limits of available funding and the competing need to address problems on higher level systems.

In 2012, FHWA issued a Local Agency Traffic Signal Operations and Maintenance Report aimed at enhancing traffic control systems

and refining municipal operations and maintenance plans. Since its publication CROCOG has worked with CTDOT and regional municipalities to foster awareness and training on traffic signals, incorporate traffic signals into ITS Strategic Planning and support a Traffic Signal Circuit Rider program throughout Connecticut.

Recommendation

- 1. Funding for Town Roads.** Continue a policy of allowing the use of federal funds to address serious problems on town-owned roads classified as collector or higher. Funding decisions will consider the limits of available federal funds and the competing need to address problems on higher level systems.
- 2. Traffic Signals.** Support on-going efforts to work with municipalities on traffic signal operations and maintenance plans, including working with the Connecticut Traffic Signal Circuit Rider program.
- 3. Explore Regional Approach to Traffic Signal Management.** Begin exploring the opportunities in establishing a regional traffic signal program.

Implementation Schedule

Short-Term Recommendations

Congestion Management Process

Update Congestion Management Plan (CMP)	Provide a CRCOG Update of the CMP in conformance with federal performance measure standards, and in coordination with the three other regions whose boundaries stretch into the Hartford TMA.
Measure Impact of Transit Initiatives on Congestion Mitigation	Evaluate the impact of implemented transit initiatives their impact on CMP reporting, and update reporting as necessary

Freeway Improvements

I-91 at Charter Oak Bridge	Monitor conditions during construction, including advocating for CRCOG member town's concerns. Utilize CRCOG Traffic Incident Management capabilities to inform first responders needs of maintenance and protection of traffic changes during construction and facilitate any necessary coordination.
I-84 at Buckland Development Area	Work in partnership with CTDOT and municipal officials from Manchester and South Windsor to monitor the Buckland Development area. Include an 'allotment' for Buckland Area improvements as unfunded needs list due to financial limitations but continue to recognize this as a regional need. Work to evaluate how an extension of CTfastrak to the east could assist in mitigating congestion.

Long-Term Recommendation

Freeway Improvements

I-91 at Day Hill Development Area	Evaluate bus stop locations and consolidate stops to create at least 1,000 feet between stops. Stop consolidation creates faster, more reliable, and more comfortable service while allowing resources for stop improvements such as amenities and accessibility to be focused.
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Ongoing Actions

Safety Management Program

Improve Safety Management	Improve safety management by practicing the seven principles described above.
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Implementation Schedule

Ongoing Actions *(continued)*

Safety Management Program (continued)

Explore Potential Educational/ Outreach Efforts	Coordinate with AAA, CTDOT, and the T2 Center to explore potential educational/outreach efforts promoting seat belt use, combatting “3 Ds” driving, and advancing cyclist and pedestrian education.
Assist with Regional Transportation Safety Plan	Assist with ongoing development of the Regional Transportation Safety Plan, including continued attendance at related meetings with municipalities and analysis assistance.
Promote Intersection Conversions to Modern Roundabouts	Advance roundabout screenings within the Capitol Region to identify prime candidates for intersection conversions to modern roundabouts.

Congestion Management Process

Promote Congestion Mitigation Projects	Advance projects in the TIP that relate to congestion mitigation.
Expand Transit	Promote CTfastrak and NHHS Rail Service to expand transit options and connectivity
Advance Transit System Enhancements	Work to advance Transit System Enhancements study findings identified in the Sustainable Communities Initiative projects conducted in Enfield, Manchester and Windsor
Assist in Advancing Park and Ride	Monitor park and ride lot usage and work with CTDOT on improvements such as expanding lots with high utilization rates, reviewing transit service access as part of the Comprehensive Service Analysis, and providing/upgrading amenities such as shelters and bike racks/lockers where appropriate
Identify Improvements on CMS Corridors	Partner with CTDOT to identify potential improvements at locations along the Congestion Management System (CMS) corridors with a higher than expected crash rate
Encourage Transit Oriented Development (TOD)	Encourage TOD including the development of model sustainable land use regulations

Implementation Schedule

Ongoing Actions *(continued)*

Congestion Management Process (continued)

Provide Multi-Modal Planning Support to Communities	Provide technical support to communities strengthening the multimodal network and continue to build upon our regional trail system
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Support educational initiatives that encourage safe bicycle and pedestrian transportation

Develop Additional Congestion Management Strategies	Establishing further strategies to reduce congestion and evaluating their effectiveness of these strategies.
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Traffic Incident Management

Support Traffic Incident Management Activities	Continue the planning, implementation and coordination of activities such as the adoption of a Unified Response Manual, updating of diversion plans, TIM training, and participation in the FHWA annual TIM Self-Assessment. Also work on the development and implementation of a public awareness campaign for motor vehicle laws relating to highway incidents such as the “Move It” and the “Move Over”.
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Support Traffic Incident Management Partnerships	Continue to support governmental, private and public stakeholders in cultivating best practices, legislation and policy, training and performance measures. Some groups include the Greater Hartford TIM Coalition, the Capitol Region Emergency Planning Council (CREPC), and Strategic Highway Safety Plan Steering Committee.
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Support the State-operated State Farm Safety Patrol Program	Continue support for this Highway Motorist Assistance Program.
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Support Performance Measures	Continue working on data integration and collection as it relates to safety performance measures that focus on non-recurring delay/congestion, reliability, quick clearance, and reduction in secondary crashes.
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Intelligent Transportation Systems

Monitor Advancements in ITS Technology	Monitor advancements in ITS technologies and continue coordination and education efforts with CROCOG municipalities.
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Implementation Schedule

Ongoing Actions *(continued)*

Intelligent Transportation Systems (continued)

Assure Modernization of the Regional ITS Architecture	Continue to coordinate with statewide ITS activities including participation in Statewide ITS architecture updates.
ITS Implementation	Continue implementing ITS to update the freeway traffic management system and enhance incident management efforts.
Regional Traffic Signal Operations and Management	Continue to research the benefits and impacts of providing a regional approach to operating and maintaining local traffic signal systems.

Freeway Improvements

Coordinate I-84 Viaduct Study with Other Regional Planning Efforts	Coordinate study findings with ongoing planning and regional assets such as One City, One Plan (Hartford's Plan of Conservation and Development), the Hartford Line passenger rail initiative, and CTfastrak.
Assist in I-84 Viaduct Implementation Planning and Funding Identification	Continue discussions and develop an overall project implementation approach and associated timeline with CTDOT and the City of Hartford. Key near-term concerns will be the identification of funding for the next phases of project development.
Continue to serve on the project Public Advisory Committee	
Promote Economic Development Opportunities Associated with I-84 Viaduct Project	Advocate for appropriate planning and policies that will help encourage opportunities for development above the highway, including potential air-right value capture mechanisms.
Promote Multi-Modal Connections to Putnam Bridge Replacement	Continue discussions with CTDOT and the towns of Glastonbury and Wethersfield related to funding the multi-modal connections to the bridge's new sidewalk.
Monitor Putnam Bridge Condition	Continue to monitor the condition of the current Putnam Bridge, including the likely timeline needed for its replacement.

Implementation Schedule

Ongoing Actions *(continued)*

Freeway Improvements (continued)

I-84: Hartford to Farmington	Work in partnership with CTDOT and municipal officials to advance the above projects.
I-84 at Rentschler Development Area	The proposed flyover connection should be assessed further as development occurs, to help facilitate redevelopment of this Economic Development Area of Regional Significance.
Route 2 within the Region	Provide safety improvements along Route 2 in East Hartford including ramp geometric improvements and roadside safety improvements.
Assist with I-84/I-91 Planning Efforts	Continue to support CTDOT's study of the interchange and act as a conduit between CTDOT, the City of Hartford, and other stakeholders to assure all voices are heard in the study process. Assist CTDOT with the review of major impacts and benefits to assure adequate consideration of the region's needs prior to any major planning decisions are made, especially relative to the screening of or alternatives or advancement of alternatives to a next phase.
Ensure that All Design I-84/I-91 Interchange Concepts Are Thoroughly Explored	Work with CTDOT to determine if all concepts have been sufficiently explored that could address some of the additional issues highlighted by stakeholders in this section.

Rocky Hill-Glastonbury Ferry

Continue Operation of Historic Ferry	The Capitol Region Council of Governments supports the continued operation of the historic ferry with adequate hours of operation and a reasonable fare structure.
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Bridge Infrastructure Improvements

Funding for Municipal Bridges	Support funding initiatives that assist Municipalities in securing monies to address bridge repair, replacement or removal on town roadways, while placing priority on bridges that most improve regional performance measures. Continue to keep municipalities apprised of bridge conditions and solicitation opportunities.
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Implementation Schedule

Ongoing Actions *(continued)*

Municipal Road Management

Funding for Town Roads	Continue a policy of allowing the use of federal funds to address serious problems on town-owned roads classified as collector or higher. Funding decisions will consider the limits of available federal funds and the competing need to address problems on higher level systems.
Traffic Signals	Support on-going efforts to work with municipalities on traffic signal operations and maintenance plans, including working with the Connecticut Traffic Signal Circuit Rider program.
Explore Regional Approach to Traffic Signal Management	Begin exploring the opportunities in establishing a regional traffic signal program.

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Chapter 04

Complete Streets

The private automobile is not the only way to travel within the Capitol Region. Alternative travel modes include local and express bus service provided primarily by **CTtransit**, commuter rail along the Hartford Line, bus rapid transit (BRT) along **CTfastrak**, paratransit services provided for the elderly and persons with disabilities through such agencies as the Greater Hartford Transit District, rideshare services, and active transportation alternatives (bicycles, scooters, and pedestrian options, to name a few). This section of the LRTP focuses on transit options.





The Capitol Region, like many other regions in the country, has begun to recognize the value of active transportation and is working to take steps towards improving pedestrian and bicycle access, and safety. Several towns

in the region have developed committees to examine bike and/or pedestrian issues. The City of Hartford has committed to incorporating bike lanes with repaving efforts where road widths allow. This aligns with broader cultural trends and a national resurgence towards a transit and active transportation oriented society; through strategic action in the coming decade the region has the opportunity to become a leader in this arena.

CRCOG maintains a separate bicycle and pedestrian plan that is currently undergoing a significant update. The region’s current plan was developed in 2008 and updated in 2015 with new projects. The vision from that plan was:

We envision a Hartford region where people will choose and be able to walk and bicycle as

a way to travel, to be healthy and to relax. This will be a region where authorities, organizations and individuals have:

- *recognized the value of walking and bicycling;*
- *made a commitment to healthy, efficient and sustainable communities; and*
- *worked together to overcome the physical, social and institutional barriers that often limit an individual's choice to walk and bicycle.*

Our vision enables us to imagine a transformed region where population centers are connected and people can ride their bikes or walk throughout the region on dedicated bike and pedestrian paths and ways, free from the increasing costs of automobile travel, pollution and noise. The strategy for achieving this vision is based on efforts in the 5 “E’s”: Engineering, Education, Encouragement, Enforcement, and Evaluation.

CRCOG is in the process of developing a new plan that broadens its focus to complete streets. The current plan sees non-motorized transportation as an integrated part of the region’s transportation system. Instead of focusing on dedicated facilities it promotes the integration of all modes into every transportation project.



The plan that is currently under development includes three focus areas:

- The Regional Complete Streets Network Map
- Complete Streets Policies
- Implementation Guidance

At the state level, there have been several statewide plans to improve walking and biking. The latest effort, the CT Bike Ped Plan 2017 Update, is currently in progress. In addition, the following statewide legislation has been passed:

- An Act Improving Bicycle and Pedestrian Access (Public Act 09-154)
- Vulnerable User Law (Public Act 14-31)
- Bicycle Safety Bill (Public Act 15-41)

The Connecticut Department of Transportation (CTDOT) has also completed the following plans, studies, and design guidance with sections relevant to improving walking and biking:

- CT Community Connectivity Program Roadway Safety Audits (2016 – Present) – Roadway safety audits completed in Avon, Berlin, Bloomfield, Bolton, Canton, Columbia, Coventry, East Hartford, Ellington, Enfield, Glastonbury, Manchester, Mansfield, New Britain, Newington, Plainville, Simsbury, South Windsor, Southington, Tolland, Vernon, West Hartford, and Windsor.
- CTDOT Connecticut On the Move: Strategic Long-Range Transportation Plan 2009 – 2035 (2009)
- CTDOT Highway Design Manual, 2003 (2013)
- CTDOT Strategic Highway Safety Plan (2010 – Updated in 2013)
- CTDOT 2015 Statewide Transportation Improvement Program – STIP (2015)

Existing Conditions

Since 2008 the region, and the state, have made significant progress in implementing bike and pedestrian projects. The following is a summary of major accomplishments in a few key areas:

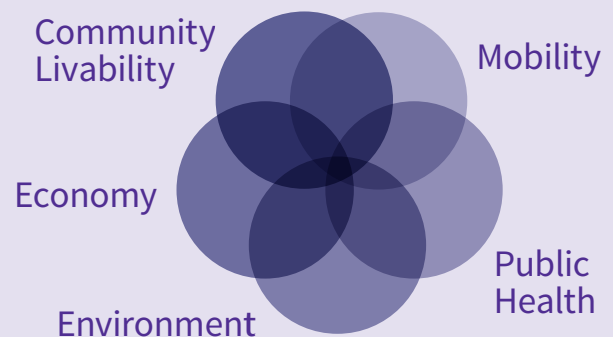
Trails

The focus of the 2008 Bike/Ped plan's trails section was completion of the East Coast Greenway (ECG). This Long-Range Transportation Plan includes full completion of the ECG within the CROCOG region as a funded project. Only a few gaps in the trail still remain and most of them are either planned, in design, or actively being studied.

Funding

Up until recently funding for complete streets and trail projects was limited to a few key sources. For the most part, funding came from the Recreational Trails Program, Transportation Alternatives (or Enhancements in previous

Societal Benefits of a Walkable / Bikeable Region



years), and municipal funds. As part of its LetsGoCT initiative, the state has dedicated significant state resources to closing gaps in trails and building more complete streets. Over \$30 million of state funds have been dedicated to trail projects since 2015 and the state started a new Community Connectivity Grant Program that provides technical assistance for evaluating safety issues, as well as competitive capital grants. The infusion of resources has led to completion of the Farmington section of the ECG which included a bicycle and pedestrian bridge over Route 6; extension of the ECG to Bolton along Interstate 384; and implementation of complete streets projects throughout the region.

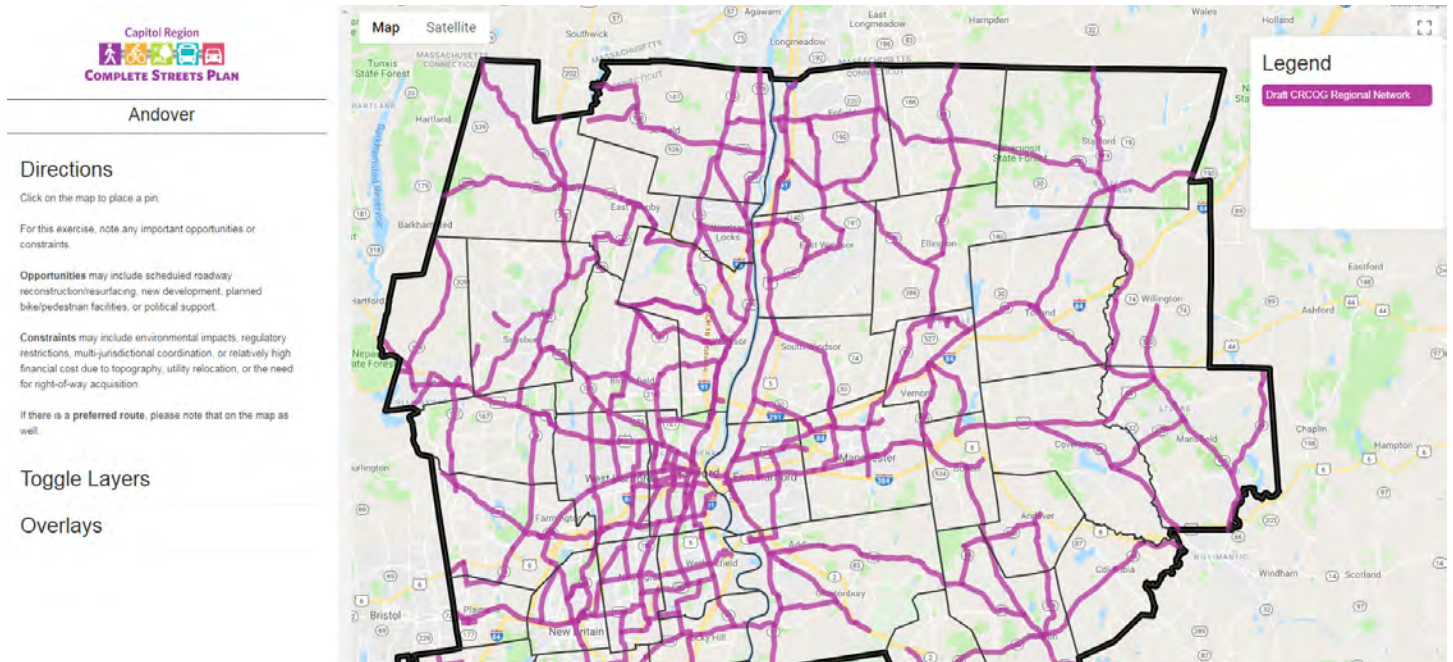
Complete Streets Work in Municipalities

Many of the region's municipalities have begun implementing complete streets in earnest. New Britain created a downtown complete streets plan and has already leveraged millions of dollars of funding to implement projects that have transformed the city. Hartford is in the process of finishing their bicycle plan and have revised their zoning to eliminate parking minimums for cars and add them for bikes. Hartford also has a privately run dockless-bike-share system that has proven to be very popular. West Hartford adopted a complete streets policy that has garnered national recognition.

Figure 04.1 — Complete streets as seen in Downtown New Britain



Figure 04.2 – Regional Network Map



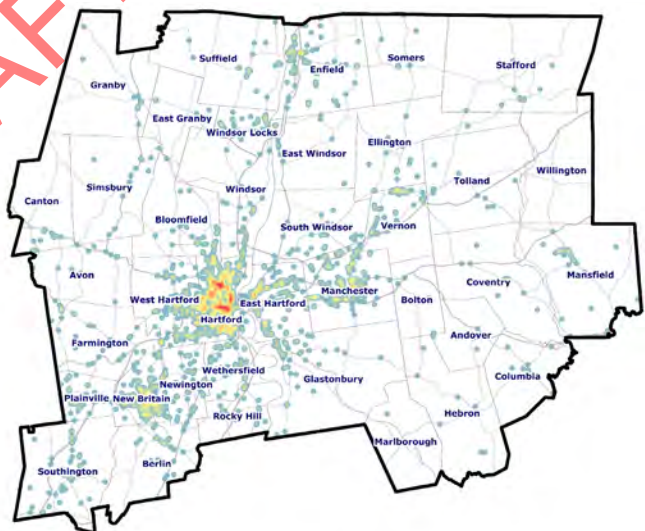
The Regional Network Map is being developed with an online interactive tool. CRCOG also plans to track progress through a similar online tool.

The Complete Streets Network Map

Much of the backbone of the region’s trail system has now been completed, or will be completed soon. The focus now will shift to connecting to that backbone as well as connecting regional centers to each other. With few ready to use abandoned rail corridors left, this network will largely be implemented through complete streets work.

Through the regional Complete Streets Plan, CRCOG will define a network of priority regional complete streets corridors. This network, currently in draft form (but soon to be finalized) was developed using a combination of data, municipal plans, and public input (See Figure 04.2). The process of defining the network started with a prioritization exercise that asked people which elements of a complete streets network were most important. The top elements were equity (that the network serve those

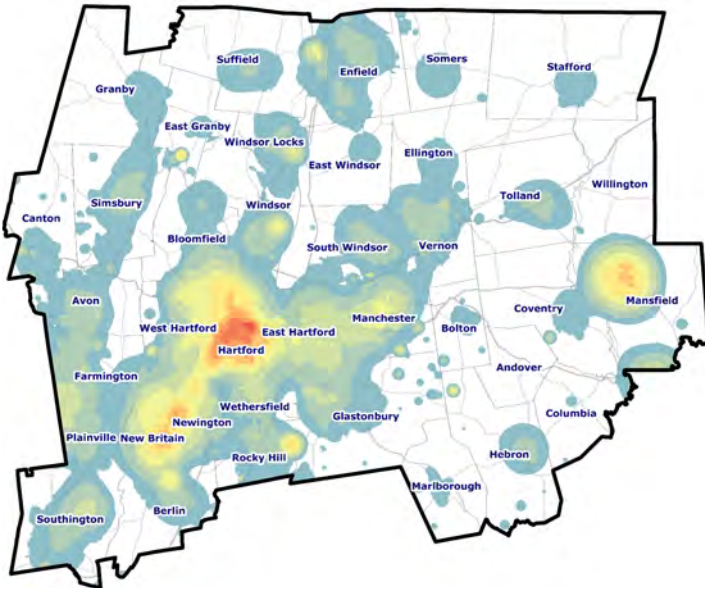
Figure 04.3 – Safety Map



most in need), safety (that it provide safe travel for vulnerable users), and connectivity (that it increase mobility and access).

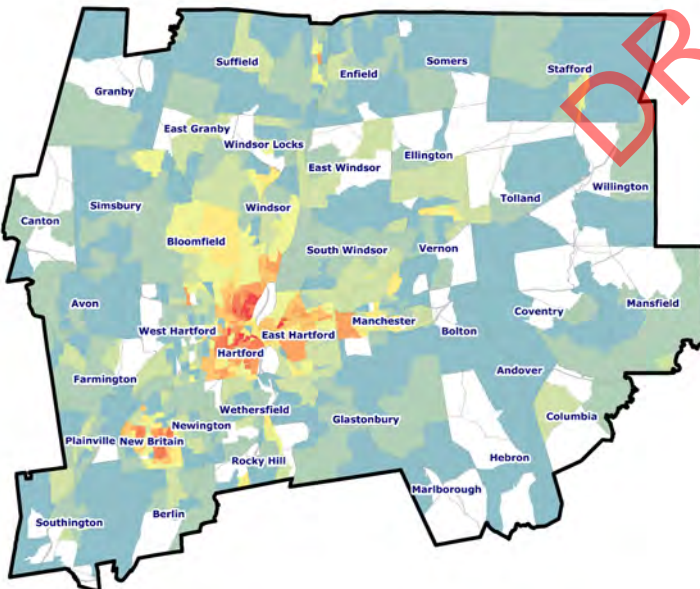
A series of maps with key indicators for these elements was created to define the nodes needed to be connected. CRCOG also used an interactive web map to get input from the general public as well as municipal officials. That process led to a first draft of the network

Figure 04.4 – Demand Map



Data includes population density, employment, bus stop ridership, proximity to amenities.

Figure 04.5 – Equity Map



Data include % people with disabilities, % over age 64, % children, % zero-car households, % in poverty, % minority.

map. The map was then refined through additional municipal input to adjust routes based on local knowledge. The map will also be reviewed by the public. A final version of the map will be developed in concert with the regional complete streets policy.

Issues and Deficiencies

Input from stakeholders and cyclists and pedestrians in the region was collected as part of the ongoing CRCOG Complete Street plan to identify a desired network that outlines key areas of concern and need. Additionally, the technical analysis conducted for CRCOG communities that participated in Road Safety Audits (RSA) from the CTDOT Community Connectivity Program (which focused on non-motorized user safety and connectivity) identified the following issues and deficiencies:

Medium Term

Signal and sign improvements and ADA compliance were recommended most frequently within the CRCOG region; however, communities should work to align these facets with broader improvements. There were also recommendations for sidewalk repair, expansion, or improvements along 63% of corridors and crosswalk realignment, expansion or removal was recommended along 62% of corridors. Communities should address more immediate infrastructure related projects; this includes sidewalk repairs, modifications, or improvements; improvements or expansion of crosswalks; and smaller scale alterations to roadway or intersection design.

Long Term

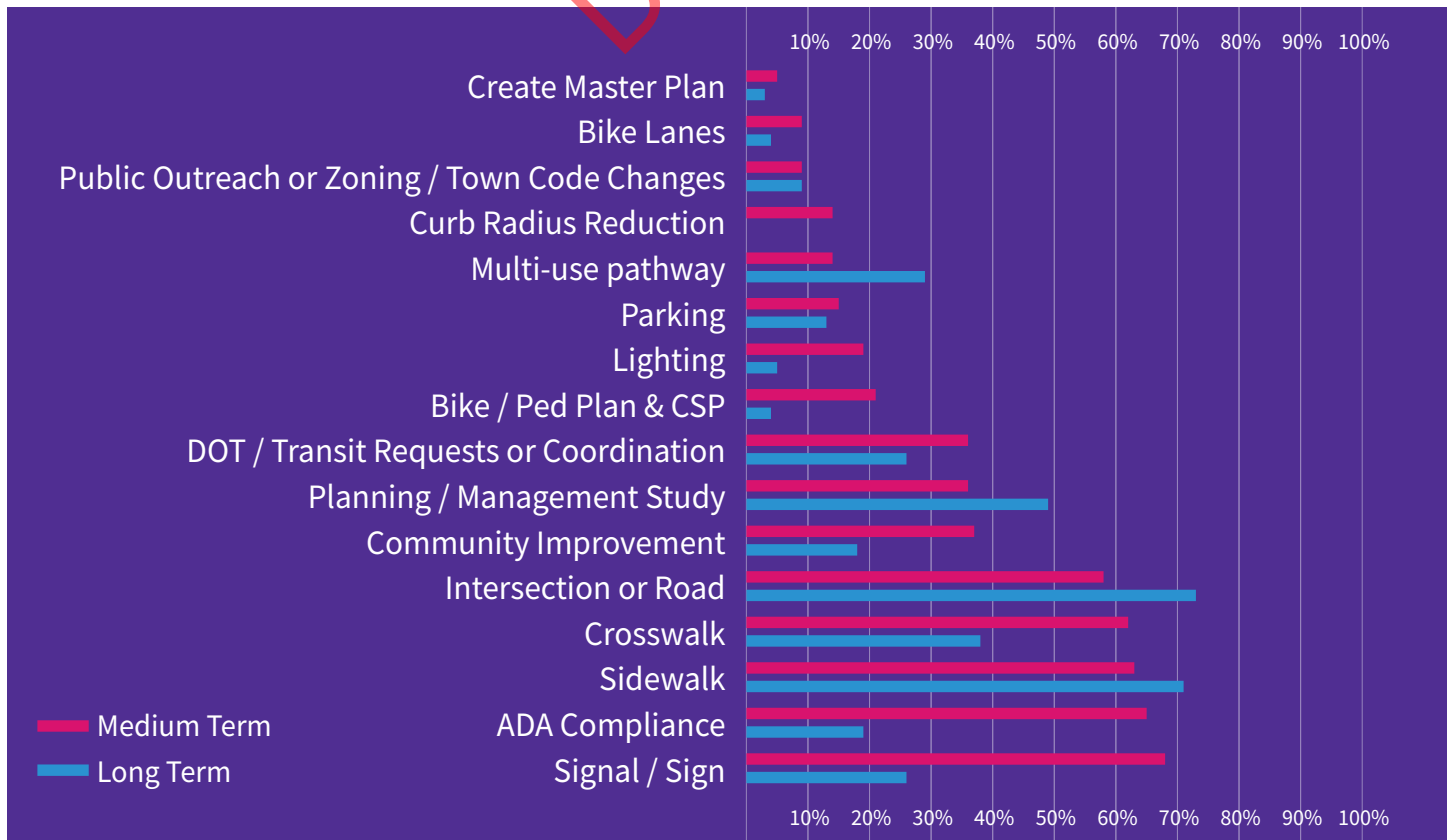
Alterations to intersections or road designs were recommended along 73% of RSA corridors within the CRCOG region and sidewalk expansion/improvements were recommended in 71% of RSA audits. Poor pedestrian connectivity was seen regardless of density, and results in pedestrian behaviors that are unsafe. State, regional and local coordination efforts are needed to plan, design, and implement pedestrian gaps with particular emphasis at intersections as well as mid-block crossings.

Recommended Complete Streets Improvements

Continue To Develop Complete Streets Policies

A strong complete streets policy is necessary to ensure that infrastructure projects consistently include accommodations for all users. On October 23, 2014, CTDOT adopted a Complete Streets Policy (No. Ex.O.-31). The policy was developed in accordance with Connecticut General Statutes, particularly the Accommodations and Provision of Facilities for All Users, which requires that Complete Streets must be considered as a condition of funding in adherence with Public

Figure 04.6 – Recommendation Frequency



Act 09-154. This policy further lays out how CTDOT will integrate complete streets into its work and implement complete streets solutions in Connecticut communities.

Key points of the policy include:

- Adherence to the Complete Streets Law throughout the Department
- Establishment of a Department-wide Complete Streets Standing Committee
- Ongoing training on complete streets for CTDOT staff and partners
- Revisions to eligibility criteria to make complete streets easier to fund
- Improved design, construction and maintenance guidelines that are supportive of pedestrians and cyclists
- Measurement of pedestrian and cyclist use and needs

CROCOG is in the process of developing its own regional complete streets policy that would apply to its own funding decisions. While still in process, the policy is envisioned to include:

- A requirement that projects include accommodations for all users unless an exception is granted
- An exceptions process that lays out conditions under which certain accommodations can be omitted due to feasibility issues

- A list of which funding programs the policy applies to
- Criteria for prioritization of funding in relation to the region's regional network
- Guidance on available design standards that are applicable to complete streets infrastructure
- Model changes to selection policies and criteria to encourage greater inclusion of high-quality complete streets elements
- A framework for evaluating progress
- Enough flexibility to allow it to apply to all 38 municipalities in the region

A draft policy is being developed and will be vetted by the Transportation Committee before being presented to the CROCOG Policy Board. CROCOG anticipates adopting the policy in mid-2019.

While CROCOG can adopt policies related to its funding programs, the region's roads are owned and maintained by either CTDOT or municipalities. CTDOT already has a complete streets policy that is beginning to be implemented. At this time, however, only a handful of municipalities in the region have formal complete streets policies. West Hartford was cited by League of American Cyclists as having one of the best policies in

“ State, regional and local coordination efforts are needed to plan, design, and fill gaps in pedestrian facilities with particular emphasis at intersections as well as mid-block crossings. ”

the country. Many other municipalities have not yet started to develop a policy. CROCOG, through its Regional Complete Streets project, is developing best practices guidance for municipalities and has held a workshop on developing local policies. Ultimately, CROCOG would like to see every municipality adopt a policy that fits with its context.

Support Education Programs

Building bike lanes, trails, sidewalks and other facilities is important, but providing facilities alone will not cause vast numbers of people to change their travel mode. One of the big stumbling blocks in encouraging individuals to try bicycling and walking for regular transportation is that they feel very vulnerable to motor vehicle traffic, even with facilities provided. Furthermore, many pedestrians, bicyclists and motorists do not have a clear understanding of their respective rights and responsibilities on the streets and highways. Therefore, educational programs targeting all three groups: motorists, pedestrians, and bicyclists are needed.

Efforts designed to educate system users about basic traffic laws need to be made regularly and will require ongoing collaboration between citizens, interest groups, and government agencies. Getting the public to safely use the facilities by teaching safe user skills and demonstrating that walking and biking provides real benefits are equally important and support behavior change.

Our strategy in the education area is to build upon existing programs and to build coalitions where this is possible.

Transportation Demand Management

One of the desired outcomes of greater availability of bicycle, pedestrian, and transit infrastructure is that travelers will have less reliance on personal automobiles. While infrastructure is necessary to support mode shifts, driving alone is culturally ingrained. Programs designed to encourage people to try other modes of transportation can be effective methods of shifting people's preferences.

Continue to Collect and Evaluate Data

The ongoing collection and analysis of bicycle and pedestrian data is critical for benchmarking continuing efforts to improve facilities and encourage active transportation modes.

“ One of the big stumbling blocks in encouraging individuals to try bicycling and walking for regular transportation is that they feel very vulnerable to motor vehicle traffic [...] ”

Recommendations

1. Develop a Regional Complete Streets

Policy – Continue working with the Transportation Committee to develop a regional complete streets policy that is flexible enough to work for all 38 municipalities, from urban to rural. The policy should consider funding criteria, applicability to funding programs, an exceptions process, and an evaluation framework.

2. Support CTrides Program – Continue to support the DOT funded CTrides program. This program provides educational resources, information, and incentives to travelers to use other modes of transportation. The program needs continued funding and should be supported by the region.

3. Regional Bike Share – Continue to work toward implementing the vision for regional bike share outlined in the Metro Hartford Region Bike Share Plan.

4. Demonstrate Progress – CROCOG will develop an online interactive map to show its progress toward completing the regional complete streets network.

5. Implement the Regional Complete Streets Network – The regional network described above will represent the key linkages between regional centers of activity. While a complete streets ethic requires that all streets be complete, from a regional perspective, these are the key linkages needed to enhance mobility and access. Specific actions should include:

- a) Revisit project selection criteria where applicable to prioritize completion of the regional network.
- b) Work with CTDOT to ensure that projects on roadways identified in the regional network map include appropriate complete streets infrastructure.
- c) Develop a complete streets screening tool for projects to determine if appropriate infrastructure is present. Key to this is determining if: sidewalks and ramps meet ADA requirements; bike facilities that maximize separation and protection (within available right of way and budget); facilities connect to logical termini; transit shelters and amenities are provided in high ridership areas; traffic signals are accessible to and responsive to all users.

6. Provide Bicycle Amenities – The determinant of whether an individual can make a trip by bicycle sometimes hinges on very simple facilities: are there convenient and secure storage racks at the destination? If the bike ride is long, are there showering facilities available? In addition, cycling can be feasible for a greater number of individuals if a cycling trip can be combined with a transit trip.

Already, CTtransit has installed bicycle racks on all of its buses, so that an individual can put their bike on the bus and have it at their final destination. Secure bike parking at transit stops, including park n ride lots is also essential. CTDOT has also provided bicycle racks at all CTfastrak station areas. The plan recommends that

the region commit to a program to install bicycle parking throughout the region. Additionally, the plan recommends that the region provide bike stations (facilities that provide lockers, showers, and indoor bicycle storage) at two locations in the region – one in downtown Hartford and one in the Day Hill Road corridor in Windsor.

7. Revisit selection criteria to

conform to the adopted complete streets policy – Once the policy is adopted, selection criteria for relevant funding programs should be revisited with changes considered to better align with model policy.

8. Produce best practices guidance for municipal complete streets policies –

Development of best practices guidance is underway and will assist municipalities with creating their own policies.

9. Expand Multi-use Path System –

As noted above, the previous plan emphasized completion of the East Coast Greenway. While much of that work is already programmed, trails continue to be a priority in the region.

- *Fund Projects to Close Gaps in the East Coast Greenway* – The East Coast Greenway (ECG) is a network of trails that, when complete, will stretch from Maine to Florida. Within the region, the trail will follow the Charter Oak Greenway and the Farmington Canal Heritage Greenway. Both of these trails have gaps, and the major gap in the ECG through the region is the connection

between these two trail systems.

Completion of the ECG is a regional priority.

- *Continue to Support Funding for Projects that Close Gaps in the Farmington Canal Heritage Trail* – The only significant gap left in this trail is in Plainville, CT. There is currently a planned alignment for this trail and a design project has been initiated.
- *Support Funding for the Charter Oak Greenway* – When complete, will extend from Andover, through Bolton, Manchester and East Hartford, to the Founders Bridge trail. A gap exists in East Hartford that is currently being studied as part of the Silver Lane Corridor Study.
- *Link the Two Interregional Greenways* – A general route for linking the Charter Oak Greenway and the Farmington Canal Heritage Greenway has been identified and should be implemented.
- *Pursue Funding for Additional Greenway Projects* – CROCOG supports construction of a secondary set of trails that provide important commute routes, that link to the two primary trails and that serve significant sub-areas of the region. It is important for the region to continue to build upon the interregional greenways to create a system that can serve many areas of the region, and to take advantage of funding opportunities. It is also important to recognize that in some cases, closure of very small gaps in bike access can have a very large payoff in enabling large numbers of people to feel comfortable cycling.

- *Standardize Pedestrian and Bicycle Facilities Design in Region* – This plan lays out a framework for identifying and prioritizing needs to streamline the allocation of funding as it becomes available. Staff will encourage communities to utilize the newly created CROCOG Active Transportation Audit for roadways and trails to identify needed improvements, and will compile national design guidelines that can be used to correct safety deficiencies. Tools related to bike and pedestrian friendly land use will also be developed, such as the CROCOG Model Land Use Regulations for Sustainable Communities.

10. Provide technical assistance to municipalities wishing to create their own local policy.

11. Support education programs provided by regional partners – Numerous organizations throughout the region provide educational resources to various users of transportation facilities. These programs have proven to be effective and should be supported by CROCOG. Examples include: Watch for Me CT, Bike/Walk CT's Share the Road program, BiCiCo (part of the Center for Latino Progress), and programs at various schools.

12. Biking and Walking Events – Work with local advocacy groups to assist them in the planning and implementation of events that encourage bicycling and walking.

13. Data collection – The national bicycle and pedestrian data collection project will help guide analysis of bicycle and pedestrian

activity. Counts will be conducted in cooperation with towns, using a volunteer staff where possible. In 2019 CROCOG will perform its 10th bicycle and pedestrian count. CROCOG also revised its methodology so that locations are counted on a three year cycle. This improves consistency which will allow for better comparisons over time. In 2019 CROCOG will begin the first year of its second cycle.

- a) Upgrades to CT**transit** buses included automatic passenger counters that will provide an improved level of data about where and when people ride the bus. This will improve the region's ability to determine where infrastructure is most needed.

Implementation Schedule

Short-Term Recommendations

Complete Streets

Develop a regional complete streets policy	Continue working with the Transportation Committee to develop a regional complete streets policy that is flexible enough to work for all 38 municipalities, from urban to rural. The policy should consider funding criteria, applicability to funding programs, an exceptions process, and an evaluation framework.
Support CT rides Program	Continue to support the DOT funded CT rides program. This program provides educational resources, information, and incentives to travelers to use other modes of transportation. The program needs continued funding and should be supported by the region.
Regional Bike Share	Continue to work toward implementing the vision for Regional Bike Share outlined in the Metro Hartford Region Bike Share Plan.
Demonstrate progress	CROCOG will develop an online interactive map to show its progress toward completing the regional complete streets network.

Long-Term Recommendations

Complete Streets

Implement the Regional Complete Streets Network	<p>The regional network described above will represent the key linkages between regional centers of activity. While a complete streets ethic requires that all streets be complete, from a regional perspective, these are the key linkages needed to enhance mobility and access. Specific actions should include:</p> <ol style="list-style-type: none"> Revisit project selection criteria where applicable to prioritize completion of the regional network. Work with CTDOT to ensure that projects on roadways identified in the regional network map include appropriate complete streets infrastructure. Develop a complete streets screening tool for projects to determine if appropriate infrastructure is present. Key to this is determining if: sidewalks and ramps meet ADA requirements; bike facilities maximize separation and protection (within available right of way and budget); facilities connect to logical termini; transit shelters and amenities are provided in high ridership areas; traffic signals are accessible to and responsive to all users.
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Implementation Schedule

Long-Term Recommendations *(continued)*

Complete Streets (continued)

Provide Bicycle Amenities	<p>The determinant of whether an individual can make a trip by bicycle sometimes hinges on very simple facilities: are there convenient and secure storage racks at the destination? If the bike ride is long, are there showering facilities available? In addition, cycling can be feasible for a greater number of individuals if a cycling trip can be combined with a transit trip.</p> <p>Already, CTtransit has installed bicycle racks on all of its buses, so that an individual can put their bike on the bus and have it at their final destination. Secure bike parking at transit stops, including park n ride lots is also essential. CTDOT has also provided bicycle racks at all CTfastrak station areas. Our plan recommends that the Region commit to a program to install bicycle parking throughout the Region. Additionally, the plan recommends that the Region provide bike stations (facilities that provide lockers, showers, and indoor bicycle storage) at two locations in the Region – one in downtown Hartford and one in the Day Hill Road corridor in Windsor.</p>
Revisit selection criteria to better align with model complete streets policy	<p>Once the policy is adopted, selection criteria for relevant funding programs should be revisited and changes considered to better align with model policy.</p>
Produce best practices guidance for municipal complete streets policies	<p>Development of best practices guidance is underway and will assist municipalities with creating their own policies.</p>

Implementation Schedule

Ongoing Actions

Complete Streets

Expand Multi-use Path System

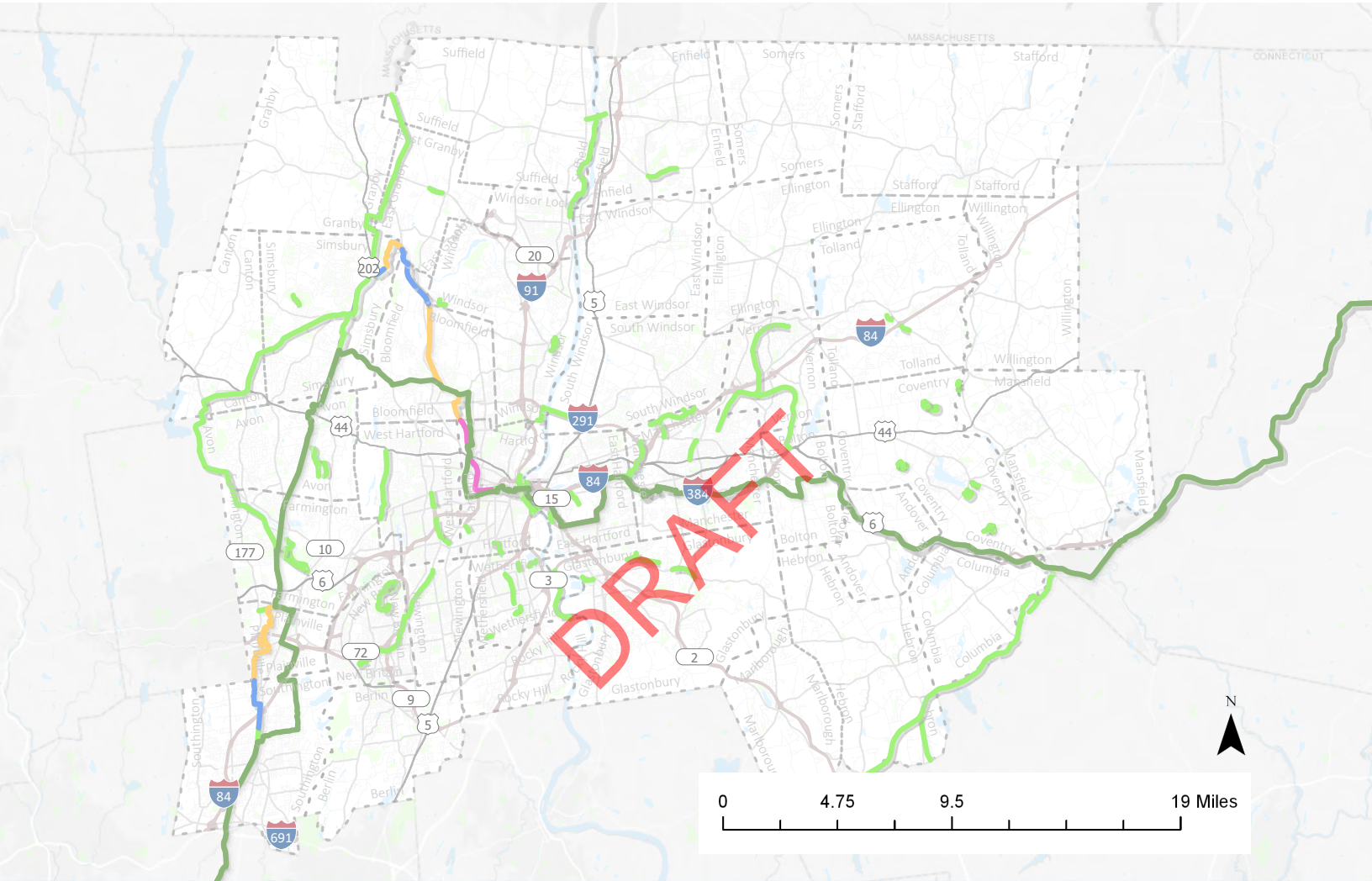
- **Continue to Support Funding for Projects that Close Gaps in the Farmington Canal Heritage Trail.** The only significant gap left in this trail is in Plainville, CT. There is currently a planned alignment for this trail and a design project has been initiated.
- **Support Funding for the Charter Oak Greenway.** When complete, the Charter Oak Greenway will extend from Andover, through Bolton, Manchester and East Hartford, to the Founders Bridge trail. A gap exists in East Hartford that is currently being studied as part of the Silver Lane Corridor Study.
- **Link the Two Interregional Greenways.** A general route for linking the Charter Oak Greenway and the Farmington Canal Heritage Greenway has been identified which will traverse downtown Hartford, travel in a northwesterly direction, generally following the North Branch of the Park River Corridor, to Bloomfield. In Bloomfield, the trail will follow the Griffin rail corridor (an active freight line), and then follow a power line corridor to the Village of Tariffville in Simsbury. From Tariffville, the trail will follow the Farmington River to the Canal Greenway.
- **Pursue Funding for Additional Greenway Projects.** Our plan also supports construction of a secondary set of trails that provide important commute routes, that link to the two primary trails and that serve significant sub-areas of the Region. It is important for the Region to continue to build upon the interregional greenways to create a system that can serve many areas of the Region, and to take advantage of funding opportunities. It is also important to recognize that in some cases, closure of very small gaps in bike access can have a very large payoff in enabling large numbers to bicycle.
- **Standardize Pedestrian and Bicycle Facilities Design in Region.** This plan lays out a framework for identifying and prioritizing needs so that as funding becomes available, we can select the most critical projects to move forward. Staff will encourage communities to utilize the newly created CRCOG Active Transportation Audit for roadways and trails to identify needed improvements, and will compile national design guidelines that can be used to correct safety deficiencies. Tools related to bike and pedestrian friendly land use will also be developed, such as the CRCOG Model Land Use Regulations for Sustainable Communities.

Implementation Schedule

Ongoing Actions

Complete Streets

Greenway Map – Multi-use Trails



Trail Status

- Official East Coast Greenway
- Funded
- Study
- Concept
- Complete

Closing gaps in the region’s existing multi-use path system continues to be a priority. In some cases, closure of small gaps can have large payoffs by creating large, connected, comfortable bicycle access for new riders.

Implementation Schedule

Ongoing Actions *(continued)*

Complete Streets (continued)

Provide technical assistance to municipalities wishing to create their own local policy

Support education programs provided by regional partners

Numerous organizations throughout the region provide educational resources to various users of transportation facilities. These programs have proven to be effective and should be supported by CRCOG. Examples include: Watch for Me CT, Bike/Walk CT's Share the Road program, BiCiCo (part of the Center for Latino Progress), and programs at various schools.

Biking and Walking Events

Work with local advocacy groups to assist them in the planning and implementation of events that encourage bicycling and walking.

Data collection

We will use the national bicycle and pedestrian data collection project as our guide in measuring bicycle and pedestrian activity. Counts will be conducted in cooperation with towns, and we will use volunteers for this work to the extent possible. In 2019 CRCOG will perform its 10th bike/ped count. CRCOG also revised its methodology so that locations are counted on a three year cycle. This improves consistency which will allow for better comparisons over time. In 2019 CRCOG will begin the first year of its second cycle.

a) Upgrades to CT **transit** buses included automatic passenger counters that will provide an improved level of data about where and when people ride the bus. This will improve our ability to determine where infrastructure is most needed.

Chapter 05

Airport System Ground Access

Within the CROCOG region there are 14 airports, including Bradley International Airport (Bradley), two commercial reliever airports (Robertson Field and Hartford-Brainard Airport), four public use airports, and seven restricted landing areas (RLAs). Two of the 14 airports in the region are owned by the Connecticut Airport Authority (CAA), a quasi-public agency created in 2011 to own, improve, and operate Bradley International Airport along with five other state owned airports. Of primary concern in CROCOG's Metropolitan Transportation Plan (MTP) is surface transportation/ground access to the region's primary airport, Bradley. This includes both passenger and freight (rail and truck) movement into and out of this regional transportation hub.



Planes tied down at Robertson Airport, the regions only Municipal owned airport

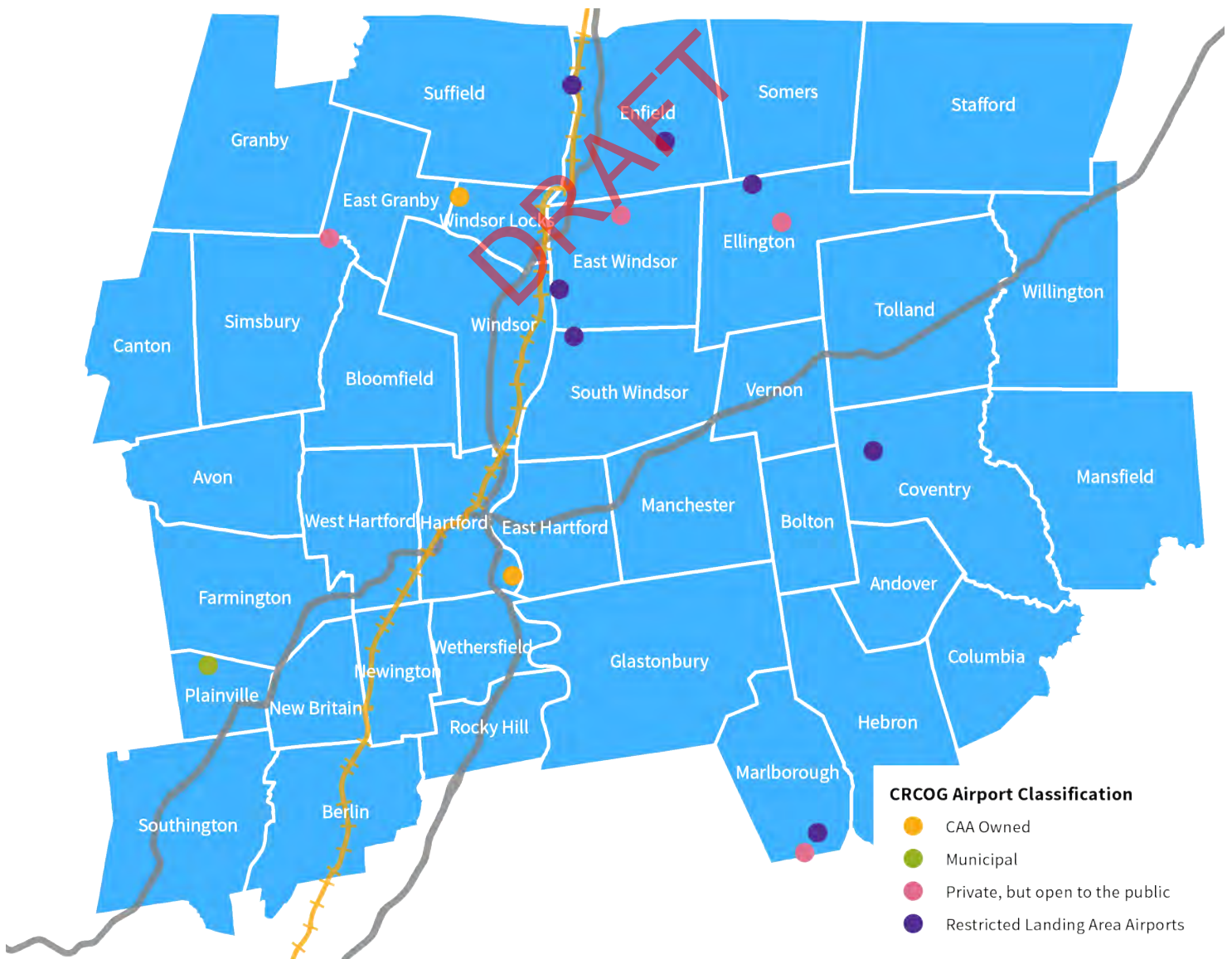
CRCOG considered the following transportation assets when investigating how to improve ground access to Bradley International Airport: express bus service, shared-rides through Transportation Network Companies (TNCs) like Uber and Lyft, and potential passenger rail station connections from Hartford Union Station and Windsor Locks station on the Hartford Line, both to Bradley Airport and the planned new integrated ground transportation center which is scheduled to complete design in 2019, with the groundbreaking occurring in 2021/2022.

Existing Conditions

Bradley Airport is an important transportation facility and an engine of economic growth for the Capitol Region and the State of Connecticut with 2.6 million people living within a 60-minute drive. In 2017, Bradley handled more than 6.4 million passengers (enplanements and deplanements), according to the CAA.

The airport was rated by readers in a Conde Nast 2018 Traveler survey of airports as the third best airport in the country. Among the

Figure 05.1 – CRCOG Regional Airports



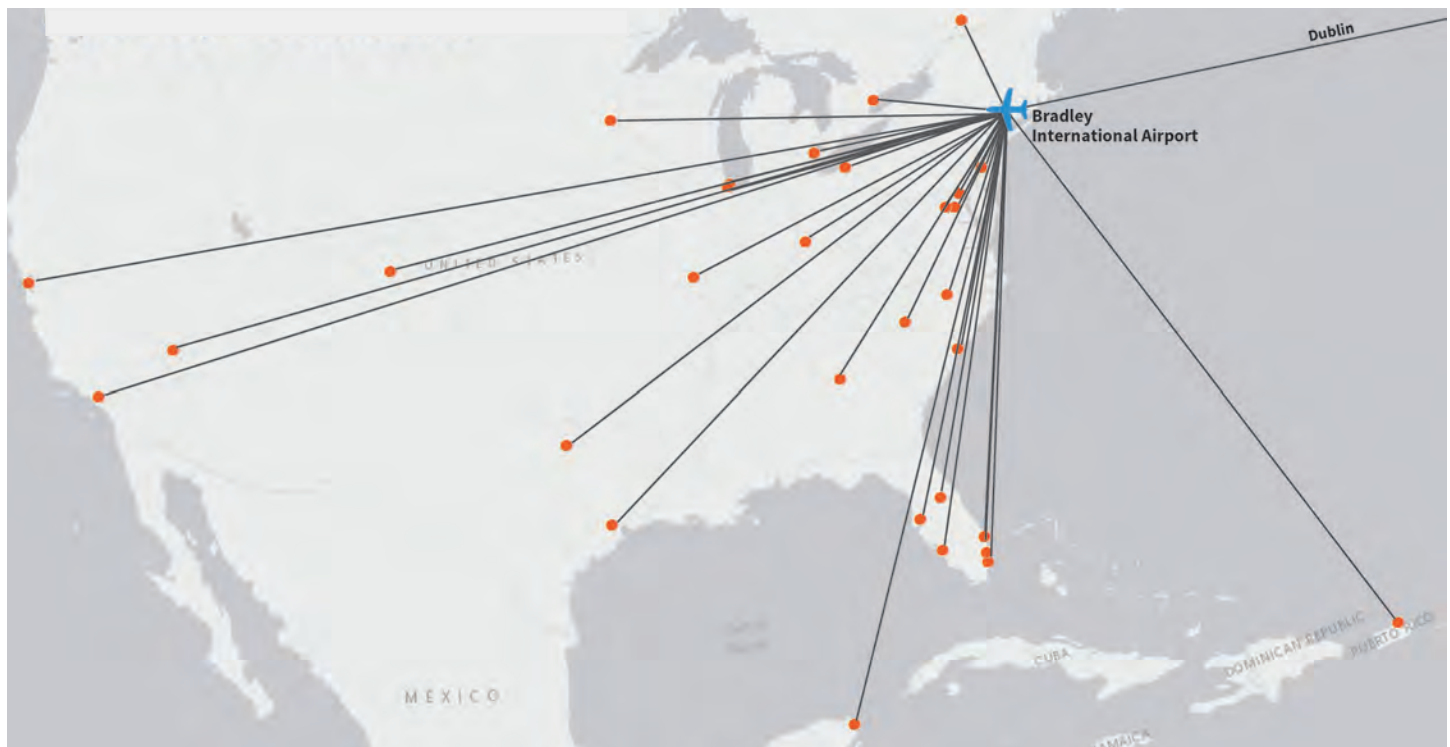
reasons for its high ranking include “convenient on-site parking, plentiful charging stations and free Wi-Fi, decent restaurant options, and an overall relaxed atmosphere.” Bradley, a mid-sized airport as defined by the Federal Aviation Administration (FAA), serves major U.S. markets as well as Mexico, Canada, Puerto Rico, and Ireland. Passenger service has grown substantially since 2014 growing from six airlines servicing 25 destinations to nine airlines servicing 32 destinations. Since 2016 alone, service to nine destinations has expanded with either increased or new service. The nine

airlines that now service Bradley include two low-fare carriers and three international carriers. Bradley operates 65,516 annual flights, an average of 179 daily flights. In 2017, Bradley Airport also handled 408,983 tons of cargo. As of 2017, passenger growth at the airport was increasing, rising 6.2% over the previous year and 18.7% in the last five years. Compared to other airports nationwide, Bradley ranked 53 out of 553 total commercial airports in the US in volume of passengers enplaned and 34 out of 137 qualifying air cargo hubs in the tonnage of air cargo landed.

Figure 05.2 – Bradley National Service Improvements



Figure 05.3 – Bradley Non-Stop Destinations



Issues and Deficiencies

Bradley currently enjoys good roadway access and convenient parking (as noted in the Conde Nast survey), however, there is currently limited transit access. Route 20 and Interstate 91 offer access to most parts of the airport for automobile users. However, to support anticipated development on and near the airport, it will be necessary to continue to improve roadway access and to develop better transit access to and from the airport.

Input from stakeholders in the region as well as the technical analysis conducted for CAA's 2016 Strategic Plan identified the following issues and deficiencies to be addressed in order to further improve Airport System Ground Access in the region:

- Roadway access needs continued improvements to support ongoing development surrounding the airport.
- There is insufficient transit service to Bradley Airport. Improved bus service is needed, including: more frequent Bradley Flyer service and a transit link between Windsor Locks Station and the airport to capitalize on Hartford Line service.
- Growing demands for cargo require investments in new facilities.

Recommended Airport Improvements

CAA released a Strategic Plan in 2016. The CAA Strategic Plan was a comprehensive review of what they do, how they do it, and what changes are needed for the future. The objectives reflected in many of the recommendations, are governed by the following five goals:

- **People:** Attract & Develop the Best, Most Customer-Oriented Employees
- **Customer Service:** Streamline and Improve the Home-to-Plane Experience
- **Air Service:** Increase Non-Stop Routes and Passenger Traffic
- **Finance:** Achieve a Financially Healthy System of Airports
- **Economic Impact:** Increase the Value Generated by the CAA's Airports

The most important goal of the CAA Strategic Plan related to ground access for passengers is focused on customer service and the “Home-to-Plane” experience – to provide better ground access and a seamless experience for passengers. For freight movement, the primary goal is to provide better cargo service, through facility improvements such as a new on-airport cargo facility.

“ The most important goal of the CAA Strategic Plan related to ground access for passengers is focused on customer service and the “Home-to-Plane” experience [...] ”

Ground Access

Roadway

Roadway: To help facilitate economic development in the area in and around the airport, roadway access needs to continue to be supported and improved over the next 30 years. To improve traffic flow from Route 75 to the new ground transportation center, the Bradley Master Plan calls for updates along the remainder of Schoephoester Road; two alternatives have been developed. Alternative A has a flyover ramp connecting Route 20 to terminal A, replacing the at grade signalized intersections. Alternative B recommends a roundabout at Cargo Road. In both alternatives, roundabouts are proposed at Postal Road Light Lane and Route 75.

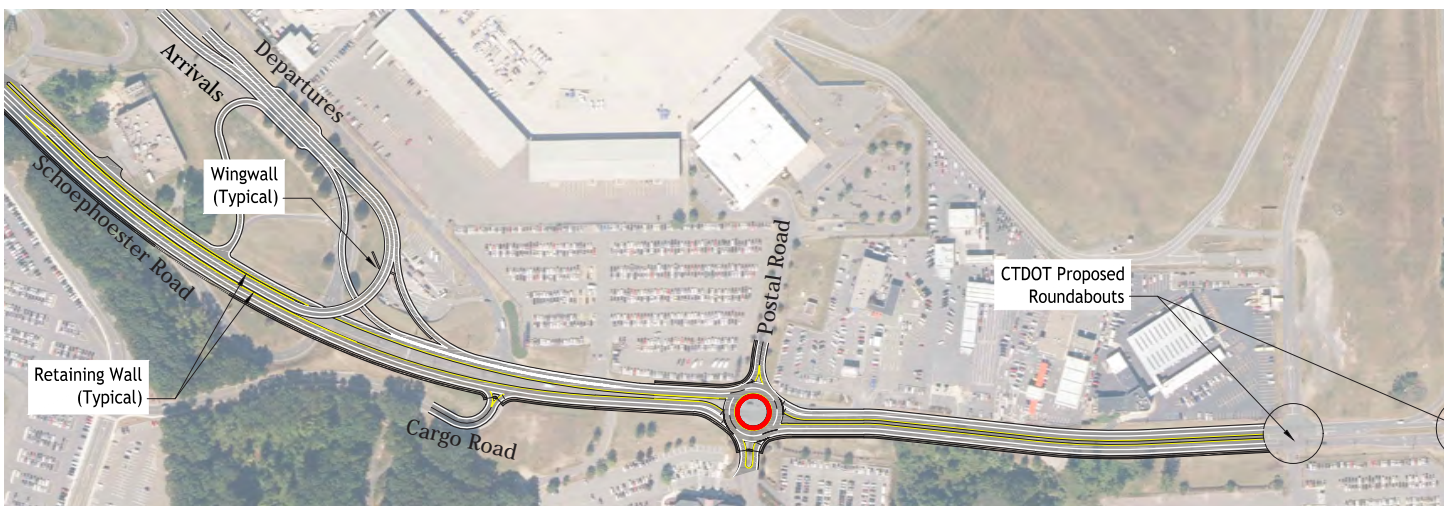
Public Transportation Access

Link to the CTrail Hartford Line – Current access is limited to taxis, TNCs, and the Bradley Flyer bus route (from downtown Hartford, including Hartford Union Station). There is

currently no transit connection between the airport and the Windsor Locks train station. With the opening of the Hartford Line commuter and intercity rail service, service from Windsor Locks train station would provide a reliable link to the airport from the three major cities in the Knowledge Corridor (Springfield, Hartford and New Haven); additionally, it would provide a link to the New Haven Line rail service. CTDOT recommended that a bus shuttle be provided as a connection between the rail station in Windsor Locks and the airport. A 2016 study conducted by the Bradley Development League examined the feasibility of improving connections via rapid transit or light rail, and while this proved to be impractical due to cost, travel times and construction considerations, the study did identify street routings showing near direct access to airport by a transit vehicle (e.g. shuttle van or small bus). Travel time would be roughly 10-15 minutes from the Windsor Locks station. Any proposed improvements to the transit connections to the airport would have to consider the new integrated ground transportation center to enable a truly multi-modal access concept.

Figure 05.4 – Bradley Roadway Plan

Source: <http://www.bradley-planning.com/project-documents/>



Bus Access: The Bradley Flyer bus route operates between the airport and downtown Hartford with service approximately every hour between 4:00 am and midnight. Ridership on the route is relatively low in comparison to other CT*transit* routes and is geared mainly towards commuters who work in the Bradley area. Given the very limited transit service to the airport today, bus service improvements are needed. The Bradley Flyer is the only bus service between the airport and downtown Hartford, and it was designed to serve employees at the airport, not air travelers. The route's schedule and frequency should be adjusted to become more attractive to travelers. CROCOG's Hartford Comprehensive Transit Service Analysis recommends extending the Bradley Flyer to New Britain along the CT*fastrak* guideway but recognizes the concern of limited parking availability at the stations. Solutions to help alleviate these concerns could include encouraging long-term airport parking at the underutilized Szczesny Garage in New Britain, charging for parking at CT*fastrak* stations, and increasing parking capacity at CT*fastrak* stations.

Figure 05.5 – Bradley Flyer Bus waiting to depart from Hartford's Union Station



Recommendations

- 1. Transit Connection between the airport and the CTrail Hartford Line** – Provide a transit connection to the CTrail Hartford Line service by instituting a direct shuttle service from the airport to the Windsor Locks rail station, recognizing the airport's plans for an integrated ground transportation center. Shuttles schedules should align with train arrivals and departures. The shuttle could either be operated by CT*transit* or as a partnership with TNCs.
- 2. Adjust Bradley Flyer Service** – To improve bus service to Hartford from Bradley the route should operate more frequently and be re-routed to serve the Ground Transportation Center when completed. Extending the Bradley Flyer to New Britain along CT*fastrak* and rebranding the route could attract more choice riders coming from the stations.
- 3. Marketing and branding the Bradley Flyer** – Improved branding, user-friendly schedules, and better signage at the airport could help bolster ridership.
- 4. Support Bradley Master Plan's calls for improved designs for roadways surrounding the airport.**

Harness New Technologies to Improve Ground Access

Transportation Network Companies (TNCs)

Less than five years ago, Uber and Lyft began operations in Connecticut. In a short period of time, they have become a popular option for airport travelers to and from Bradley Airport. Much of the population in the Capitol Region does not have transit access to the airport and by using TNCs to access Bradley, travelers who might have chosen to drive in the past avoid paying parking fees at the airport's lots. TNCs might also have the flexibility to fill the last mile gap between the Windsor Locks Hartford Line station and Bradley Airport. Given the aforementioned restrictions to provide transit service, a partnership with TNCs to provide a subsidized shuttle service to travelers might be the most feasible way to connect the Windsor Locks Hartford Line station and the airport in the near future. **CTrail**, Amtrak and the TNCs would need to coordinate to ensure that a sufficient number of shuttles were available each time a Hartford Line train arrived at Windsor Locks station. Passengers could pay the additional shuttle fare with their purchase of their rail ticket; the combined rail and shuttle fare being an additional ticket for purchase via the website, train station kiosks and ticket counters. The TNCs providing the service would also need to ensure that all vehicles providing the connection were ADA compliant.

Figure 05.6 — Trip Planning App



Source: AECOM

Mobility as a Service

To improve travelers' experience to and from Bradley Airport, implementation of Mobility as a Service (MaaS) could provide customers with a one-stop shopping approach to their trip, linking travel from their point of origin to the airport and even final destination. The growing popularity of TNC's like Uber and Lyft with Bradley Airport customers demonstrates a desire for alternate modes of travel. While most people are familiar with Uber and Lyft, they may be unaware of other travel options available to and from the airport, like the Bradley Flyer. Travelers for whom the Capitol Region is their trip destination might want to avoid renting a car but might be overwhelmed or unaware of alternative modes of travel in the Capitol Region. MaaS, through a custom trip planning app available on the Bradley Airport website, for download, and installed at airport kiosks and through a team of trip planners employed as concierges at an airport call center, would provide a single interface for the broad array of travel options in the

Capitol Region. The trip planning service would also include the development of an integrated payment system which would package the region's rapidly expanding mobility options into different plans, ranging in mode types and duration. Travelers could load money onto their phone app which could be used to pay for services like Uber, Lyft, the Hartford Line and LimeBike.

Modes of travel and the number of mode operators are rapidly growing in the Capitol Region. The broad array of travel options mean Capitol Region residents are less dependent on travel by single occupancy vehicle but complicated trip planning and inefficient methods of payment are obstacles for those who want to take advantage of this broad array of mobility options. MaaS is a strategy used increasingly world-wide to harness the quickly expanding range of travel modes. Urban areas like Helsinki, Finland have already integrated trip planning and payment systems available that combine multiple modes and payments for travelers. Customers can select a payment package suited to their level of use and mode preferences. Municipalities in the United States, ranging from large cities like Los Angeles to more rural areas like Tompkins County, New York are planning MaaS programs tailored to their residents' needs.

Recommendations

1. Implement MaaS pilot program at Bradley Airport – Implementation of Mobility as a Service (MaaS) would provide customers with a one-stop shopping approach to their trip to and from Bradley Airport, harnessing the rapidly expanding number of travel modes available in the Capitol Region.

Figure 05.7 – Airplane hangar at Roberston Airport



Competitive Cargo Service

In 2016 air cargo accounted for 0.1% percent of freight (tonnage) moved in Connecticut but 4.5% of the value of all freight. This indicates that freight shipped by air in the state primarily consists of small, high value objects. Air cargo is handled through Bradley's three cargo complexes: Roncari Freight Facility, Aviation Facilities Complex, and UPS Air Express sorting Hub. The airport is serviced by six air cargo airlines: ABX Air, Fedex Express, Fedex Feeder, Southern Air, UPS Airlines, and Flight Express.

Bradley has great potential as an air cargo facility because of its easy ground access, uncongested airport facilities, and proximity to New York and Boston. According to IHS-Transearch forecasts, air tonnage at Bradley is forecasted to increase from 116,000 tons in 2014 to 252,000 tons in 2040, an increase of 117.3 percent. To meet these growing demands a new on-airport cargo facility at Bradley is needed and would position the airport to meet future air cargo demands. Ideally this cargo center would be located to allow for multimodal freight access with the highway and rail systems.

Air Tonnage Expected Increase

According to IHS-Transearch forecasts, air tonnage at Bradley is forecasted to increase from 116,000 tons in 2014 to 252,000 tons in 2040, an increase of 117.3%.

The ease of getting in and out of Bradley, combined with a good regional highway system, makes it attractive to air cargo handlers seeking to serve not only the Hartford-Springfield area, but other parts of New England as well. While Bradley's air cargo services cannot compete with New York and Boston on price, they can offer faster delivery times in most parts of New England, and often can offer faster delivery times into New York City and Boston as well. The continued improvement of air cargo capabilities at Bradley will ensure that it maintains its position as a cargo hub for New England.

Recommendations

- 1. Cargo Expansion** – Consolidate cargo at Bradley and support development plans for the growth of cargo.
- 2. Multimodal Cargo Center** – Evaluate making Bradley a true multi-modal freight facility by improving rail freight access to the airport and developing support facilities for trucking.
- 3. Capitalize on Air Cargo Potential** – Continue to improve Bradley's air cargo capabilities and services, and capitalize on problems that New York and Boston airports are experiencing due to increasing ground and air congestion.

Regional Economic Development

From a regional perspective, the Bradley International Airport provides a critical link to the nation's air transport system and the nation's economy. The airport's importance as a potential engine of economic development was noted in the Gallis Report where its role was defined as providing fast and convenient access to the national and international transportation systems. The presence of accessible, quality air service gives the region a competitive advantage in those economic sectors and industries that rely on fast and convenient delivery of people and goods. These advantages can help stimulate a substantial amount of economic growth.

Bradley International Airport continues to be a catalyst for economic growth for the region as a whole, and for airport-related development within the immediate vicinity of the airport itself. Annually the airport contributes \$4 billion in economic activity and produces \$1.2 billion in wages and 18,000 full-time jobs. It has been estimated that over a 20-year period, the airport would create more than 140,000 jobs and \$34 billion in economic output. These estimates have been recognized in the Gallis Report, the Department of Economic and Community Development 2005 study, the Airport Economic Impact Study, and the Bradley Area Transportation Study. Bradley also realizes significant competitive advantages such as having over 1,000 acres of undeveloped, reasonably priced and easy to develop land within the four adjoining

Bradley International Airport: A Catalyst for Economic Growth

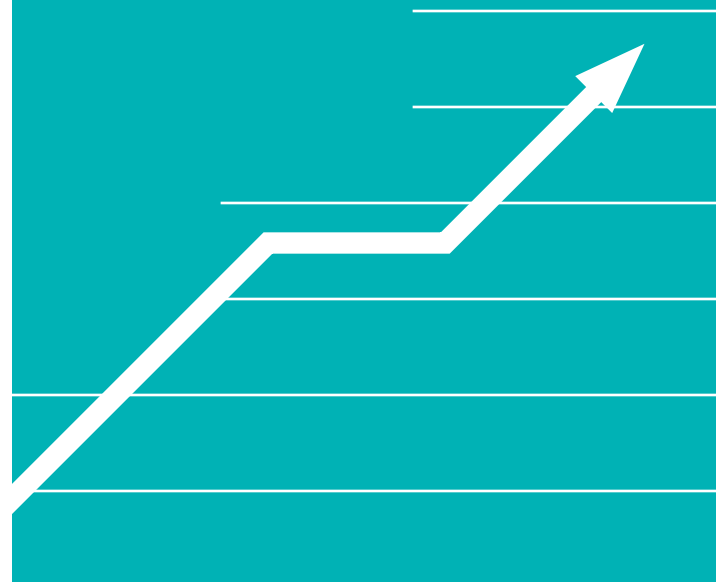
Annually the airport contributes

\$4 million
in economic activity

\$1.2 billion
produced in wages

18,000 full-time jobs

It has been estimated that over a 20-year period, the airport would create more than 140,000 jobs and \$34 billion in economic output.

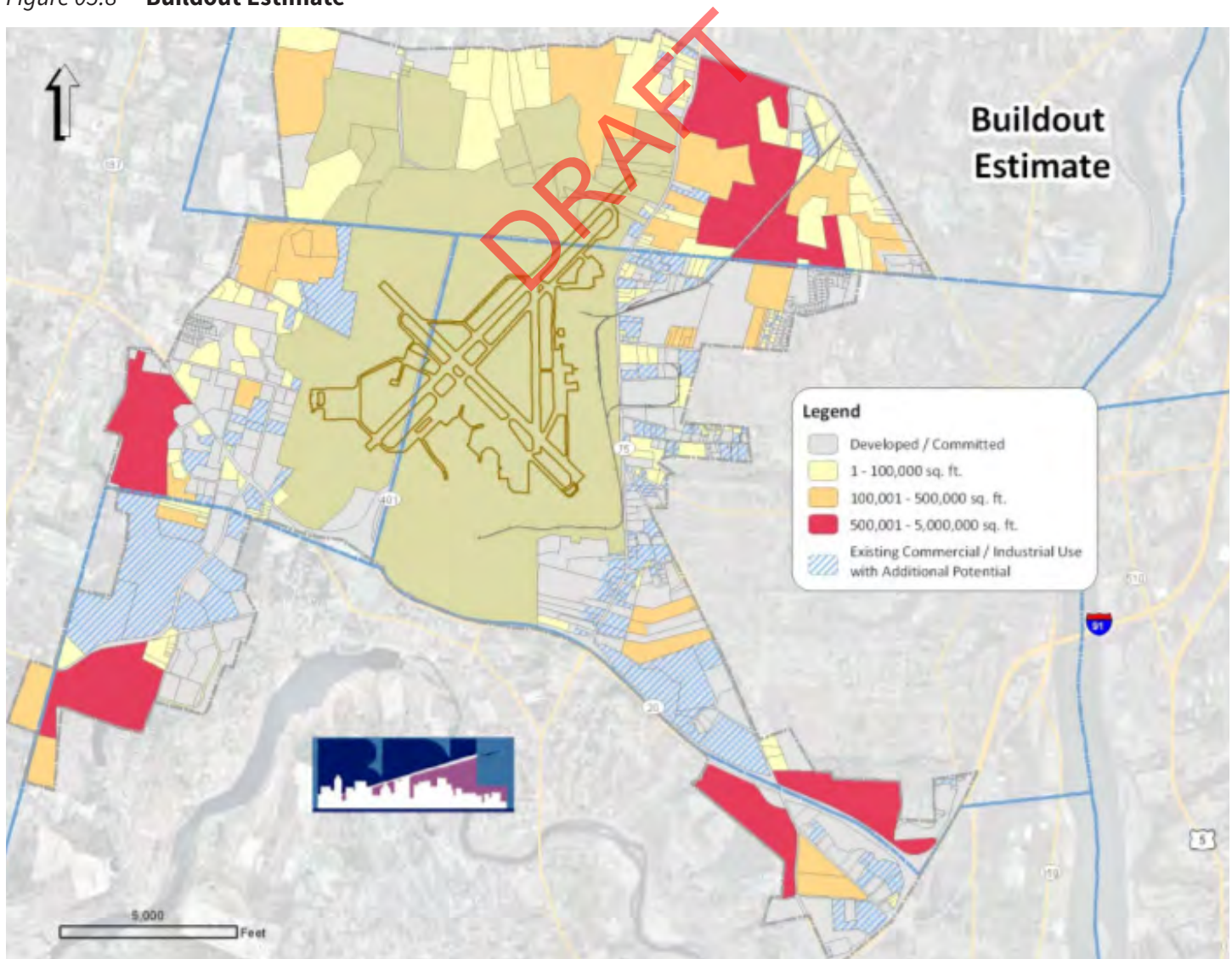


towns; 100 million potential customers within a 500-mile radius (representing 1/3 of the US economy); top tier corporate neighbors; and more than 2,000 hotel rooms and conference facilities within a 60-mile radius. To capitalize on these advantages, the State of Connecticut enacted Public Act 10-98 in 2010, creating a Bradley Airport Development Zone. The Zone, which was established in 2011, includes land in Suffield, East Granby, Windsor, and Windsor Locks and provides property tax exemptions and corporate business tax credits for air cargo, aerospace,

manufacturing, and transportation-related services. A Buildout Analysis found that the Bradley Airport Development Zone could support an additional 20.2 million square feet of development.

To achieve the full benefit that the airport can offer, appropriate land use regulations, good road systems, adequate infrastructure, and full consideration of the potential impacts on adjacent communities will be needed. Proper planning is necessary to ensure not only that the maximum growth potential from the airport is realized, but

Figure 05.8 – Buildout Estimate



also that the growth occurs in a manner that provides maximum benefit with minimum disruption to the environment, neighborhoods, towns, and the region.

In order to realize the airport's full economic potential, sufficient and appropriate planning must be undertaken, and supportive programs must be put in place. The Council of Governments supports planning (state, regional, and local) that helps achieve the airport's economic development potential in a manner that has minimum impact on the environment and on neighborhoods in the general vicinity of the airport.

Recommendation

1. Support planning efforts that maximize economic development potential of the airport – Support planning efforts (state, regional, and local) including land use regulations, good road systems, and adequate infrastructure that help achieve the airport's economic development potential in a manner that has minimum impact on the environment and on neighborhoods in the general vicinity of the airport.

Invest in Infrastructure

In 2009, as a result of the American Recovery and Reinvestment Act (ARRA) and state funds, Bradley was able to reconstruct two runways, upgrade a major water main crossing, and install new electrical duct banks and lighting cables. In 2015 Bradley demolished the Murphy Terminal (Terminal B) in preparation for a new ground transportation center, which along with the project to realign the western portion of Schoephoester Road, will help improve overall ground access and "home-to-plane" travel. Work on the new \$225 million transportation center will begin in 2019 and include consolidated rental car facilities, approximately 900 public parking spaces, and a transit center with bus docks. The Master Plan update outlines recommendations to improve safety, operational efficiency, functionality of the airfield, and incorporates all necessary facilities. Issues identified include deficient runway lengths, unused runways, lack of full parallel taxiways, and incomplete compliance with the latest FAA design standards.

Recommendation

1. Invest in Infrastructure – Support infrastructure investments like the planned new ground transportation center that improve airport's functionality, safety and operational efficiency with the goal of attracting new travelers to Bradley.

Figure 05.9 – Draft Recommendation Plan for the Bradley Master Plan update

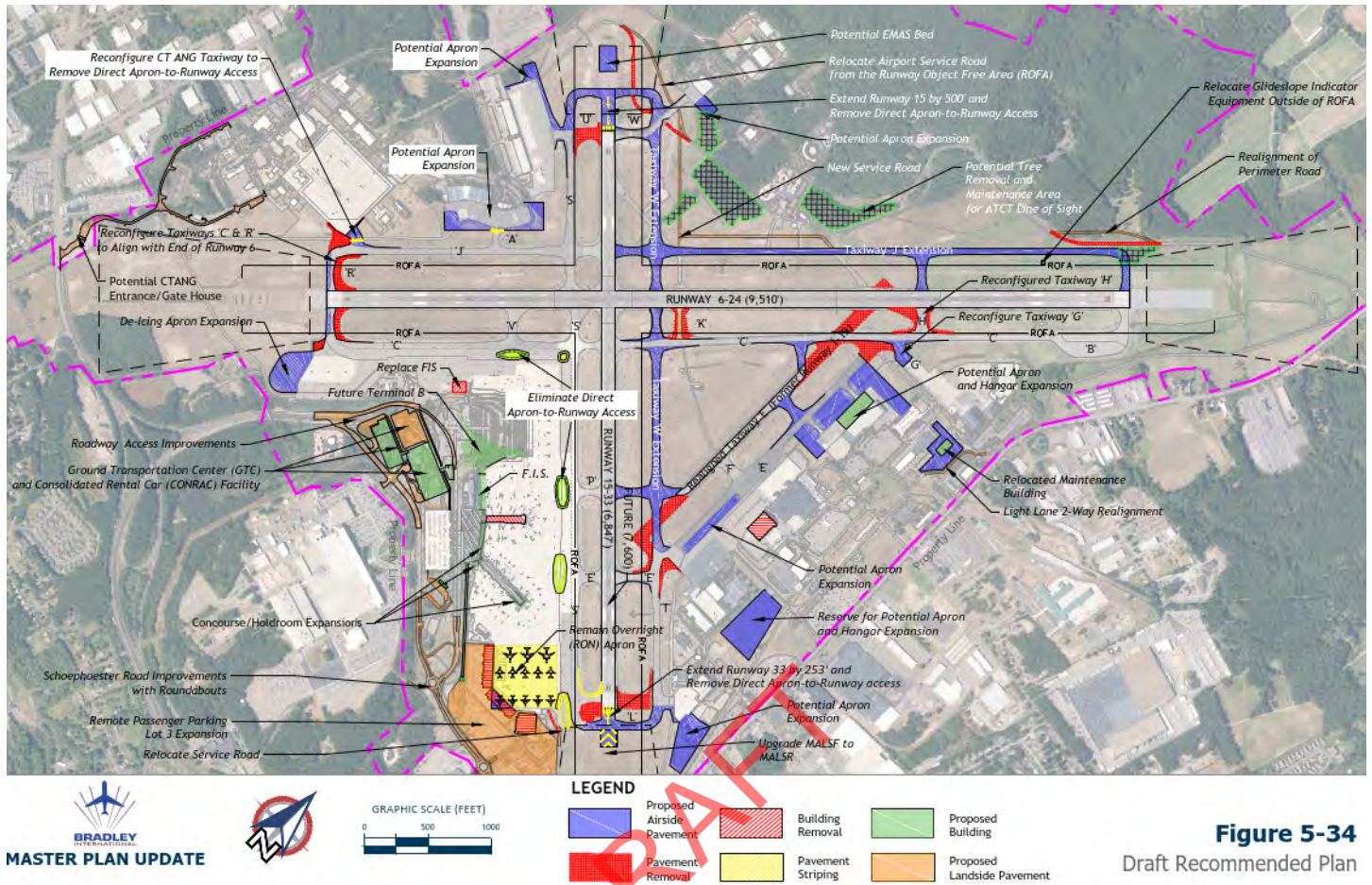
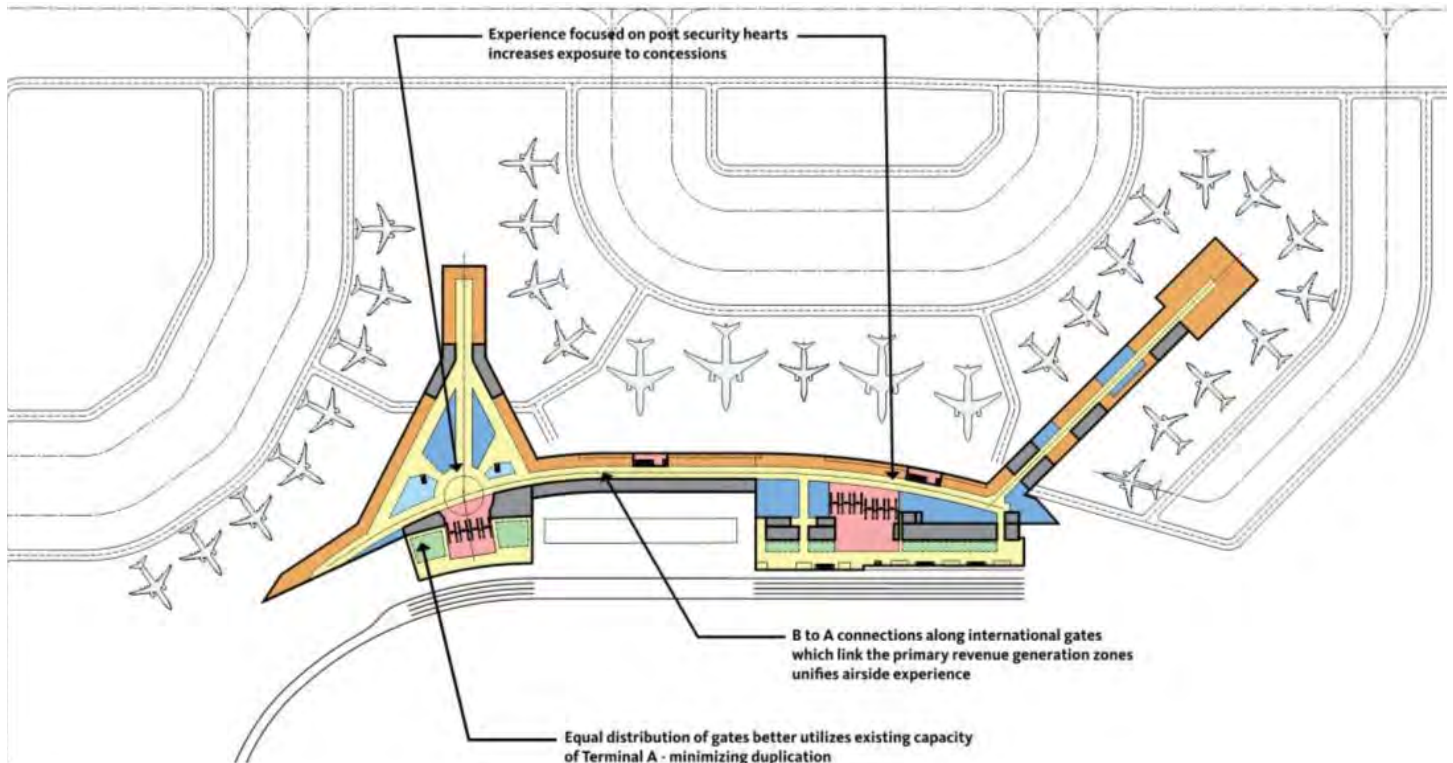


Figure 05.10 – Long Term - Departure Terminal layouts



Implementation Schedule

Short-Term Recommendations

Ground Access

Transit Connection between the airport and the CT rail Hartford Line	To improve bus service to Hartford from Bradley the route should operate more frequently and be re-routed to serve the Ground Transportation Center when completed. Extending the Bradley Flyer to New Britain along CT fastrak and rebranding the route could attract more choice riders coming from the stations.
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Marketing and branding the Bradley Flyer	Improved branding, user-friendly schedules, and better signage at the airport could help bolster ridership.
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Harness New Technologies to Improve Ground Access

Implement MaaS pilot program at Bradley Airport	Implementation of Mobility as a Service (MaaS) would provide customers with a one-stop shopping approach to their trip to and from Bradley Airport, harnessing the rapidly expanding number of travel modes available in the Capitol Region.
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Competitive Cargo Service

Cargo Expansion	Consolidate cargo at Bradley and support development plans for the growth of cargo
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Long-Term Recommendations

Ground Access

Multimodal Cargo Center	Evaluate making Bradley a true multi-modal freight facility by improving rail freight access to the airport and developing support facilities for trucking.
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Invest in Infrastructure	Support infrastructure investments like new ground transportation center that improve the airport's functionality, safety and operational efficiency with the goal of attracting new travelers to Bradley.
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Implementation Schedule

Ongoing Actions

Ground Access

Support Bradley Master Plan's calls for improved designs for roadways surrounding the airport.

Competitive Cargo Service

Capitalize on Air Cargo Potential

Continue to improve Bradley's air cargo capabilities and services, and capitalize on problems that New York and Boston airports are experiencing due to increasing ground and air congestion.

Regional Economic Development

Support planning efforts that maximize economic development potential of airport

Support planning efforts (state, regional, and local) including land use regulations, good road systems, and adequate infrastructure that help achieve the airport's economic development potential in a manner that has minimum impact on the environment and on neighborhoods in the general vicinity of the airport .

DRAFT

Chapter 06

Freight Transport System

Goods movement plays an important role in economic growth. The importance of freight transport is obvious in economies dominated by industries that ship massive quantities of heavy and/or bulky materials, but even in economies dominated by financial, insurance, and service industries, efficient movement of goods is still vital. Freight transport is required to import finished products and basic commodities used by both businesses and consumers, as well as for the export of some of the specialized products produced within the region.



Trucks parked at the Willington truck stop located off of I-84

In recent years, CROCOG has enhanced its freight planning process to include an inventory of freight-relevant infrastructure and a stakeholder outreach program. CROCOG also coordinates its freight planning efforts with CTDOT and neighboring planning agencies. This coordination included CROCOG's support of the development of CTDOT's Statewide Freight Plan, which was finalized in 2017. Based on this continuous planning effort, opportunities to improve freight transportation infrastructure have been identified. This section describes the region's freight transportation system and goods flows, identifies issues and opportunities, and proposes potential strategies and actions for maintaining and improving goods movement in the region.

Existing Conditions

The volume of goods moving to, from, and through the region continues to increase. The tonnage of freight is projected to increase 0.8% annually between 2014 and 2040, and the value of these goods is projected to increase 3% annually. Previous analyses have projected future increases in freight traffic, with the recent CTDOT Statewide Freight Plan projecting an increase of 57% in goods movement by 2040.

The primary modes of goods movement are trucks, rail, air, water, and pipelines. In Connecticut, trucks carry over 90% of goods. Figure 06.3 shows the statewide freight volumes by mode. About 40% of truck traffic in the region is through traffic, and inbound freight exceeds outbound freight by more than a 2:1 margin.

Issues and Deficiencies

The Capitol region's highway congestion issues affect truck travel. Roadway congestion results in increased costs to the trucking industry in terms of hours of delay and lost productivity.

Inadequate infrastructure also hinders truck travel in the region. Recent CROCOG analysis has identified bridges with inadequate clearances (see Figure 06.2), bridges with weight restrictions, and roads with through-truck restrictions.

Previous studies also have identified a shortage of rest areas, service plazas, and other areas that could meet the demand for truck parking. The Capitol Region currently has only three of the state's 20 state-owned public traveler roadside facilities (rest areas or service plazas).

Truck congestion could be eased in the state without affecting the volume of goods by expanding rail freight. CTDOT owns substantial contiguous rail rights-of-way in the western and eastern sectors of the region where rail service could be initiated in the future. However,

Figure 06.1 —
I-84's Willington truck stop is privately-owned



potential rail freight expansion opportunities are limited by various factors, including Amtrak’s management of the Hartford Line and physical constraints in the form of weight, height and width limits on the region’s rail lines.

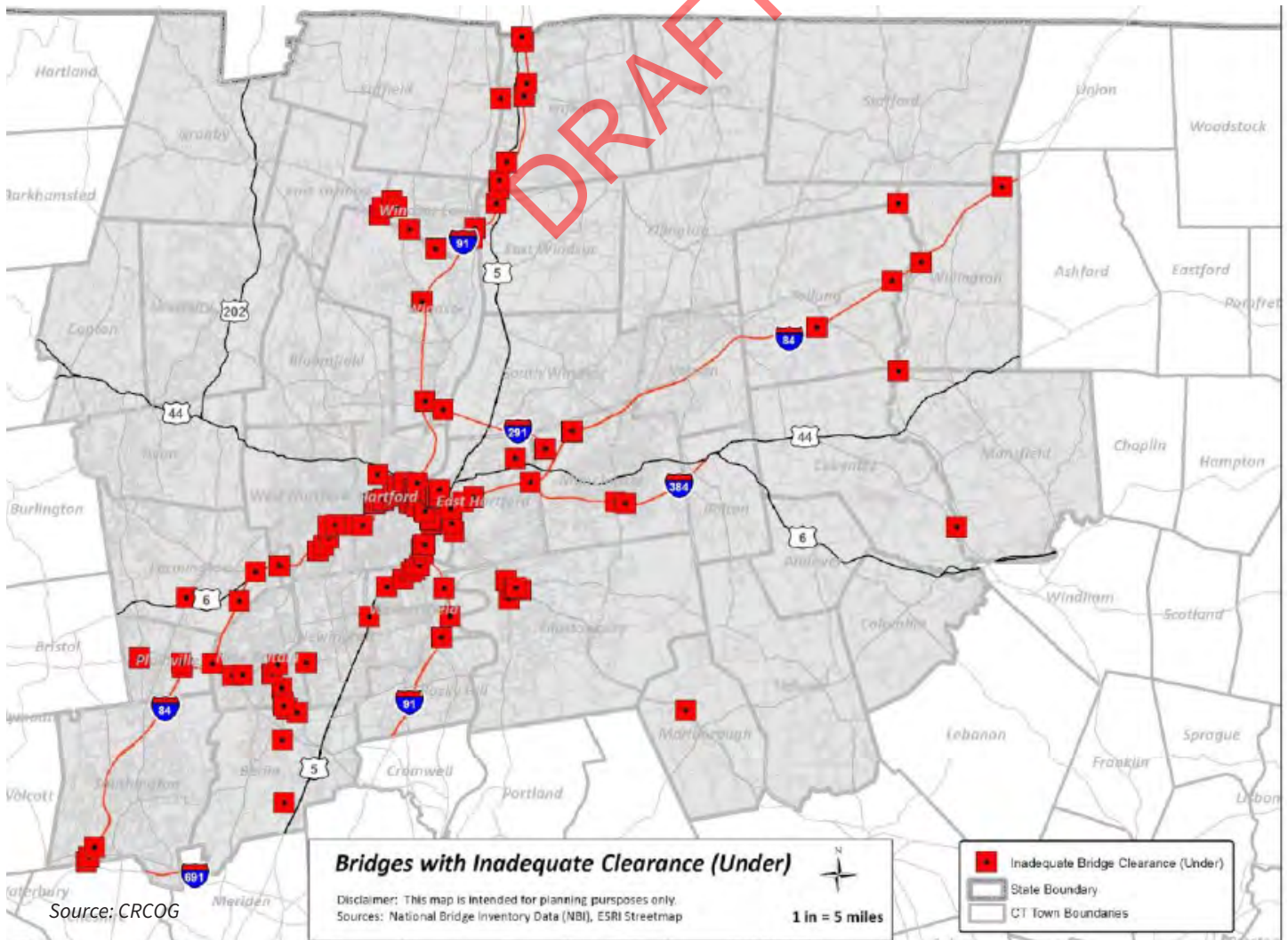
Bradley Airport is another regional freight asset that is not being fully utilized. The airport currently has limited space for storing trailers and limited capacity for truck and freight rail access and support facilities. The state is working to maximize the economic potential of the airport through incentives and land use policy.

Input from stakeholders in the region identified the following issues and deficiencies to be

addressed in order to further improve freight transport in the region:

- The regional highway system has significant truck bottlenecks.
- While there could be opportunity for expanded freight rail service in the region, facilities have constraints that limit expansion.
- There is a lack of truck parking and service facilities in the region.
- There is a shortage of space for trailer storage and scheduling difficulties at Bradley Airport.

Figure 06.2 – Bridges with Inadequate Clearance (over)



Highways / Trucks

Interstate highways are the main channel for truck traffic, with an estimated 80% of truck freight moving on Interstates. In Connecticut, Figure 06.4 shows the daily truck volumes along the main roads, as well as supporting facilities for trucks such as rest areas and parking areas.

The National Network for trucks differs from the National Highway System. It requires states to allow conventional combinations of trucks along key routes. More recently, the FAST Act authorized the National Highway Freight Network in order to provide strategic direction to federal policy and funding to improve truck freight flows. This network is comprised of the Primary Highway Freight System (PHFS) and other Interstate portions not on the PHFS. In the Capitol Region, this network includes I-84, I-91, I-291, and I-384. The network also includes any Critical Urban Freight Corridors or Critical Rural Freight Corridors that states may designate. Within the Capitol Region, CTDOT’s Critical Urban and Rural Freight Network includes Routes 20 and 75 near Bradley International

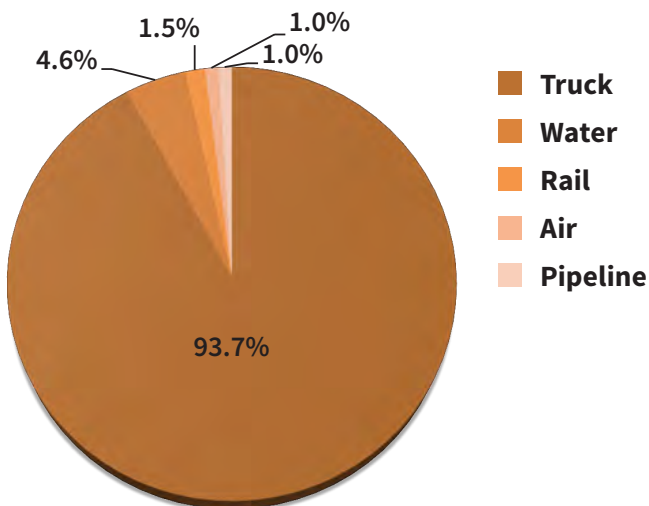
Airport; Route 44 through Hartford, West Hartford, Avon, and Canton; and Route 6 through Bolton, Andover, Columbia, and Mansfield

There are two main truck traffic bottlenecks in the region: I-84 at its interchange with I-91 and on I-91 at its intersection with Route 5/15 (the Charter Oak Bridge). Both locations are listed in the American Transportation Research Institute’s (ATRI) Top 100 Truck Bottleneck List (national survey), ranked at 24 and 100, respectively. The 1-84/1-91 interchange has an average peak speed of 36 miles per hour and the 1-91/Route 5/15 intersection has an average peak speed of 45.8 miles per hour.

New federal performance management regulations require using a Truck Travel Time Reliability (TTTR) index for Interstate highways to assess the impact of roadway congestion on goods movement. CTDOT calculates the TTTR index as the ratio of longer travel times (95th percentile) along a roadway segment to a “normal” travel time (50th percentile), with reliability defined as a TTTR of less than 1.5. The TTTR’s of interstate segments are used to create the TTTR Index for the entire Interstate system using a weighted aggregate calculation for the worst performing times of each segment. For this indicator, CRCOG has adopted the CTDOT target, which is 1.83. The current regional value is 1.85, which falls just short of meeting the target.

Investments must be made in infrastructure to improve truck travel. Trucks are limited by low clearances and weight and truck travel restrictions. The lack of truck parking is also a long-standing issue, which leads to highway safety and operational concerns due to illegal truck parking.

Figure 06.3 — Freight Tonnage by Mode, Connecticut

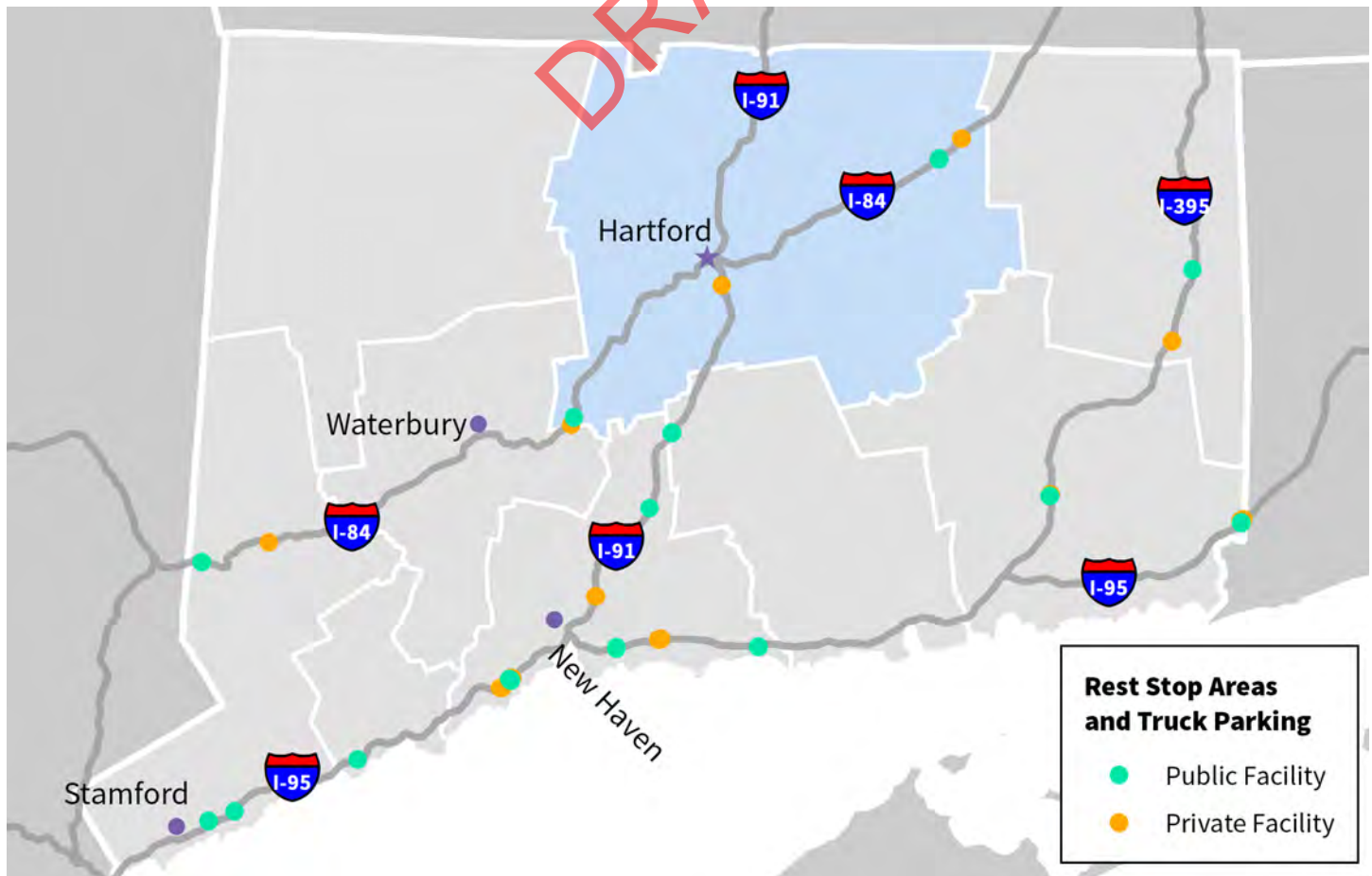


While the highway system serves long-haul trucking needs, in recent years there has been a growing demand for short-haul trucking services, particularly due to the growth of e-commerce. Such service emphasizes the importance of “last mile” connections, which may be difficult for some trucks because of vehicle size versus local road restrictions, road conditions / constraints, traffic congestion, lack of signage, and navigation difficulties. Further, truck traffic in downtown areas or residential neighborhoods may generate concerns about congestion, pollution, and noise.

Intelligent Transportation System Technology

Trucks experience the same roadway congestion that cars do. Recurring and non-recurring congestion result in travel delays that increase shipping time and costs, which may result in higher consumer costs. The implementation of Intelligent Transportation System (ITS) technology, aimed at providing traveler information and managing congestion, has been increasing in recent years. The region’s roadways currently have a range of ITS devices including fiber optic cable, computerized advanced signal systems, closed circuit TV cameras, variable message signs, and highway advisory radio.

Figure 06.4 – Rest Stops Areas with Truck Parking in Connecticut



Recommendations

1. Explore Developing and Improving Parking and Rest Stop Facilities in the region.

Consider the potential development of a private truck parking facility in the Hartford area; improve the existing rest stop facilities in Willington and the eastbound rest stop facility in Southington.

2. Improve Highway Conditions.

Address truck bottlenecks along regional highway system. Advance key highway construction projects.

3. Ensure I-84 Hartford (Viaduct) Project Includes Rail Track Meeting National Rail Freight Standards.

When constructing the I-84 Viaduct project, provide for rail track suitable to 286,000 pound weight allowing freight traffic to meet national standards for rail freight cargo.

4. Increase Deployment of ITS technology and Increase Traveler Information.

Coordinate with CTDOT on allowing freight companies access to RTMS information to make better routing decisions and reduce shipping delays.

5. Modernize Rest Stop Facilities.

Work to increase the number of truck parking spaces by increasing rest area or service plaza capacity. Seek to improve the functionality at existing stops by making available travel information and electrification to stop diesel idling through the use of heating and cooling hook-ups/cable hook-ups.

6. Coordinate Short-Haul Trucking Deliveries.

Study issues related to short-haul trucking demand and last-mile delivery needs, including the location of freight facilities. In concentrated service centers, plans for consolidating frequent pickup and delivery could be made.

7. Maintain Truck Weight and Safety Enforcement Activities.

Work with CTDOT to explore the possibility of installing Virtual Screening Facilities (VSF) in the region and to expand the use of Weigh-In-Motion (WIM) technology (from pilot installations in Greenwich and Union) to increase mobility for compliant trucks and allow enforcement officers to spend resources on those in violation of safety laws.

Rail

Statewide, freight rail carries about 3.6 million tons per year, or about 3% of total goods movement.

The Hartford Line between New Haven and Springfield is the primary route for moving rail freight to, from, and through the Capitol Region. The Connecticut Southern Railroad (CSO) carries freight for the national rail freight carrier CSX over this line. Other rail freight routes in the region include the following (see Figure 06.5):

- Connecticut Southern Railroad — operates several short routes including the Manchester Secondary, the Windsor Branch, the Wethersfield Branch, and the Suffield Branch / Bradley Spur
- Central New England Railroad — operates the Griffin Industrial Track and the Armory Branch
- Providence and Worcester Railroad — operates the Wethersfield Secondary route
- Pan Am Southern — operates the Terryville Secondary and the Canal Branch
- New England Central Railroad — operates one line crossing the northeastern portion of the region

Increasing rail freight would help to mitigate some of the demand for and impacts of truck traffic. An average rail car carries about as much as four trucks; thus, rail freight activity would help to reduce truck trips, roadway congestion, and air pollution. Rail typically is best-suited for bulky, low-value commodities such as lumber, paper, and fuel oil, but rail shipping could serve other markets through intermodal service (trailer on flat car and container on flat car) under certain conditions. Generally, rail

intermodal is viable only for freight shipments of 750 miles or longer in trucking corridors with relatively high demand or annual volume.

CTDOT owns substantial contiguous rail rights-of-way in the western and eastern sectors of the region where rail service could be initiated in the future. There also may be opportunities for intermodal or transloading activity. For example, the CSX intermodal terminal in West Springfield, MA may provide an opportunity to reduce through truck traffic in the Capitol Region. The potential expansion of rail freight will also depend largely on identifying businesses that can utilize rail shipping services. The 2005 study, *Freight Movement in the Hartford Metropolitan Region*, conducted by Global Insight estimated the maximum truck-to-rail mode shift potential in the region is about 12 percent. Going forward, efforts need to be made to realize this increase in rail freight's share of goods movement in the Capitol Region.

Figure 06.5 – Freight Rail Network



Potential rail freight expansion opportunities may be limited, however, by various factors. Freight rail on the Hartford Line is limited by time restrictions and high fees imposed by Amtrak. CROCOG's freight infrastructure assessment also identified physical constraints to the rail network. For example, the national rail industry standard requires the capability to handle cars up to 286,000-pound gross vehicle weight (286k), but most lines in the region currently only have capacity for 263,000 pounds (263k). In addition, there are height restrictions at the Albany Avenue bridge in Hartford, the I-91 overpass in Windsor Locks, and at the location of overhead power lines in Windsor. There is also a width restriction at the Asylum Bridge abutment in Hartford. In addition, potential freight rail expansion may need to address issues such as at-grade road crossings, noise, and environmental impacts.

Recommendations

- 1. Coordinate Current and Potentially Expanded Operations with Passenger Rail Schedules.**
- 2. Upgrade Rail Bridge Along Knowledge Corridor.** Reconstruct the Connecticut River Rail Bridge to allow for improved freight rail movement north and south along the Knowledge Corridor.
- 3. Address Constraints to Expanding Service.** Upgrade lines to 286,000-pound capacity and address clearance limitations.
- 4. Explore Expansion Opportunities.** Preserve previous rail freight corridors for potential future use.
- 5. Consider Intermodal / Transload Opportunities.**
- 6. Identify Potential Customers Along or Near Rail Freight Corridors.**

Air

While air freight accounts for a relatively small portion of total goods movement, it typically carries higher-cost, time-sensitive goods. Bradley International Airport has several types of air cargo activities including small freight operations, dedicated freight operations, airmail, and other freight forwarding services. The U.S. Postal Service has a post office and mail sorting facility at Bradley, and dedicated cargo airlines with regular operations include UPS, FedEx, and DHL Express. UPS also has a large package sorting facility. Bradley handles high-value goods such as aircraft components, electrical and machine parts, and other consumer goods. The demand for air cargo and mail service has been increasing; air cargo carriers at the airport currently ship about 115,000 tons of cargo and 3,000 tons of mail each year. According to the 2018 update of the Bradley Airport Master Plan, Bradley is expected to experience continued growth in air cargo, with a projected increase of about 33% in annual volume by 2037.

Previous and current planning initiatives provide support for expanding air freight and related commercial activity at Bradley. The Bradley Development League, a consortium of the four surrounding towns (East Granby, Suffield, Windsor, and Windsor Locks), markets the airport and region for economic development.

The Bradley Area Transportation Study (2002) provided a comprehensive analysis of current and future traffic conditions and land use in the airport area, and it identified

transportation improvements necessary for accommodating growth and maintaining safe and efficient access to the airport area. These are discussed in more detail within this Plan in Chapter 5: Airport System Ground Access. In 2010, the state established the Bradley Airport Development Zone (BADZ), which extends tax incentives to companies that develop or acquire property in the zone and engage in manufacturing, manufacturing-related research and development, warehousing and distribution, and/or other airport-related commercial activity. In 2012, a build-out analysis for BADZ found that it theoretically could add 20 million square feet of commercial or industrial use. Most recently, the airport's Master Plan Update provides a planning and development framework to address landside and airside

Increasing Demand for Air Cargo and Mail Service

Air cargo carriers at the airport currently ship about 115,000 tons of cargo and 3,000 tons of mail each year. According to the 2018 update of the Bradley Airport Master Plan, Bradley is expected to experience continued growth in air cargo, with a projected increase of about 33% in annual volume by 2037.

facilities and land development considerations for the next 20 years and beyond.

Challenges to consider in further considering air freight expansion opportunities include providing adequate space for storing trailers, accommodating freight carrier schedules, and identifying specific commodities as niche markets. There is also potential to make Bradley a true multimodal freight facility by improving rail freight access and developing support facilities for trucking. This multimodal approach could also lend itself to the development of a “freight village” in the Bradley area.

A freight village is a complex characterized by the following:

- Goods move between two or more forms of freight transportation
- Active distribution centers and industrial activities are located adjacent to the modal shift facilities
- Supporting uses may include truck stops/rest areas, office space, retail, and hotels
- The village is often under the management of a single entity

Recommendations

- 1. Address Constraints.** Address shortage of space for trailer storage and scheduling difficulties
- 2. Pursue Airport Area Development.** Explore and pursue airport area development opportunities, including the development of a “freight village.”
- 3. Maintain and Improve Groundside/ Intermodal Connections.**
- 4. Create a Niche Market.** Consider targeting specific commodities rather than pursuing general freight.
- 5. Continue to Improve Bradley’s Air Cargo Capabilities and Services.** Evaluate making Bradley a true multi-modal freight facility by improving rail freight access and developing support facilities for trucking.

Maritime

The Capitol Region has no major ports, and the Connecticut River is not a year-round shipping option because it freezes in winter. Nonetheless, improved and increased maritime shipping at Connecticut coastal ports and along the coastline (particularly of petroleum products) may be significant because it could help to mitigate truck traffic in the region.

Recommendation

1. Explore opportunities to divert freight from truck to water transport.

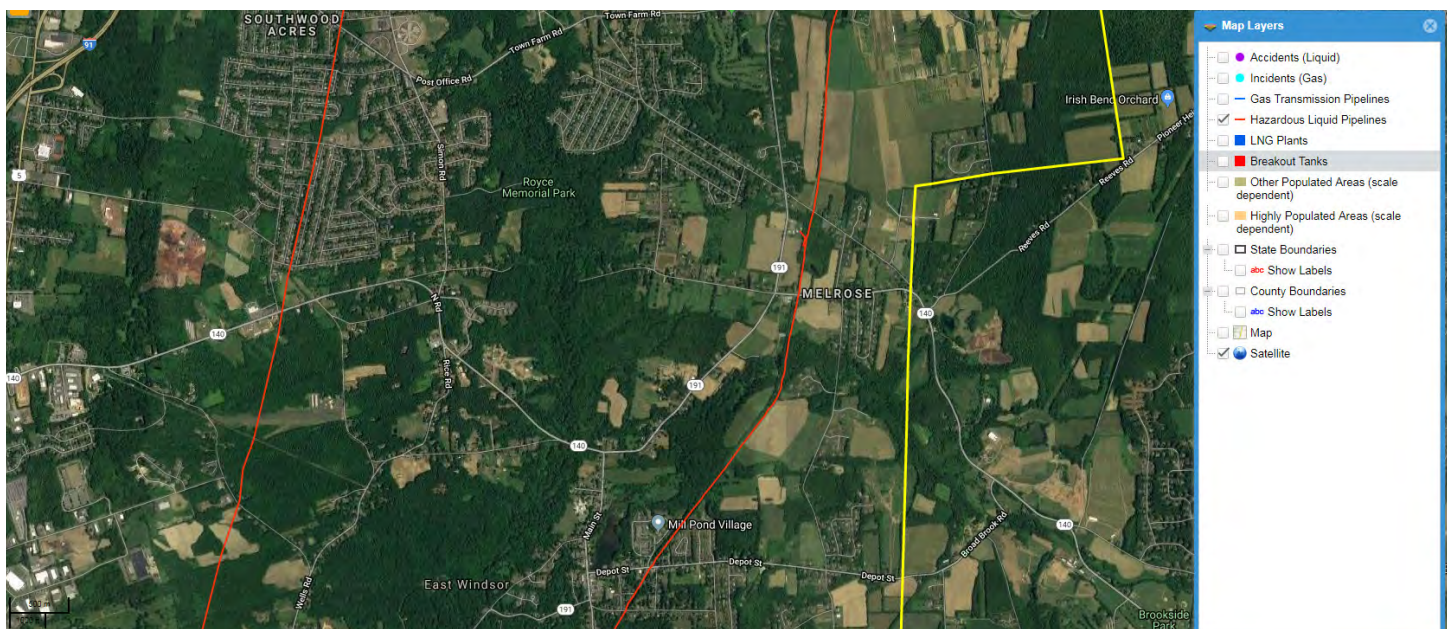
Coastal barges could divert through shipments of petroleum, relieving truck traffic on I-91 and I-84.

Pipelines

Some pipelines carry petroleum products into and through the region. One major line is an approximately 100-mile pipeline that carries refined petroleum products from New Haven through central Connecticut and into Massachusetts. Running north from New Haven, the pipeline has Connecticut delivery locations in Middletown, Rocky Hill, East Hartford, Hartford, Bradley International Airport, Melrose (East Windsor), and Enfield. A pipeline terminal with a 345,000 barrel capacity is located in Wethersfield. It handles ultra-low sulfur diesel, gasoline, ethanol, and heating oil. Such terminals receive products from pipelines and distribute them to third parties, who in turn deliver them to end-users and retail outlets.

In addition, portions of two interstate natural gas pipelines run through the region. These lines are the Tennessee line, which runs north-south, and the Algonquin line, which runs east-west with a few north-south spurs.

Figure 06.6 – Pipelines in Hartford County



Implementation Schedule

Short-Term Recommendations

Highways/Trucks

Explore Developing and Improving Parking and Rest Stop Facilities in Region

Consider the potential development of a private truck parking facility in the Hartford area, improve the existing rest stop facilities in Willington and the eastbound rest stop facility in Southington.

Rail

Coordinate current and potentially expanded operations with passenger rail schedules

Air

Address constraints

Address shortage of space for trailer storage and scheduling difficulties.

Long-Term Recommendations

Highways/Trucks

Improve Highway Conditions

Address truck bottlenecks along regional highway system. Advance key highway construction projects.

Ensure I-84 Viaduct Project Includes Rail Track Meeting National Rail Freight Standards

When constructing the I-84 Viaduct project, provide for rail track suitable to 286,000 pound weight allowing freight traffic to meet national standards for rail freight cargo.

Rail

Upgrade Rail Bridge Along Knowledge Corridor

Reconstruct the Connecticut River Rail Bridge to allow for improved freight rail movement north and south along the Knowledge Corridor.

Air

Pursue Airport Area Development

Explore and pursue airport area development opportunities, including the development of a “freight village.”

Implementation Schedule

Ongoing Actions

Highways/Trucks

Increase deployment of ITS technology and increase traveler information

Coordinate with CTDOT on allowing freight companies access to RTMS information to make better routing decisions and reduce shipping delays.

Modernize Rest Stop Facilities

Work to increase the number of truck parking spaces by increasing rest area or service plaza capacity. Seek to improve the functionality at existing stops by making available travel information and electrification to stop diesel idling through the use of heating and cooling hook-ups/cable hook-ups.

Coordinate Short-Haul Trucking Deliveries

Study issues related to short-haul trucking demand and last-mile delivery needs, including the location of freight facilities. In concentrated service centers, plans for consolidating frequent pickup and delivery could be made.

Maintain truck weight and safety enforcement activities

Air

Maintain and improve groundside / intermodal connections.

Create a Niche Market

Consider targeting specific commodities rather than pursuing general freight.

Continue to improve Bradley's air cargo capabilities and services

Evaluate making Bradley a true multi-modal freight facility by improving rail freight access and developing support facilities for trucking.

Maritime

Explore opportunities to divert freight from truck to water transport

Coastal barges could divert through shipments of petroleum, relieving truck traffic on I-91 and I-84.

Chapter 07

New and Emerging Technologies

Transportation is undergoing a number of concurrent transformations that are changing opportunities and expectations for how people move. This chapter presents an overview of four major trends (vehicle electrification, connected and autonomous vehicles, micro-mobility, and shared mobility) as well as the underlying concept of smart cities; highlights case studies that demonstrate how national and regional cities are leveraging new technologies; summarizes key takeaways; and presents recommendations for incorporating new and emerging technologies to advance mobility goals in the CROCOG region.



Smart and connected streets

Trends Overview and Case Studies

Vehicle electrification, connected and autonomous vehicles, micro-mobility, and shared mobility are expanding options for how people move, elevating traveler expectations around the customer experience, and providing new opportunities for partnerships and services to public agencies.

Connected and Automated Vehicles

Connected and Automated Vehicles Trend Overview

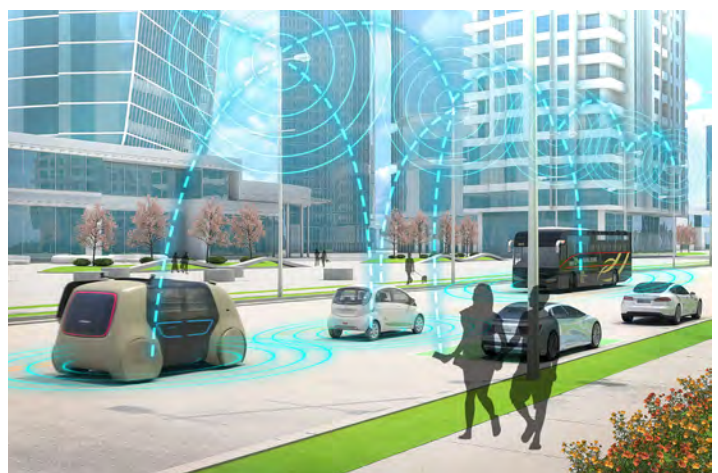
Connected vehicles (CV) communicate with other vehicles, infrastructure, or other connected devices via short-range radio signals, enabling roadway users to be aware of their ever-changing surroundings. Automated vehicles (AVs) automate at least some aspect of driver function. These vehicles operate through sensors, cameras, radar, and software to sense and respond to surrounding conditions.

CV technologies use mainly two types of communications: cloud-based technology and two-way network data transfer between devices. The developing CV technologies can be summarized as: Vehicle-to-Infrastructure (V2I), Vehicle-to-Vehicle (V2V), and Vehicle-to-Everything (V2X). The United States Department of Transportation's (USDOT) National Highway Traffic Safety Administration (NHTSA) has adopted the six level definitions

of autonomous vehicles as published by the Society of Automotive Engineers (SAE International). The six levels are “No Automation”, “Driver Assistance”, “Partial Automation”, “Conditional Automation”, “High Automation”, and “Full Automation”.

Various levels of connectivity and automation have been incorporated into new vehicles on the road today. Automakers like Ford are planning to aggressively elevate vehicles' automation levels in the near future. Fully autonomous vehicles could be available to consumers as early as 2021 but there is still much uncertainty surrounding the timeline; the Victoria Transport Policy Institute estimates that the full fleet conversion won't be achieved until the 2060s based on the deployment rates of previous technologies. It is anticipated that the region's roadways will be occupied by vehicles with various levels of connectivity and automation. Proactive planning is needed now to channel technologies to policy objectives in the CROCOG region.

Figure 07.1 — **Connected/automated vehicle technologies**



Connected and automated vehicle technologies have potential societal and physical implications. The USDOT (estimates that over a thousand lives could be saved by implementing just two of the many connected vehicle safety applications the agency is developing. Similarly, the NHTSA notes that 94% of serious crashes are due to error, and that automation has the potential to remove human error to protect drivers, passengers, cyclists, and pedestrians.

Automated and connected vehicle technologies also have implications for land use patterns. McKinsey estimates that automated vehicles will reduce the need for parking space in the United States by more than 2,200 square miles as they don't need space for people to enter and exit when parked; vehicles could park in spaces that are 15% tighter. This land can be repurposed for public-serving uses like housing, active transportation, or other uses as communities see fit. Conversely, there is concern that automated vehicles may contribute to sprawl as their automation may make long distance travel more palatable. Continued observation and responsive regulation

should be employed to ensure that these technologies are deployed in a responsible manner that prioritize sustainability.

Connected and Automated Vehicles Case Study

Connected and automated vehicle technologies can be applied across multiple vehicle types and industries, including privately owned vehicles, shared vehicles, construction vehicles, and freight trucks. These technologies could enhance transit networks by providing first/last mile connectivity to existing transit service. Connected and automated technology could also be used on transit vehicles to improve service, for example automated bus rapid transit or use of connected and automated technologies to lower operating costs and improve safety through object detection and avoidance on rail systems .

Current AV deployments in the United States mainly consist of small automated shuttles operating in limited or semi-controlled environments. The first vehicle to operate on California's roads without a driver behind

“ [...] the National Highway Traffic Safety Administration notes that 94% of serious crashes are due to error, and that automation has the potential to remove human error to protect drivers, passengers, cyclists, and pedestrians.”

the wheel was an EasyMile shuttle in March 2018. The goal of the shuttle is to encourage commuters to take transit by providing frequent and convenient connections from Bay Area Rapid Transit (BART) to employment in Bishop Ranch in Contra Costa County.

CV infrastructure in the United States is occurring both on interstate highways as well as arterials. Colorado DOT is deploying hundreds of roadside units on I-70. Cities all over the United States are participating in American Association of State Highway and Transportation Officials' (AASHTO) SPaT (Signal Phase and Timing) challenge, deploying roadside units at signalized intersections (see Figure 07.2).

Vehicle Electrification

Vehicle Electrification Trend Overview

Electric vehicles are those in which the vehicle propulsion system is powered exclusively by electricity or a combination of electricity and fuel (hybrids). While still accounting for a small percentage of the overall vehicle fleet, electric vehicle sales have been increasing, with implications for environmental impacts and demand for charging infrastructure. According to Forbes and the Inside EVs report, there has been a 70% year-over-year increase in monthly sales of electric vehicles in the

Figure 07.2 — SPaT Challenge Participants



United States. Electric vehicles in the U.S. have grown at a 32% compound annual growth rate over the past four years.

Growth in EVs has the potential to drastically minimize the environmental impacts of the transportation system and vehicle fueling infrastructure. According to the United States Environmental Protection Agency, transportation accounts for around 27% of greenhouse gas emissions in the US. Electrification of some vehicle types would have a larger impact on lowering emissions than others. While large diesel trucks have been getting more efficient and cleaner, they still represent a large portion of vehicle emission; unfortunately, electrifying them is more complicated than smaller vehicles. Increased use of electric vehicles also requires increased charging related infrastructure. Most passenger vehicles can be charged by plugging in. However, although the cost of smaller passenger electric vehicles has decreased over time, electrification of larger vehicles like freight trucks and buses is still substantially more expensive due to the large and costly batteries required for even short-range trips. For these vehicles existing charging infrastructure includes overhead systems at transit stations, overhead catenary systems, or static charging at maintenance facilities. Emerging technology includes inductive charging that would enable vehicles to charge while driving over embedded inductive charging infrastructure. Implementing effective charging technology for large trucks should be prioritized due to its potential to reduce greenhouse gas emissions.

Performance and safety standards for EVs are set by the Federal Communications Commission (FCC) and several professional organizations including: the Society of Automotive Engineers (SAE); the American National Standards Institute (ANSI); and the Institute of Electrical and Electronics Engineers (IEEE). The SAE has established an industry-wide standard for performance, safety and the testing of EVs. ANSI and IEEE have also set safety standards for human exposure to radio frequency radiation and magnetic fields. The use of the electromagnetic spectrum is also regulated by the FCC.

Vehicle Electrification Case Study

The Colorado Department of Transportation is currently conducting a Smart Powered Lanes project that seeks to innovate transportation in Colorado. A pilot project is developing a wireless technology that will allow vehicles to charge as they are driving at full speed. It has been tested on a closed track (not publicly-accessible) and proven to transfer energy safely without impacting vehicle operation.

Micro-Mobility

Micro-Mobility Trend Overview

Micro-mobility refers to small personal devices used for relatively short trips, for example electric scooters and bicycles. While scooters, bicycles, and other personal mobility devices have existed for a long time, several technologies have enabled them to

be deployed and used at much more frequent rates in recent years. Battery sizes have decreased and costs have gone down, GPS combined with apps enables the devices to be accessed and located virtually anywhere, and the low cost per trip has made using such devices relatively affordable. Within a relatively short timeframe, these companies have provided a new mobility option to many people in cities across the US. The bike and scooter share company Lime noted in its annual report that in the year since it launched people have taken six million rides on its dockless scooters and bikes.

While not suitable for very long trips or all trip types (for example for those needing to transport other passengers or baggage) micro-mobility has the potential to serve a large portion of trips in a sustainable, on-demand fashion. According to the U.S. Department of Energy, almost 60% of vehicle trips in 2017 were less than six miles. Shifting some of these trips to bikes or scooters could help reduce transportation related emissions.

Micro-Mobility Case Study

E-scooters have been launched in several cities across the United States, including Atlanta, Austin, Denver, Chicago, Washington DC, Los Angeles, San Jose, Seattle, New York City, and San Francisco. Most e-scooter trips are one to two miles long. While some of these trips may otherwise have been made by walking, some likely would have been made using a vehicle, while others are enabling new connections to transit. Public perception of

e-scooters is also highly favorable. A Populus survey of over 7,000 individuals across ten major US cities found that 70% of respondents favored e-scooters, and that support for scooters was generally higher for lower income individuals, indicating that e-scooters can provide an affordable transportation option.

Shared Mobility/ Mobility as a Service

Shared Mobility/ Mobility as a Service Trend Overview

Shared mobility and mobility as a service (MaaS) is a move from commodity based consumption of transportation (owning a car, bike, etc.) to a service based model (consuming a trip on a shared service). Shared

Quick Fact

According to the US Department of Energy, almost 60% of vehicle trips in 2017 were less than six miles. Shifting some of these trips to bikes or scooters could help reduce transportation related emissions.



mobility/MaaS includes car and ride share, like transportation network companies Uber and Lyft, as well as bike share and on-demand shuttle services. These services have grown rapidly in recent years. According to Susan Shaheen of UC Berkeley, global membership in car sharing services has grown tremendously from around 350K in 2006 to 15 million in 2016. Research by Russell Meddin of NYU found that by December of 2015 there were 980 cities worldwide with IT-based bike sharing, and by October 2015 there were 87 of these programs in the US. Shared mobility and MaaS enables people to consume transportation without necessarily needing to own any one mode, expanding access and mode choice.

Shared Mobility/ Mobility as a Service Case Study

While several examples of MaaS exist in Europe, deployments in the United States are more limited. In February 2018 the City Council of Monrovia, California approved an updated transit model for the city called GoMonrovia . The program combines Lyft ride share, Lime dockless bike share, and the City's existing dial-a-ride service into an integrated transportation service. Those who live and work in Monrovia can use these services for reduced rates and access services through a smart phone app or dial in reservations.

Figure 07.3 — **Mobility as a service concept**



Smart Cities

Smart Cities Trend Overview

Underlying all of the above is a move towards smart cities. Smart cities are defined broadly as urban areas that use sensors to collect real-time data that is used to manage city assets and services more efficiently. As the production of transportation related data increases (through people's uses of connected devices as well as sensors on vehicles and in infrastructure), there is an opportunity to leverage this data to provide enhanced services that better meet constituents' needs.

One example of a smart city application is traffic signal performance measure technology. Here, a small computer is installed in a traffic signal cabinet to collect, analyze and transmit information to a website about the number of vehicles passing through and the associated signal timings. Consecutive traffic signals can all be connected on one corridor to derive a more comprehensive analysis. Analyses are created automatically and include percent of arrivals on green, queue length, delay, time space diagrams, and more. Traffic signal performance measure technologies are currently operational in Norwalk and Danbury, CT.

Smart Cities Case Study

Kansas City created a digital roadmap to enable smart city solutions. The roadmap outlines ways to collect, analyze, share, and leverage data across city departments to enable leaner and more efficient governance.

Smart city approaches are also being deployed specifically in the transportation sector. The Colorado Department of Transportation is currently developing a Smart Mobility Plan that will serve as a blueprint for deploying connected, automated, and smart technologies statewide. The intent of the plan is to identify technology solutions that can advance the State's transportation equity, accessibility, and maintenance goals in addition to traditional physical infrastructure solutions.

“ Smart cities are defined broadly as urban areas that use sensors to collect real-time data that is used to manage city assets and services more efficiently.”

State of Trends in CROCOG Region

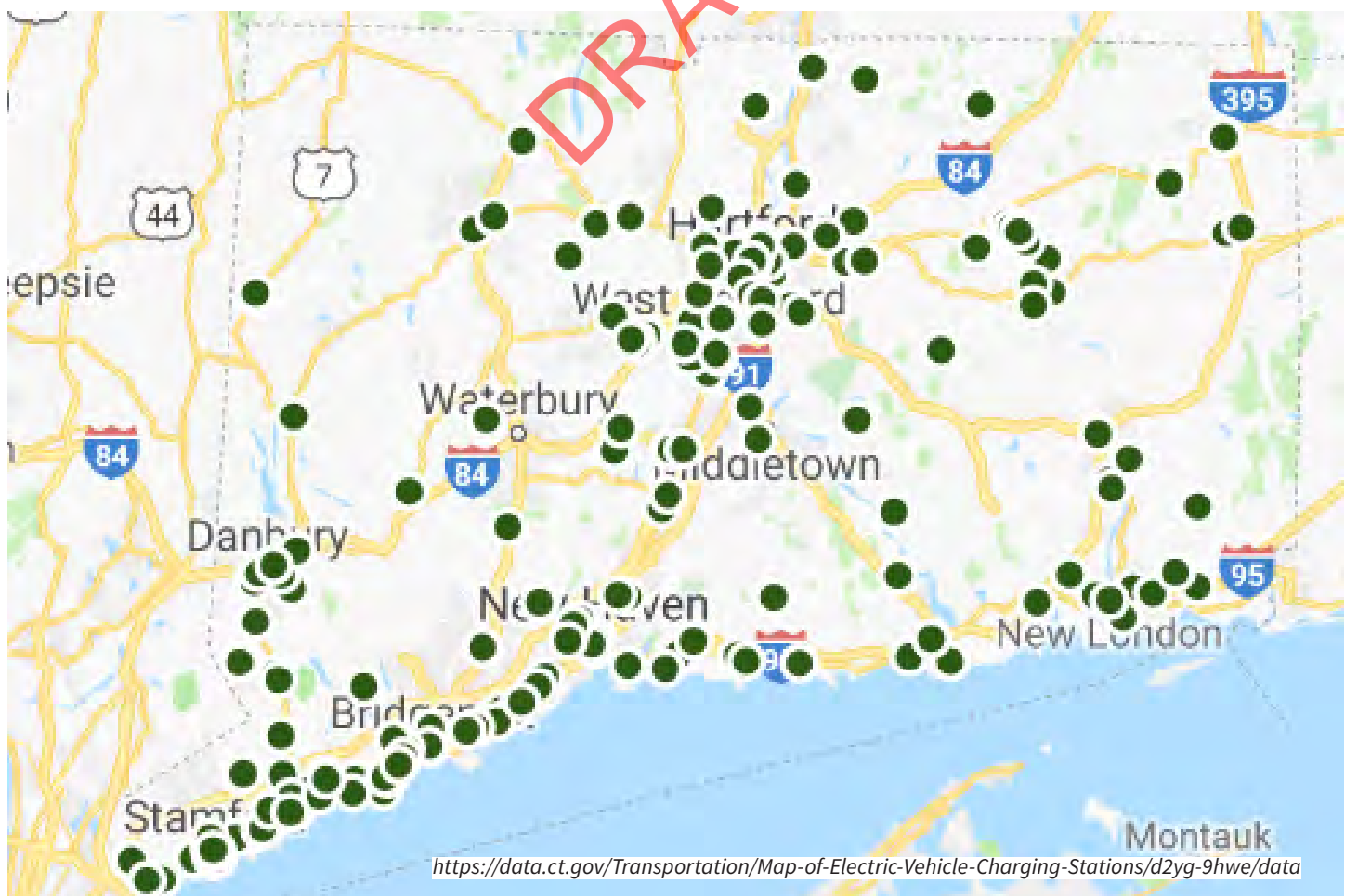
Connected and Automated Vehicles

Connecticut, like the rest of the world, is grappling with how to respond to the rapid rise and evolution of CVs/AVs. The state passed a law in 2017 establishing a pilot program to test AVs and also formed a 15-member task force to study AVs. CTDOT is developing a Strategic Plan for Implementing CVs/AVs in Connecticut. CTDOT is also working on a Traffic Signal Management Plan which will be completed in 2019. For more information see Appendix 2.

Vehicle Electrification

Connecticut, through EVConnecticut (a partnership between the state's Department of Energy and Environmental Protection and Department of Transportation), has implemented policies that provide financial incentives to buy electric vehicles, and to build and host EV charging stations. The number of charging stations in the state is growing, they are currently located mostly in urban areas along major highways with a large proportion located in the Capitol Region. The state details further strategies to encourage electric vehicle usage in the Department of Energy and Environmental Protection's 2018 report Comprehensive Energy Strategy.

Figure 07.4 – EV Charging Stations in Connecticut



Micro-Mobility

The CROCOG region gained its first Micro-Mobility asset in June 2018 with the arrival of the dockless bike share company LimeBikes. Data shared by LimeBikes showed that 92% of the 25,000 trips taken in the first 100 days ended in Hartford with nearly 1,000 trips ending within 40 feet of a city bus stop. It's not uncommon to find bikes in other towns in the region, signaling a desire in the CROCOG region for Micro-Mobility options.

Smart Cities

The Capitol Region has not yet implemented technology associated with Smart Cities. As mentioned earlier in this section, Norwalk and Danbury have implemented traffic signal performance measure technology. These are the only current projects associated with Smart Cities known in Connecticut at the time of this report. Connecticut will need to invest in infrastructure required by Smart Cities to move future projects forward.

In June 2017, Connecticut passed a law that established a pilot program allowing manufacturers and fleet service providers to test AVs in up to four (4) municipalities. The law outlines the requirements for testing and requires participating municipalities to enter into agreements with AV testers. The law establishes a 15-member task force to study AVs and develop legislative recommendations for regulating AVs. The task force will also evaluate the pilot program established under the law. The task force consists of six (6) legislative appointees, three (3) legislative

transportation committee appointees, two (2) governor appointees (one with insurance expertise), and four (4) ex-officio members representing the Department of Motor Vehicles (DMV), CTDOT, state police, and the Office of Policy and Management. The task force convened for the first time in June 2018. In addition to the inter-agency taskforce, CTDOT formed an internal working group to build their knowledge base and expertise in CV/AV related issues.

CTDOT is developing a Traffic Signal Management Plan to be completed in 2019 and a Strategic Plan for Implementing CVs/AVs in Connecticut, which will be used to highlight the current status of CV/AV technologies and their high-level impacts, and justify next step strategies, investments and partnerships. The plan outlines CV/AV interests and needs by bureau/office, identifies Connecticut's mission, vision, goals and objectives, presents an internal organizational structure for the implementation of CV/AV in the state, and provides an action plan with roles and responsibilities separated into four time frames (immediate, near term, mid-term and long term). The plan is scheduled to be published in fall 2018. CTDOT is also looking to update their existing statewide ITS Architecture to include CV/AV applications. They have programmed approximately \$2.5 million for CV/AV projects in the Capital Program for 2019 (pending approval).

CTDOT has submitted an Federal Highway Administration (FHWA) Advanced Transportation & Congestion Management Technologies (ATCMTD) grant application

to test and deploy AV micro-shuttles at the University of Connecticut and the City of Stamford. They are also exploring additional opportunities for AV micro-shuttle testing and CV pilot projects, including participation in AASHTO's SPaT Challenge for the deployment of DSRC V2I devices, harnessing the safety benefits of CV technologies. On the research side, CTDOT is a participant in the Connected Vehicle Pooled Fund Study (CVPFS) and is exploring a potential partnership with the University of Connecticut to address a variety of CV/AV interests and needs. They have also hosted two Northeastern Summits on CVs/AVs, encouraging regional knowledge transfer and sharing of best practices. The next Northeast Summit is being planned for June of 2019.

Key Takeaways

Several key takeaways emerge from the evaluation of emerging technology trends and case studies above relevant to the CROCOG LRTP:

- Priority areas for CV/AV/EV infrastructure:** CV/AV/EV technologies are being developed rapidly by private automakers. While the timeline for widespread adoption is uncertain and likely several decades out, now is the time to identify priority locations to deploy such technologies to best meet the CROCOG region's specific needs through advance planning, pilot projects, and infrastructure investments.
- Interoperability and integration:** As discussed above several new and emerging technology trends are occurring concurrently. Even as private companies advance their own technologies and services, CROCOG and the region's local governments have a role to play in fostering an interoperable and integrated transportation system that puts people's needs first.
- Incentives/disincentives (VMT, ZOV, Congestion):** While the technologies above have the potential to foster more sustainable, efficient transportation, their impacts on traveler choices and behaviors are unknown. For example, with inexpensive automated vehicle trips people may opt to take more or longer trips, or to shift trips from fixed route and schedule transit to on-demand automated vehicles. This behavior could result in more vehicle miles traveled and congestion. CROCOG has a role to play in incentivizing behavior that contributes to a more sustainable, efficient transportation system and dis-incentivizing behavior that creates the opposite outcome. Several policy options exist for this, including congestion or cordon pricing, vehicle mile traveled pricing, or fees for zero occupancy trips and discounts for higher-occupancy shared trips.
- Supporting infrastructure for micro-mobility:** Micro-mobility devices are currently being deployed on existing streets, sometimes resulting in conflicts with pedestrians, vehicles, and cyclists. The proliferation of these new devices provides an opportunity to rethink street design and consider what the complete street of the future may look like, and where and how they can be safely integrated to maximize travelers' choices.

Technological Improvements to Support in Capitol Region

Short-Term Recommendations

New and Emerging Technologies

Facilitate regional discussion on data.	Facilitate a regional discussion on data to better understand data availability, sharing, and opportunity to leverage data to make better informed transportation decisions.
Advocate for an automated vehicle pilot.	Support automated vehicle pilot, that focuses on first/last mile connections, university areas (UConn), large employers (Ideconomics, Travelers), or in areas with parking limitations (West Hartford).
Integrate micro-mobility with complete streets.	Identify appropriate locations for micro-mobility device usage, parking, and charging and create design guidelines to integrate this new mode into multi-modal, complete streets.
Incentivize new and emerging technologies.	Incentivize inter-agency coordination and deployment of new and emerging technologies by awarding points to agencies that collaborate on pilots and deployments during funding distribution process.
Enhance transportation services with new and emerging technologies.	Identify new and emerging technologies, for example connected and automated technologies with signal preemption, that could enhance transportation services and alternatives currently being evaluated.
Keep up with trends in transportation technologies.	Attend the 2019 Northeast CV/AV Summit, hosted in Connecticut, to stay current on the latest technologies and trends in the region and beyond.
Update Bus Service Guidelines	Encourage transit operators to adopt bus service guidelines for route design, schedule design, route productivity, service delivery and financial performance that are in-line with CTDOT's Statewide Bus Study.

Technological Improvements to Support in Capitol Region

Ongoing Actions

New and Emerging Technologies

Enhance connectivity between new and emerging technologies and TOD zones

Focus new and emerging technology investments and pilots near TOD zones to enhance first/last mile connectivity to transit and high-density, mixed uses.

Identify locations and develop policies for emerging mobility services.

Identify appropriate locations and develop policy guidance for emerging mobility service distribution, pickup, and drop-off locations to enhance connectivity with transit, integrate with other modes, and ensure passenger safety.

Guidelines for integration and interoperability.

Establish guidelines for compatibility among new and emerging transportation technology devices to foster integration and interoperability.

Provide guidance to municipalities.

Provide guidance on standard definitions of new and emerging transportation technologies for those municipalities that currently lack policies/regulations.

Upgrade infrastructure to support new and emerging technologies.

Support the upgrading infrastructure to meet current and future needs for new and emerging technologies, for example fiber, WiFi, and striping to support vehicle connectivity and automation.

Chapter 08

Transportation Performance Management

Transportation performance measures and targets describe how well the transportation system is functioning in quantitative terms and then set future targets for system performance based on calculated values, recent trends, and assumed future funding levels. Both states and Metropolitan Planning Organizations (MPOs) are now required to incorporate Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) performance measures and targets into their planning practices. However, an MPO may either support statewide targets set by the state or set its own, along with assuming the responsibility of achieving them.



Greater Hartford Transit District vehicle being serviced at their new operations and maintenance facility

For its first round of target setting (2018-2022), the Connecticut Department of Transportation (CTDOT) has set statewide performance measure targets that assume a continuation of 2017 state and federal transportation funding levels. CRCOG has chosen to support these statewide targets. Included below is a summary of performance trends and targets for each of three (3) FHWA categories of “Safety Measures”, “Infrastructure Conditions Measures”, and “NHS Performance, Freight, and CMAQ Measures”, and the FTA Transit Measures. For a more comprehensive overview of CRCOG’s transportation performance management efforts, please refer to the materials in Appendix 3.

Safety Measures

Crash data shows that roadways have become increasingly safer over the previous few decades, likely the result of increased roadside and vehicle safety features, and seat-belt usage. Although serious injury rates in Connecticut continue to decline, 2015 and 2016 data shows disturbing new increases in fatalities both in Connecticut and nationwide. The causes of the increase are somewhat elusive, but preliminary analysis has indicated that driver behavior (distracted, drunk, etc.) may be a significant contributor. Additionally, there has been an increase in the number of non-motorized fatalities and serious injuries, likely partially due to the increased bicycle usage. Although an ultimate goal is to continue reducing fatalities and serious injuries, it is of immediate importance to halt or reverse any

recent increasing trends. Therefore, statewide targets have been set at the most recent 5-year rolling averages for each of the measures. CRCOG’s rate of highway fatalities and serious injuries remains similar to the statewide rates.

Infrastructure Conditions Measures

The infrastructure condition measures consist of both pavement and bridge conditions. In general, the region’s pavements are in relatively good condition, and are significantly better than both current statewide conditions and targets. However, both current regional and state bridge conditions can be categorized as needing improvement. Although statewide conditions are expected to improve and meet aggressive 2022 targets, the region’s bridge conditions are not anticipated to improve significantly. A prime contributor to the percent of bridges in poor condition in the region is the I-84 Viaduct in Hartford. A project to reconstruct I-84 within the viaduct area underway and included in the highway section of this plan but will not be completed until well after the 2022 performance measure target year.

NHS Performance, Freight, and CMAQ Measures

Roadway congestion on the National Highway System (NHS) as well as environmental sustainability of the transportation system are major concerns. While a more complete picture of congestion delays is provided in the Congestion Management Process (CMP) summarized in the Highway System

chapter (Chapter 3), a similar yet distinct effort involving performance measures and targets are discussed here. Regarding system reliability, statewide 78.3% and 86.3% of the respective person-miles traveled on the Interstate and non-Interstate NHS system are considered reliable. CROCOG performs slightly better than the state in this area, however, it is projected that the percentage of reliable person-miles travelled both statewide and within CROCOG will decrease slightly by the 2022, indicating a slight increase in congestion. Freight reliability is captured by the truck travel time reliability index, which is 1.75 statewide and a bit more severe in CROCOG at 1.83. Freight reliability is also projected to decrease slightly due to increasing congestion by the 2022 target year.

Measures and targets for environmental sustainability are only partially in effect. Currently, only the on-road mobile source emissions target related to CMAQ funded projects has been set (two others have been deferred until 2022). The rate of reduction of volatile organic compounds, nitrogen oxides, and particulate matter has shown improvement in recent years, benefiting from large transit projects. However, these rates of reduction are anticipated to worsen in the near future years as fewer large-scale transit projects occur.

Transit Measures

Performance measures and targets for transit fall into two categories: Transit Asset Management (TAM) and Transit Safety. Currently, only TAM rules are in effect, consisting of four measures. In general, within CROCOG current facility conditions meet the statewide targets, but current vehicle conditions do not meet the statewide targets. Due to the interregional nature of transit, CROCOG has relied solely on targets developed by CTDOT for transit asset management activity within the region. Currently, a high percentage (see Table 08.4 and Table 08.5) of the rolling stock statewide has exceeded its useful life benchmark (ULB), with the target aiming for a substantial reduction in that percentage. Similarly, high percentage (see Table 08.4 and Table 08.5) of non-revenue generating support vehicles are also beyond their ULB, again with a target seeking to substantially lower this percentage. Finally, there are no transit facilities within CROCOG that score less than a 3.0 on the Transit Economic Requirement Model (TERM) scale, indicating that all are in acceptable condition.

Performance Management Requirements

According to the FHWA, Transportation Performance Management (TPM) is a “strategic approach that uses system information to make policy and investment decisions to achieve national performance goals.” The TPM approach ensures that investments in transportation infrastructure are performance-driven and outcome-based. Transportation planning agencies also apply TPM principles when making decisions about where to invest resources.

The MAP-21 federal funding legislation of 2012 established a performance and outcome-based program with the main objective to invest resources in projects that collectively lead toward achieving seven national goals: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, and environmental sustainability.

MAP-21 required states and MPOs to establish performance measures in key areas related to the above mentioned seven national goals, and it required states to set performance targets in support of those measures. States were to coordinate with MPOs in setting the targets, and MPOs were required to either support the statewide targets or set their own. It also required the following plans to include State targets (and/or MPO targets, as appropriate):

- Metropolitan Transportation Plans
- Metropolitan Transportation Improvement Program (TIP)
- Statewide Transportation Improvement Program (STIP)
- State asset management plans under the National Highway Performance Program (NHPP)
- State performance plans under the Congestion Mitigation and Air Quality Improvement program

Additionally, MAP-21 required reporting on progress in achieving set performance targets. It required states to report on the condition and performance of the National Highway System (NHS); the effectiveness of the investment strategy document in the State asset management plan for the NHS; and the ways in which the State is addressing congestion at freight bottlenecks.

In 2015, MAP-21 was superseded by the FAST Act federal funding legislation, which continued MAP-21’s overall performance management approach. The FAST Act made only a few changes to MAP-21’s performance management provisions. Congressional legislation in this area was codified in 23 C.F.R. (Code of Federal Regulations) Part 490, where the description, composition, and calculation methodologies for these performance measures are detailed.

Goals and Objectives of Existing and Future Plans

While CRCOG's 2011 Long Range Transportation Plan (LRTP) and 2015 LRTP Update do not formally set out measurable objectives and performance measures per se, each document describes a number of commitments to good planning outcomes on behalf the Council of Governments:

- Developing a transportation system that offers more and better travel choices
 - Developing a good regional transit system as an alternative to the automobile
 - Developing a bicycle and pedestrian system
 - Create a sustainable transportation system by linking land use and transportation
- Emphasis on environmental justice
- Better systems operation and management

The 2015 LRTP Update augments these policy commitments with an overview of how federal performance management requirements and goal areas would be accounted for and reflected in the 2018 plan update. This sets the stage for the establishment of CRCOG's 2018 Metropolitan Transportation Plan (MTP), informed by local experience and expertise, and creating a more fully institutionalized process of Transportation Improvement Program development informed by long-range plan goals, measurable objectives and performance targets.

This current 2018 MTP focuses on those FHWA and FTA transportation performance measures that have been federally-mandated,

reinforces that CRCOG's MTP is a performance-based document, and conveys CRCOG's efforts in implementing a transportation planning program that is focused on achieving performance targets. Fifteen (15) of the seventeen (17) FHWA and four (4) of the eight (8) FTA performance measures are currently required and are addressed in this chapter. The remaining six (6) performance measure/targets are not yet required.

Systems for Measuring Performance

CRCOG has been working closely with CTDOT to prepare and implement systems for measuring and monitoring the performance of transportation facilities and services. Such systems require identifying data sources and available data, considering and establishing target values for the required indicators, and determining methods of assessing the impact of investment strategies upon indicator values. CTDOT's pavement and bridge management system provides a possible prototype for establishing performance management in other areas (for more information, see Best Practices Section at the end of this chapter). This system provides advanced analytical capabilities that integrate strategic planning with capital investment decision-making and performance outcomes.

Some of the challenges in setting up performance management systems include a lack of historical data to establish trend or baseline indicator values and difficulty in assessing the actual or projected impact of strategies or projects upon indicator

values. Based upon the work of CRCOG and CTDOT, the following is a brief summary of the status of setting targets for the federally-required performance indicators:

- CTDOT has established, and CRCOG has indicated its support for, measures in the following highway performance areas: injuries and fatalities, pavement condition, bridge condition, performance of the NHS, freight movement, and environmental sustainability
- CTDOT has established, and CRCOG has supported, the four targets for Transit Asset Management
- Targets are not yet required to be set in a few performance areas, including transit safety and two of the highway congestion reduction areas (Peak Hour Excessive Delay (PHED) and Single Occupancy Vehicle (SOV))

This work provides the basis for recommending further enhancements to CRCOG’s performance management system. In particular, CRCOG is seeking to integrate performance management information into its capital programming processes in order to help to evaluate and prioritize candidate transportation investment projects by their potential effectiveness in improving system performance.

Current Performance

Using available data, CRCOG has assessed the region’s current performance for the federally-required performance measures. For the various key indicators, this assessment has compared the region’s values with the statewide values, statewide targets, and federal standards, if any. The current performance of the region’s transportation facilities and services is satisfactory in some areas and lacking in others. A summary is provided below:

Safety	The number and rate of serious injuries have been decreasing, but the number and rate of fatalities have been increasing.
Infrastructure Condition	Current pavement conditions meet the statewide targets, but current bridge conditions do not meet the statewide targets.
NHS Performance	The current values for all traffic meet the statewide targets, but the current value for truck traffic does not meet the statewide target.
Transit Asset Management	Current facility conditions meet the statewide targets, but current vehicle conditions do not meet the statewide targets.

The following sections provide a more detailed summary of the region’s performance under each goal area and performance area.

Safety Measures

Traffic crashes, fatalities, and injuries generate substantial costs in terms of property damage, lost productivity, medical costs, insurance costs, and legal costs, not to mention loss of life or drastic changes in quality of life. The federally-required measures involve fatalities, fatality rates, serious injuries, serious injury rates, and fatalities and serious injuries involving non-motorized travel. The selected indicators for 2018, all utilizing 5-year rolling averages (2011–2015), are in the table below.

Since the population of CROCOG comprises slightly less than one-third of Connecticut's population, it can be seen in Table 08.1 that it has a proportional number of fatalities and serious injuries as a percentage of the state total. CROCOG chose to support the state safety targets in 2018 and can best contribute to this policy goal by focusing its efforts on reducing fatalities and serious injuries within its region both on its own initiative and with the help of existing state programs.

Figure 08.1 on the following page illustrates trends in safety performance across four measures throughout the state of Connecticut. As can be seen, fatalities and the fatality rate per 100 million vehicle miles traveled (VMT) were at first decreasing and then began to increase again in more recent years. This increase in fatalities indicates a worsening of performance in the associated measures (i.e. if indicators for fatalities and the rate of fatalities are higher, that means the state is doing worse). In contrast, the number of serious injuries as well as the rate of serious injuries per 100 million VMT have been steadily decreasing for several years. This means that the performance indicator has been decreasing and therefore improving in Connecticut. In addition to these opposing trends (although not depicted in the charts), the number of non-motorized fatalities and serious injuries has increased in recent years. This trend is possibly indicative of greater pedestrian and bicycle usage, while distracted driving (and walking/ biking) are also a growing problem.

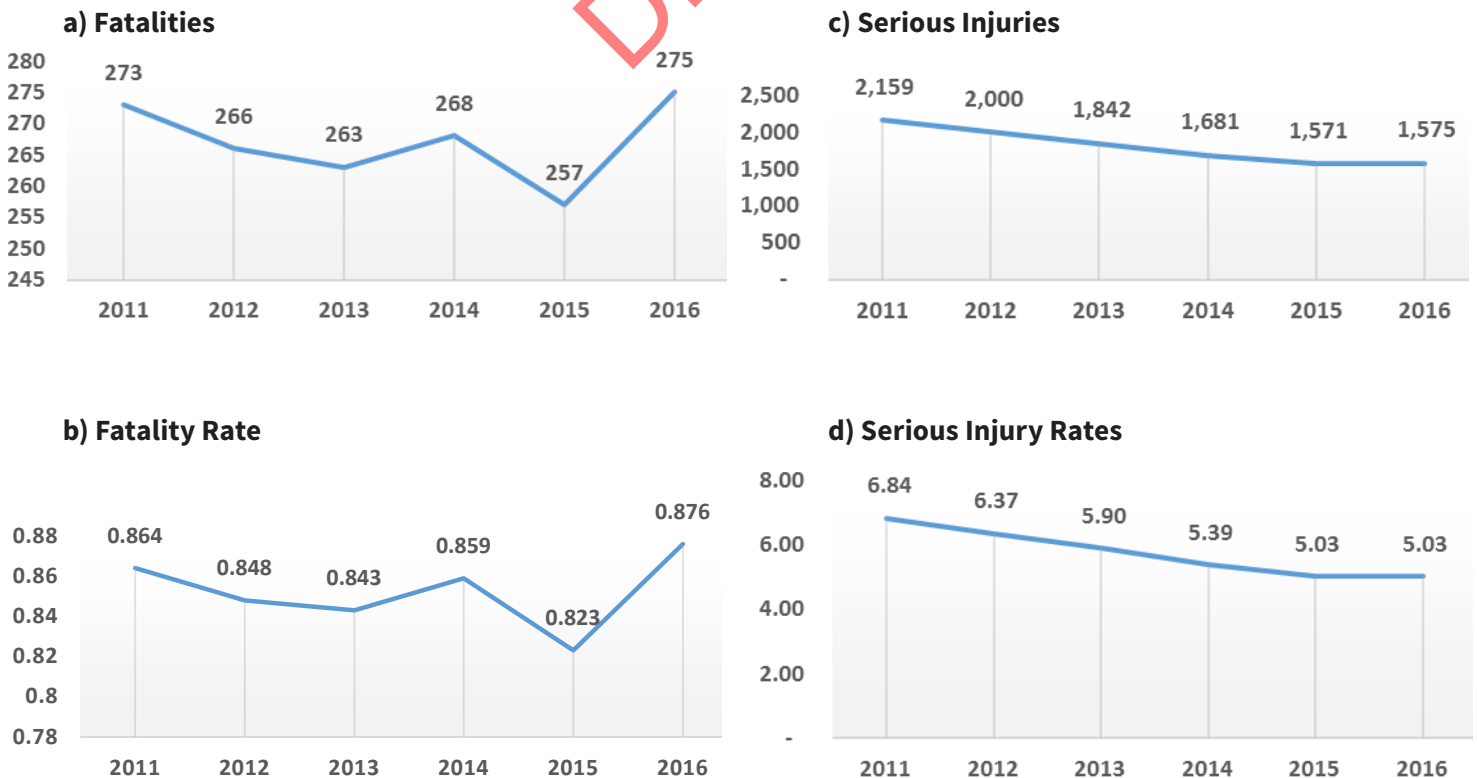
Table 08.1 — Safety Measures and Targets

Performance Indicator	Current CROCOG Measure	Current State Measure	Current State Target (for 2018)
Number of Fatalities	78	257	257 or less
Fatality Rate per 100 million VMT	0.86	0.823	0.823 or less
Number of Serious Injuries	436	1,571	1,571 or less
Serious Injury Rate per 100 Million VMT	4.87	5.03	5.03 or less
Number of Non-Motorized Fatalities and Serious Injuries	59	280	280 or less

Outlook

Statewide projections indicate that the number of fatalities and fatality rate may decrease slightly, and the number of serious injuries and serious injury rate will continue to decrease as in recent years.

Figure 08.1 — Statewide Safety Trends for Connecticut Roads (5 year averages)



Data Source: CTDOT and UCONN Data Repository

Infrastructure Condition Measures

Increasing roadway travel and deferred maintenance has accelerated the deterioration of roadway pavement and bridges. Poor pavement and bridge conditions result in costs attributable to travel delays, safety hazards, fuel consumption and emissions, and vehicle operating costs including accelerated deterioration and increased maintenance.

There are four measures/targets for Pavement Conditions and two measures/targets for Bridges Conditions. Their performance, both within CRCOG and statewide, as well as the statewide 4-Year targets (for 2022) are found in Table 08.2 below.

CRCOG has chosen to support the statewide targets set by CTDOT for both pavement and bridges. As can be seen in Table 08.2, the percentage of Interstate pavements in good condition within CRCOG exceeds the both the state’s current measure and 4-year target. Only a fraction of a percent of CRCOG Interstate pavements are in poor condition, compared to a higher percentage within Connecticut as a whole. Non-Interstate pavements in CRCOG are not in as good of condition as Interstate pavements, but CRCOG pavements in poor condition are still lower than that of the state. Bridges are an area of concern for CRCOG and compare even less favorably to those of the state. Bridge health is evaluated by the percentage of bridges (by deck area) in good and poor condition. Aggregating

Table 08.2 – Infrastructure Condition Measures and Targets

Performance Area	System	Performance Indicator	Current CRCOG Measure	Current State Measure	Current State Target
Pavement	Interstate	Percent Lanes Miles in Good Condition	73.3%	66.2%	64.4%
		Percent Lanes Miles in Poor Condition	0.1%	2.2%	2.6%
	Non-Interstate NHS	Percent Lanes Miles in Good Condition	37.3%	37.9%	31.9%
		Percent Lanes Miles in Poor Condition	3.5%	8.6%	7.6%
Bridges	NHS	Percent Deck Area Good Condition	13.6%	18.1%	26.9%
		Percent Deck Area Poor Condition	15.7%	15.0%	5.7%

the measure by total deck area and not the number of bridges ensures that large bridges receive proportionately larger amount of attention. Of note, the poor condition of the I-84 Hartford Viaduct in Hartford contributes to the high regional value. Furthermore, the percentage of poor conditions regionally (15.7%) exceeds the federal standard of 10%. Figure 08.2 and Figure 08.3 show the location of NHS Interstate pavements and bridges in poor condition. As can be seen, significant investment in pavement and bridges is required in some locations.

Outlook

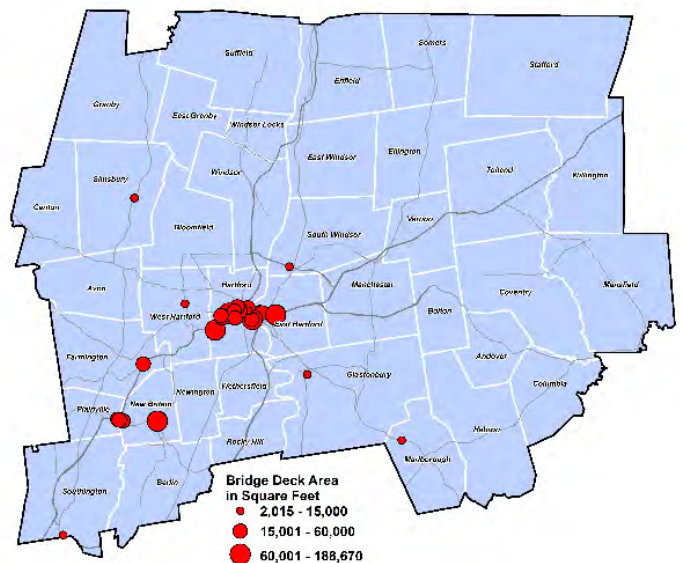
Pavement. CTDOT anticipates that NHS pavement condition will improve slightly over the next two years and then recede back to approximately current conditions over the following two years. NHS pavement conditions within CRCOG are anticipated to remain far better than those statewide.

Bridges. Bridge conditions within CRCOG are not expected to see the same improvements, as the poor condition of the large I-84 Viaduct in Hartford continues to weigh on the region's performance in the area.

Figure 08.2 – Pavement in Poor Condition



Figure 08.3 – Bridges in Poor Condition



NHS Performance, Freight, CMAQ Measures

Roadway congestion causes travel delays and generates costs due to lost time, decreased productivity, increased fuel consumption and emissions, and increased operating costs. Both passenger vehicles and commercial freight movement are affected. Efficient traffic flow is important for people as they travel to destinations for work, school, healthcare, and shopping. Congestion also affects truck traffic, increasing the time and costs of goods movement, which may result in higher consumer costs. Closely tied to congestion is the issue of air quality, which can be a major issue for human health.

Air pollution can have short-term and long-term health impacts, which result in increased health care costs, lost economic productivity, and decreased quality of life.

There are six indicators covering the performance area of Reliability of the NHS, Freight, and CMAQ: two (2) for NHS Reliability, one (1) for Freight, and three (3) for CMAQ. However, of the CMAQ indicators, only the three-part measure concerning environmental sustainability is currently in effect. Peak Hour Excessive Delay (PHED) and Percentage of Single Occupancy Vehicle (SOV) have been delayed from going into effect until 2022 as there are currently no metropolitan planning regions in Connecticut (including CRCOG) with

Table 08.3 – NHS Performance, Freight, CMAQ Measures

Performance Area	System	Performance Indicator	Current CRCOG Measure	Current State Measure	Current State Target
NHS Performance	Interstate NHS	Percent of Reliable Person Miles Traveled	73.3%	66.2%	64.4%
	Non-Interstate NHS	Percent of Reliable Person Miles Traveled	84.7%	83.6%	76.4%
Freight Performance	Interstate NHS	Truck Travel Time Reliability Index	1.83	1.75	1.83
CMAQ Congestion	Interstate	Peak Hour Excessive Delay (PHED)	N/A until 2022	N/A until 2022	N/A until 2022
	-	Percentage of Single Occupancy Vehicles (SOV)	N/A until 2022	N/A until 2022	N/A until 2022
CMAQ Environmental Sustainability	-	Change in kg/ day for VOC	N/A	263.890	30.140
	-	Change in kg/ day for NOx	N/A	462.490	102.370
	-	Change in kg/ day for PM2.5	N/A	12.950	2.674

populations of greater than one million. All six indicators: consisting of both the calculated measures and targets can be found in Table 08.3. Data for calculating these measures is largely derived from the National Performance Measurement Research Data Set (NPMRDS).

Travel time Reliability on the NHS compares days with high delay to days with average delay using road segment data. To determine the reliability of a road segment, a Level of Travel Time Reliability (LOTTR) is calculated as the ratio of the longer travel times (80th percentile) to a “normal” travel time (50th percentile), with reliability defined as an LOTTR of less than 1.5. CRCOG supports the CTDOT targets for these indicators. CRCOG’s Interstates have a reliability of 86.8%, higher than the 78.3% statewide average and the statewide targets, while the region’s non-Interstate NHS roadways experience reliability of 84.7%, slightly higher than the 83.6% statewide average and the statewide targets. Figure 08.4 and

Figure 08.5 highlight the unreliable segments along the region’s portion of the NHS.

The Truck Travel Time Reliability (TTTR) Index focuses on the Interstate component of the NHS only. The composite index for this indicator is calculated in a similar manner as with the LOTTR. To determine the reliability of a segment, a Truck Travel Time Reliability (TTTR) measure is calculated as the ratio of the longer travel times (95th percentile) to a “normal” travel time (50th percentile), with

Figure 08.5 – LOTTR on Interstate System



Figure 08.4 – LOTTR on Non-Interstate NHS System



Figure 08.6 – TTTR Index on Interstate System



reliability defined as a TTTR of less than 1.5. The TTTR's of interstate segments are then used to create the TTTR Index for the entire Interstate system using a weighted aggregate calculation for the worst performing times of each segment. CROCOG supports the CTDOT target for this measure. The TTTR Index calculated for CROCOG (1.85) is greater than the statewide TTTR Index (1.75), indicating greater congestion. The higher value for the region reflects its central geographic position including the interchange of I-84 and I-91, and the presence of two major "bottlenecks," the interchange of I-84 and I-91 and I-91 from CT 3 North to the Charter Oak Bridge ramps in East Hartford (see Figure 08.6).

The only CMAQ (Environmental Sustainability) indicator currently in effect is the three part On-Road mobile source emissions. The measure comprises cumulative 2-year and 4-year reductions and reflects a rate of reduction, not an absolute reduction associated with CMAQ funded projects. The measure includes separate indicators for three different types of "criteria" air pollutants – Volatile Organic Compounds (VOC), Nitrogen Oxides (NOX), and Particulate Matter (PM2.5). CROCOG supports the CTDOT targets for these measures. CTDOT has prepared estimated emission reductions attributable to CMAQ-funded projects in non-attainment and maintenance areas. The statewide rate of emission reduction increased in the years up to 2017. This trend occurred gradually in 2013 and 2014, then increased substantially in 2015 due to the CT **fastrak** launch, and then subsided somewhat in 2016 and 2017.

Outlook

NHS Reliability. The CTDOT targets reflect projections of an expected slight decline in travel time reliability on the NHS, likely because of anticipated increases in roadway travel.

Freight. The CTDOT targets reflect a projection that the TTTR will increase slightly over the next four years, reflecting a slight decline in performance due to increased congestion.

On-Road Mobile Source Emissions. The CTDOT targets indicate that performance will be improving in terms of continually increasing total reductions owing to additional projects. New and future CMAQ projects will contribute to emission reductions in the near future, although not to the magnitude as experienced in the past.

Transit Asset Management Measures

At public transit agencies, the condition of revenue generating vehicles at public transit affects their reliability and on-time performance, which in turn greatly influences customer satisfaction and the attractiveness of transit as a travel option. Additionally, vehicles in poor condition may have greater fuel consumption and emissions and incur higher maintenance costs. Transit agencies also utilize other vehicles for service and administrative purposes. As with revenue vehicles, the condition of service vehicles will affect their reliability, maintenance needs, and costs. The condition of various types of transit facilities is also important for the safety and convenience of passengers, as well as the efficient operations of maintenance and administrative functions. Furthermore, the condition of passenger facilities can bolster the attractiveness of public transit as a travel option.

Measures / Indicators

Because CROCOG does not operate transit services itself, it instead reports on indicators from the Greater Hartford Transit District (GHTD). Reliability of revenue-generating vehicles, i.e. buses and other vehicles that carry passengers, is assessed with an indicator that measures the percentage of these vehicles that exceed the useful life benchmark (ULB).

- Revenue-generating buses (5-year ULB)

While the indicator may be calculated for different types of vehicles; for the region it currently has been calculated only for cutaway buses. The TAM indicator for non-revenue vehicles is a three-part measure that reports the percentage of vehicles exceeding ULB for the following:

- Rubber tire vehicles (14-year ULB)
- Automobiles (4-year ULB)
- Sport Utility Vehicles (4-year ULB)

The indicator covering transit facilities is a two-part measure assessing the percentage of facilities falling below a 3.0 on the Transit Economic Requirement Model (TERM) scale. The two classes of facilities covered are:

- Passenger and parking
- Administration and maintenance

The three TAM indicators for revenue vehicle ULB, non-revenue vehicle ULB, and percentage of facilities scoring less than 3.0 on the TERM scale are shown in Table 08.4 below. The percentage of buses past their ULB is higher than the target of seventeen percent. Likewise, the percentage of non-revenue vehicles past their ULB exceed all

three targets for the GHTD, and significantly in two instances. In contrast, however, no GHTD facilities (0%) rank less than 3.0 on the TERM scale, indicating that GHTD facilities are generally in good shape (see Table 08.4 below).

In addition to the GHTD services, the CRCOG also benefits from transit services provided at the state-level such as rail and ferry.

Table 08.5 below summarizes state-level performance targets that are multiregional.

Outlook

Improvements will be made to most transit assets in the region. However, some areas will not see improvement. See the tables below and Appendix 3 for full reports with assessments and goals.



Table 08.4 – GHTD Transit Asset Management Measures

Performance Area	Performance Indicator	Current State Measure for GHTD	Current State Target for GHTD
Rolling Stock	Percentage of Cutaway Buses Exceeding ULB	24%	17%
Equipment	Percentage of Rubber Tire Vehicles Exceeding ULB	40%	7%
	Percentage of Automobiles Exceeding ULB	67%	20%
	Percentage of SUV's Exceeding ULB	25%	20%
Facilities	Percentage Passenger and Parking Facilities Rated Less than 3.0 on TERM Scale	0%	0%
	Percentage Administration and Maintenance Facilities Rated Less than 3.0 on TERM Scale	0%	0%

Table 08.5 – Statewide Transit Asset Management Measures (including CTtransit, CTrail, and others)

Performance Area	Performance Indicator	Current State Measure	Current State Target for 2018
Rolling Stock	Percentage of Tier I and II Commuter Rail Locomotive, Commuter Rail Passenger Coaches, Commuter Self-Propelled Passenger Cars, Ferry Boat Exceeding ULB	Various	0%
	Percentage of Tier II Trolley Exceeding ULB	N/A	7%
	Percentage of Tier I and II Articulated Bus, bus, and BR Over-the-Road Bus Exceeding ULB	0%, 46%, 15%	14%
	Tier I Cutaway Bus and Minivan Exceeding ULB	2%	17%
Equipment	Percentage of Steel Wheel Vehicles Exceeding ULB	100%	0%
	Percentage of Rubber Tire Vehicles Exceeding ULB	29%	7%
	Percentage of Automobiles Exceeding ULB	46%	20%
	Percentage of SUV's Exceeding ULB	62%	20%
	Percentage Passenger and Parking Facilities Rated Less than 3.0 on TERM Scale	2%	0%
	Percentage Administration and Maintenance Facilities Rated Less than 3.0 on TERM Scale	4%	0%
Infrastructure	Percentage of track segments that have performance restrictions	6%	2%

Review of Best Practices

The performance measures discussed in this chapter are new and therefore there is not yet a large, developed body of best practices from which to draw. However, there are some examples of emerging best practices found at other MPOs and state departments of transportation that can serve as guidance at this early stage. Additionally, some best practices developed around early sets of performance measures which shaped current practice new measures. After a survey of best practices, some sources of inspiration could include:

Communication and Stakeholder Input

The multi-agency working-group effort led by the Strafford Regional Planning Commission (SRPC) in New Hampshire emphasized clearly and plainly communicating both the nature and usefulness of performance measures to transportation planning. It conducted a considerable outreach effort with a large group of stakeholders, seeking to determine what common interest in performance-based planning existed throughout New Hampshire and some adjacent areas in Maine.

FHWA and State Departments of Transportation Resources

The Federal Highway Administration has an extensive webpage (<https://www.fhwa.dot.gov/tpm/>) dedicated to Transportation Performance Management with links to many examples of efforts around the country. Although many State DOT's have information available, these resources are often focused on older performance measures and not the most recent ones as defined in 23 C.F.R. Part 490. As experience and practice in this transportation policy area matures around the country, a larger and more current body of best practices will develop.

Predictive Capability

Within Connecticut, the Connecticut Department of Transportation has developed mature software and planning systems for bridge and pavement conditions throughout the state. This gives the state great capabilities to strategically plan repairs and maintenance in such a way as to directly affect the performance measures in these areas in a predetermined way. Using these systems, it can be estimated fairly confidently how much investment is needed to achieve a desired and measurable outcome, meaning that true predictive ability on the part of analysis tools has been developed. This is far ahead of any other area of performance measures. However, it serves as a challenging but highly desirable level of expertise and analytical maturity towards

which to strive in the long term for other areas of performance measures, including safety, system performance and freight.

As states' and MPOs' experience with the federal performance measures matures, priorities will ideally be clearly reflected in the selection of targets, which will then guide the MTPs and TIPs more directly. Improved capabilities that better link projects and programs to outcomes can assist in MPT and TIP development and optimize transportation system performance. CRCOG reviewed the practices of several esteemed MPOs, and it seemed their efforts to fully incorporate performance measure into the planning process were still developing. In conclusion, transportation performance management is a new and evolving practice, and CRCOG will continue reviewing, developing, and employing performance measure best practices as they emerge.

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Chapter 09

Special Emphasis Areas

There are specific emphasis areas that influence the Transportation Planning program that CRCOG has adopted. These emphasis areas are described in this section. They include: Transportation Security; MPO Coordination; Air Quality – Transportation Policy; and Demand Management Policy.

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A scenic view of Hartford, CT.

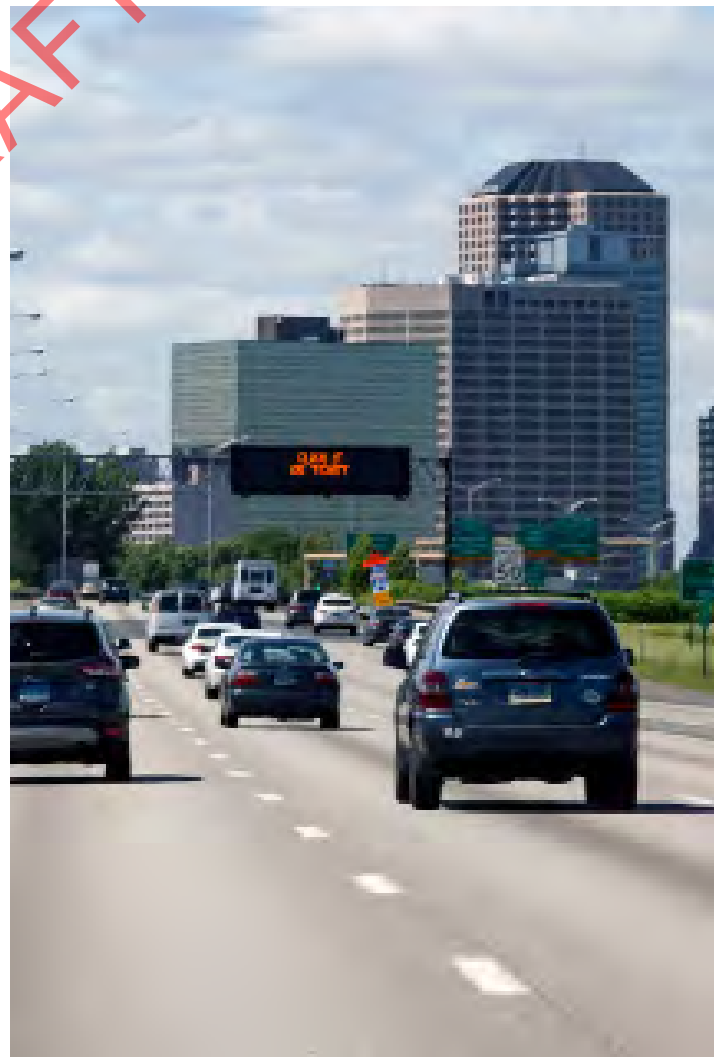
Transportation Security

Preparedness and response to events that may compromise the security of an ever-growing diverse transportation infrastructure network are critical. CRCOG supports a transportation planning function and a public safety planning function, and is proactive in addressing the necessary steps to enhance the operational readiness for handling incidents that may affect the security of regional surface transportation systems and its users. CRCOG is committed to facilitating communication and coordination among regional jurisdiction and agencies concerning transportation issues and activities that may include major disasters, biohazards, threats and security breaches.

System management methods such as freeway incident management, coordinated traffic signal systems, Intelligent Transportation Systems, and access management on arterial roads are critical elements in providing a secure transportation system. The expansion, maintenance and updating using newer technologies that will provide a more robust Intelligent Transportation Systems (ITS) network is vital as well. ITS has the capability to assist in routing of evacuations, monitoring road network conditions, and assisting in the coordination of transportation and emergency resources and responses activities. For example, the use of variable message signs, traffic signal system coordination and highway advisory radio can be used to detour the public around a major event. Transit vehicles can be used to transport evacuees from an area and be used as a respite center for responders.

“ Protection of transportation facilities must be a high priority and the response in the event of an attack must be carefully planned and practiced.”

Figure 09.1 – Variable message sign used for transportation management and security



Incident and Emergency Management

Public and private sector partnerships in the areas of incident and emergency management are vital in providing an effective approach to transportation security planning. Efforts to support this are noted below.

Capitol Region Emergency Planning Council (CREPC)

- The Capitol Region Emergency Planning Council (CREPC) is an organization comprised of all 41 municipalities in the Connecticut Department of Emergency Services and Public Protection/Division of Emergency Management and Homeland Security (DESPP/DEMHS) Region 3. CREPC serves as the Regional Emergency Planning Team (REPT) and is committed to serving the communities in DEMHS Region 3 by promoting the active participation of representatives from all 41 municipalities, including other Regional Planning Organization members within Region 3. The goal of CREPC is to provide the framework for emergency preparedness, response, recovery, and mitigation through collaborative planning and mutual aid.

The Greater Hartford TIM Coalition (GHTC) was established in 2018 to restore a previously inactive incident management program at CROCOG

- The Coalition has public and private stakeholders that represent the responder community along with representatives from towns, planning regions and state and federal emergency management agencies. More on the TIM coalition can be found in Chapter 3 of this document.

Regional Emergency Support Function

Transportation (RESF 1) - The Greater Hartford TIM Coalition acts as the RESF 1 for the region. RESF 1 addresses transportation issues and how to incorporate them into the greater emergency response effort for the region through facilitation of communication and coordination among local municipalities and agencies within the Capitol Region and DEMHS Region 3. The RESF 1 function is intended to focus on disruptions of the regional transportation system requiring inter-jurisdictional coordination and information sharing. Transportation disruptions can occur because of direct impacts upon the transportation infrastructure (e.g. disasters and evacuations) or from surges in requirements placed on the system by emergencies in other functional areas.

Transit Role in Emergency Planning

- *CTtransit* plays a role in emergency planning by monitoring the monthly CREPC meetings, attending when transit issues are discussed, and participating in emergency drills when appropriate. It is important that this relationship among responders and transit providers be maintained because of the significant role that transit vehicles can play in any emergency. Transit vehicles can be used for:

- Respite for emergency responders
- Temporary shelter for displaced citizens (heat/air condition, seating, water/food transport, etc.)
- A mobile incident command center

- Mobile triage units for injured citizens, during disaster or attack
- Mass evacuation (buses can seat 35+ to 57 passengers, upwards of 60+ for standing/seating combined)
- Mobile street and block detours; during a disaster or emergency, a 25- to 40-foot bus can block off streets and intersections freeing up emergency vehicles such as police or fire vehicles traditionally used to perform these tasks

With the implementation of **CTfastrak**, **CTtransit** developed a new Agency Safety Plan for the Hartford Division and included **CTfastrak** operations. **CTtransit**'s "Security and Emergency Preparedness Plan" was also revised and updated. A **CTfastrak** emergency exercise was conducted, first as a tabletop in December 2014 and then as a live event in January 2015. The exercise scenario included a bus collision on the **CTfastrak** guideway. State Police, **CTtransit**, CTDOT, and first responders from New Britain, Newington, West Hartford, and Hartford all participated in the event. The **CTtransit** dispatch office has been enlarged to include the Busway Operations Center (BOC) for **CTfastrak**. The BOC will be the hub for overseeing the operation of **CTfastrak**, with monitors that show live camera feeds from busway stations, as well as the source of alerts from station Emergency Call Boxes. The BOC is also central control for the AVL system.

In addition to **CTtransit**, more than a dozen public and private companies operate multi-passenger vehicles within the region, including school buses, city buses, wheelchair vans, and

smaller vehicles. These transit providers need to be encouraged to play a role in local and regional emergency planning. An aggressive response to any type of extreme emergency will need to mobilize the region's vehicles to save lives as well as to preserve equipment.

Evacuation Planning - Following the hurricanes that hit the Gulf Coast in 2005, the federal government directed all states to develop emergency evacuation and sheltering plans. Connecticut had already begun work on evacuation planning, traffic management and mass sheltering. The state addresses the three most probable evacuation-planning scenarios, which essentially occur outside the Capitol Region, but impact the region by virtue of its role in accepting evacuated persons from other parts of the state. The Capitol Region emergency planners have completed a Regional Shelter and Evacuation Guide as part of the state's overall approach to evacuation and mass care operations, in collaboration with state and intra-state regional partners.

Figure 09.2 – 2014 **CTfastrak** emergency exercise



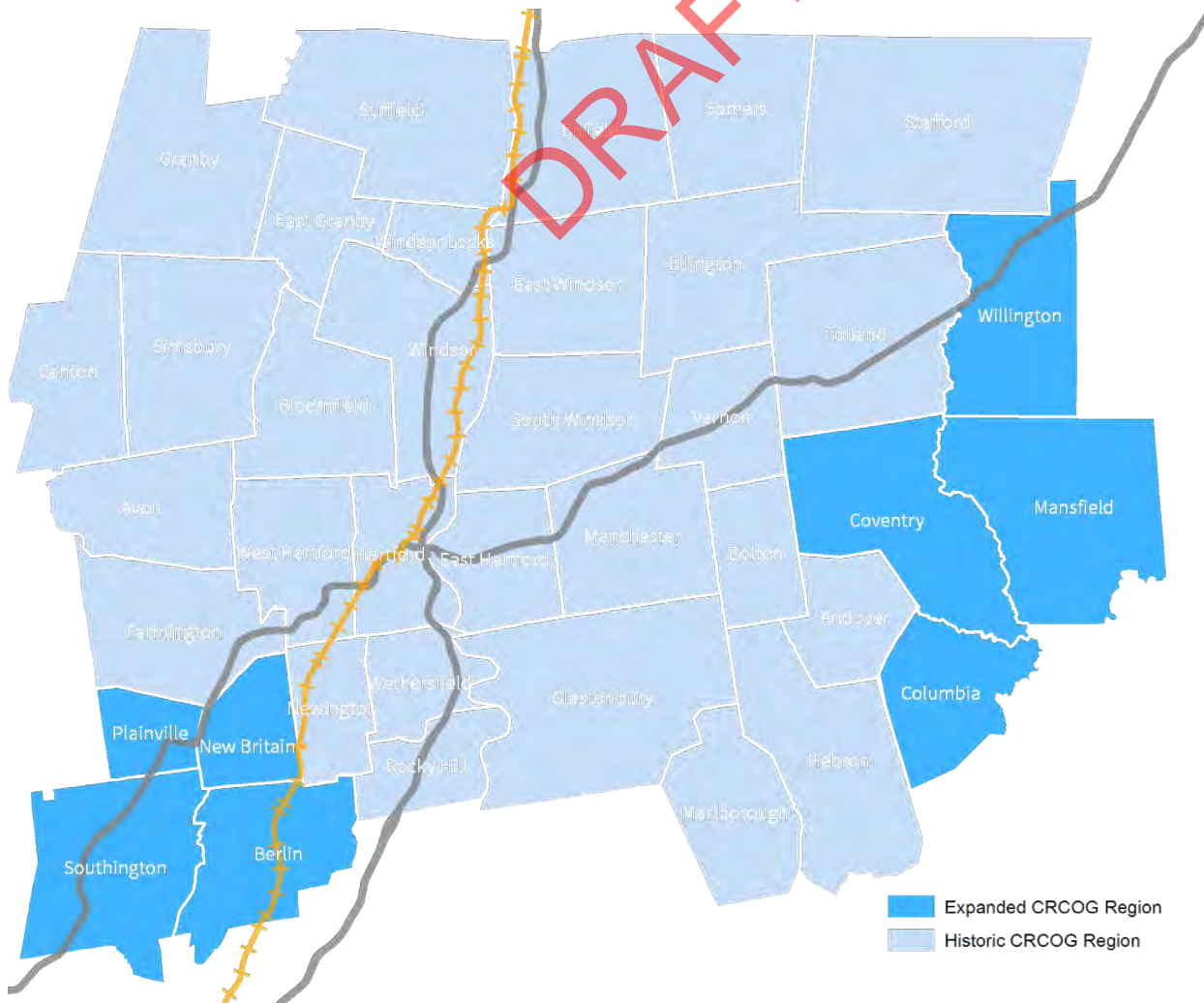
Metropolitan Planning Organization Coordination

CRCOG serves as the main Metropolitan Planning Organization (MPO) for the Hartford Transportation Management Area (TMA). Previous to 2015, the Hartford TMA extended beyond CRCOG’s boundaries and into the neighboring Central Connecticut Regional Planning Agency (CCRPA) and Middlesex Regional Planning Agency (MRPA). In 2015,

1 Metropolitan Planning Organization (MPO) is a federal term used to designate the regional planning agency responsible for approving the use of federal transportation funds within a given metropolitan area.

Regional Planning Agency (RPA) consolidation efforts were completed in Connecticut, resulting in changes in boundaries that reduced the number of regions from fifteen (15) to nine (9). This resulted in the elimination of CCRPA and MRPA and the expansion of CRCOG’s boundaries to encompass the vast majority of the Hartford TMA. However, other regions also expanded, and portions of the TMA still stretch beyond CRCOG’s borders and into the bordering RPAs of the Naugatuck Valley Council of Governments (NVCOG), Lower Connecticut River Valley Council of Governments (RiverCOG), and Northwest

Figure 09.3 – CRCOG Regional boundaries before and after 2015 reorganization



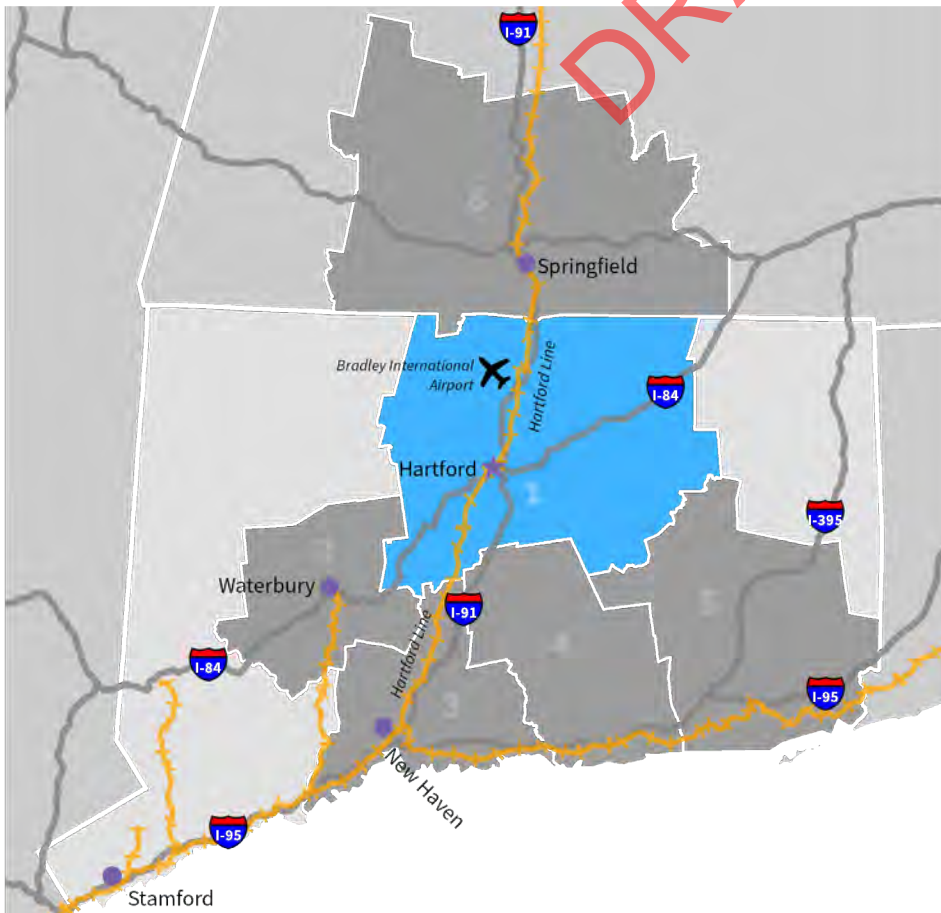
Hills Council of Governments (NHCOG). NVCOG serves as the MPO for the Waterbury urbanized area and RiverCOG serves as the MPO for the Lower Connecticut River Valley area. NHCOG is not a designated MPO.

CRCOG is committed to working cooperatively with all its neighboring regional planning agencies in the Hartford metropolitan area, as well as the planning agencies in the Springfield and New Haven areas. Since major transportation projects often extend across multiple regions, or even multiple metropolitan areas, it is important that the affected planning agencies work cooperatively to ensure inter-regional needs are met. It also ensures that proposed improvements are not duplicative or conflicting.

Hartford MPO Coordination

Since the political boundaries of the regional planning agencies do not coincide with the functional limits of the Hartford metropolitan area, it is important that the regional agencies within the metropolitan area coordinate their planning efforts. In May 2018, the four COGs that share some portion of the Hartford metropolitan area – CRCOG, NVCOG, and RiverCOG, and NHCOG – executed an agreement to do so (see Appendix 4.1). Also signing onto the agreement were CTDOT and three affected transit agencies: the Greater Hartford Transit District (GHTD), the Middletown Area Transit (MAT), and Estuary Transit District (Estuary TD). The agreement established a common goal to conduct the

Figure 09.4 – CRCOG Surrounding MPO's



1. Capitol Region Council of Governments
2. Naugatuck Valley Council of Governments
3. South Central Region Council of Governments
4. Lower CT River Valley Council of Governments
5. Southeastern CT Council of Governments
6. Northeastern CT Council of Governments

transportation programs in a manner that ensures that plans are mutually supportive of major projects and programs to improve the transportation system in the Hartford urbanized area. The agreement also required that agency activities be coordinated in a number of specific planning and programming areas. The coordination efforts include the exchange and review of annual work programs, regional transportation plans, and transportation improvement programs (TIPs).

MPO coordination is achieved primarily through periodic meetings of the Hartford Urbanized Area agencies to discuss ongoing or scheduled planning activities. A list of common issues, activities, and projects that are discussed at these meetings or are addressed through other means are listed below in Table 09.1.

Table 09.1 – List of common issues, activities, and projects at MPO coordination meetings

Item or Project in Common	Affected MPOs/ COGs	Ongoing Actions
Intelligent Transportation Systems	CRCOG, NVCOG, RiverCOG	<ul style="list-style-type: none"> The three agencies support a common program for ITS CRCOG recently completed an update the ITS Strategic Plan and continues to work on the ITS Architecture; NVCOG and RiverCOG have been stakeholders in this process.
Congestion Management Process	CRCOG, NVCOG, RiverCOG, NHTCOG	<ul style="list-style-type: none"> The four agencies support a common CMP for the Hartford metro area. The four agencies worked together to collect data, review, and update the congestion management reports, including the latest 2015 NPMRDS Update.
Traffic Incident Management	CRCOG, NVCOG, RiverCOG, NHTCOG	<ul style="list-style-type: none"> CRCOG established the Greater Hartford TIM Coalition (GHTC), to rebuild the incident management program. The Coalition is comprised of members that serve various stakeholder groups involved in incident and emergency management. Three planning organizations are part of the Coalition and represent towns within the Hartford urbanized area. The Coalition will provide guidance and direction to the TIM community to achieve new goals and strengthen a program to reach higher levels of service. The Coalition represents the RESF-1 Transportation role in the Capitol Region Emergency Planning Council (CREPC) for emergency management in the region.

Table 09.1 (continued) – List of common issues, activities, and projects at MPO coordination meetings

Item or Project in Common	Affected MPOs/ COGs	Ongoing Actions
Emergency Management	CROCOG, NVCOG, RiverCOG	<ul style="list-style-type: none"> The Capitol Region Emergency Planning Council (CREPC) works with 41 communities located in the Department of Emergency Management and Homeland Security (DEMHS) Region 3. CREPC member communities and agencies collaborate in planning, communication, information sharing, and coordination activities before, during, or after a regional emergency. The Regional ESF (emergency support function) facilitates communication and coordinates among regional jurisdictions and agencies concerning transportation issues and activities during a major disaster or incident.
Locally Coordinated Human Services Transportation Plan	CROCOG, CCMPO, RiverCOG	<ul style="list-style-type: none"> The three agencies continue to support a single plan for the Hartford urbanized area, which was developed as part of CTDOT's statewide LOCHSTP in 2007 and 2009.
The Hartford Line	CROCOG, SCRCOG	<ul style="list-style-type: none"> CROCOG established a Corridor Advisory Committee (CAC) to assist municipalities in coordinating shared resources and development plans. Municipalities that have either rail or CTfastrak stations participate in the CAC including towns in the South Central Region Council of Governments. CROCOG has coordinated with SCRCOG to spearhead issues important to towns in both regions such as revisions to parking regulations at stations.
STP Urban & Transportation Alternatives Program	CROCOG, RiverCOG, NHCOC, NVCOG	<ul style="list-style-type: none"> The agencies coordinate the use and expenditure of STBGP funds and Transit Alternative Set-Aside funds for the Hartford Urbanized area.
Farmington Canal Multi-Use Trail	CROCOG, NVCOG, SCRCOG	<ul style="list-style-type: none"> CROCOG, SCRCOG, and NVCOG all work with their affected towns to advance funding for this trail that will extend from New Haven to Northampton, MA.

Springfield MPO Coordination

CRCOG also coordinates regularly with the Pioneer Valley Planning Commission (PVPC). PVPC is the designated MPO for the Springfield, MA Transportation Management Area who’s limits extend within CRCOG’s northern border. In August of 2015, the two agencies executed a Memorandum of Understanding formalizing this cooperation (see Appendix 4.2). The two regions share a number of common transportation assets and concerns, including the Bradley International Airport, ITS and incident management on I-91, transit services for Enfield, the CTrail Hartford Line, the study of Interstate 91 in Springfield, and the Farmington Canal Trail. As detailed in Table 9.2, the two regions meet annually to review the status of planning programs, and as required for studies of transportation systems that impact both MPOs. Additionally, CRCOG

coordinates with other MPO’s as needed for interregional projects, like working with the New Haven MPO on the CTrail Hartford Line.

Figure 09.5 — Shared assets with PVPC

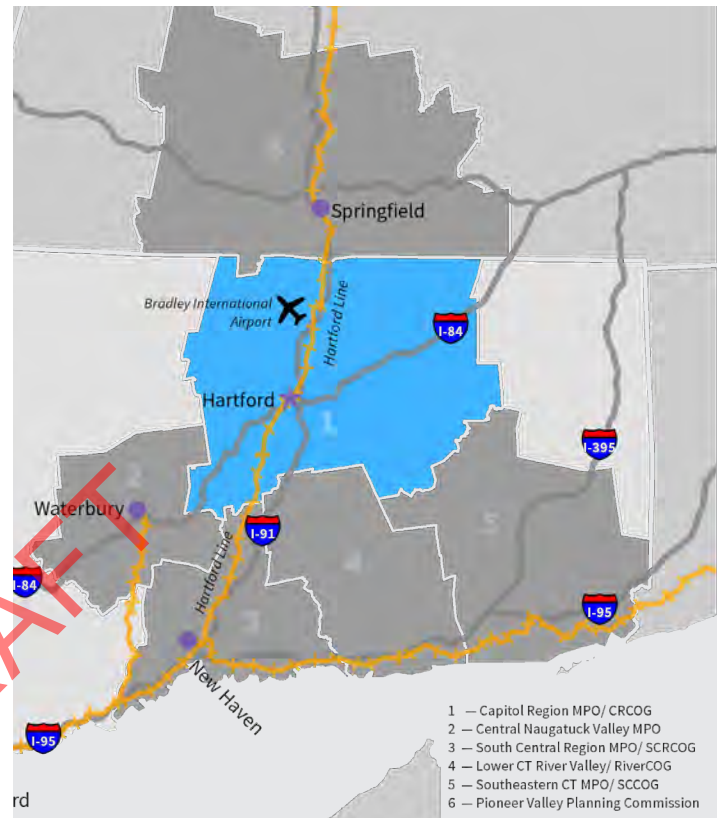


Table 09.2 — CRCOG and PVPC meeting items

Item or Project in Common	Affected MPOs	Ongoing Actions
Southern New England Transportation Issues	CRCOG, PVPC	<ul style="list-style-type: none"> The executive directors of both agencies regularly consult with one another regarding transportation issues of importance to both regions and all southern New England. CRCOG and PVPC signed a MOU in May, 2012. The MOU facilitates mutual exchange of information and expertise such as UPWP, Long Range Transportation Plan, GIS, and regional transportation model data. The PVPC is a member of the Greater Hartford Traffic Incident Management Coalition that represents the Hartford Urbanized area and a portion of the Springfield Urbanized Area. PVPC and CRCOG along with NVCOG, NHCOG, and RiverCOG serve various stakeholder groups involved in incident and emergency management.

Table 09.2 (continued) — CRCOG and PVPC meeting items

Item or Project in Common	Affected MPOs/ COGs	Ongoing Actions
Bradley	CRCOG, PVPC	<ul style="list-style-type: none"> • CRCOG regularly consults with PVPC regarding
Commuter Rail	CRCOG, PVPC	<ul style="list-style-type: none"> • CRCOG regularly consults with PVPC regarding the Hartford Line and expansion of rail service to Springfield and Boston. • CRCOG coordinates with PVPC on the FRA plans for the NEC Future corridor.
Farmington Canal Trail	CRCOG, PVPC	<ul style="list-style-type: none"> • CRCOG and PVPC both endorse this trail, and both work with their affected towns to advance funding for this trail that will extend from New Haven to Northampton, MA. • CRCOG coordinates with PVPC on the completion of the Farmington Canal Greenway in the border towns of Suffield and Southwick.
Freight	CRCOG, PVPC	<ul style="list-style-type: none"> • CRCOG regularly consults with PVPC regarding freight planning initiatives, including the recent development of State Freight Plans in Massachusetts and Connecticut.
Regional Planning		<ul style="list-style-type: none"> • CRCOG and PVPC meet regularly for continuing implementation of the Sustainable Knowledge Corridor Project, funded by a HUD Sustainable Communities Regional Planning Grant. Some of the projects are development of knowledge corridor sustainability dashboard, development of metrics, update and integrate existing regional plans, etc. • CRCOG & PVPC are working together in CT River Bi-state Partnership as a part of the partnership between four regional planning agencies located along the CT River for purposes of collaborating more effectively to improve the environment, water quality, recreation and public access on the Connecticut River.

Air Quality – Transportation Policy

Many metropolitan areas of the nation, including the Capitol Region, have serious air pollution problems. These problems are caused in large part by emissions from automobiles. Because of the automobile's key role in the air pollution problem, the federal Clean Air Act of 1990 requires metropolitan areas to develop transportation plans that help reduce vehicle emissions that contribute to air pollution.

Our plans and programs are regularly evaluated through the air quality conformity process conducted by CTDOT in cooperation with the regions and with the Connecticut Department of Energy and Environment Protection (CT DEEP). These evaluations have always shown that CROCOG plans support the state air quality programs and goals.

Air Quality Supportive Policies & Practices

- In addition to the conformity process that the region is required to conduct, CROCOG has examined air quality issues

and options for reducing emissions. The findings and conclusions from this work have helped us formulate much of the current transportation plan and programs in a manner that promotes better air quality.

This current transportation plan reflects the region's strong desire to reduce regional reliance on automobiles by developing travel alternatives such as transit, traveling by bicycle, and walking. The Plan also includes demand management and land use policies that support practices to reduce exhaust emissions by reducing travel demand.

Special Diesel Policy & Program - This plan continues an over decade long CROCOG policy regarding the reduction of diesel exhaust emissions. CROCOG's Environmental Justice Advisory Board identified diesel emissions as an air quality issue that disproportionately affects low-income urban neighborhoods. The issue was raised because there is a high incidence of asthma in these neighborhoods, and evidence suggests that diesel emissions, especially particulates, are part of the cause of this urban health problem. To address the problem, the Environmental Justice Advisory Board (EJAB) suggested that CROCOG incorporate the goal of reducing diesel emissions into its various transportation plans and policies. CROCOG continues to support that goal, and much has been done to address the issue, as described below.

Transit Buses - CT*transit* has continually sought to decrease the diesel emissions from its bus fleet. The majority of its fleet consists of hybrid-electric, hydrogen fuel cell,

Figure 09.6 — New zero emissions hydrogen bus



and clean-diesel vehicles. In FY17, CTDOT was awarded a grant through FTA's Low or No Emission Vehicle Program in FY17 to purchase four (4) 40' Proterra E2 Max electric buses and associated charging equipment. While all of the vehicles will go to Greater Bridgeport Transit (GBT), CT*transit* is helping GBT write the specs and are serving as consultants on the project. The project is part of the state's initiative to minimize the carbon emissions of Connecticut's bus fleet.

Construction Equipment - The EJAB also suggested that the Plan's recommendation for clean diesel buses be expanded to include clean diesel construction equipment used on highway projects. While expanding the recommendation to include highway construction equipment is reasonable, it must be focused on policy initiatives rather than project-based or funding initiatives. Highway construction equipment is owned by private companies, so change must be achieved by modifying the construction bid documents. CTDOT is already implementing these requirements on its largest construction projects by requiring contractors to use clean diesel equipment. In these cases, larger diesel powered construction vehicles operating for long durations are typically required to use Clean Fuels or Retrofit Emission Control Devices. The requirements also include guidelines for the idling and staging of vehicles and thresholds for a contractor prepared Diesel Emission Mitigation plan.

Ongoing Actions

- 1. Support Alternate Travel Modes.** Support projects recommended in the Transit and Complete Streets chapters of this Plan.
- 2. Reduce Diesel Emissions.** CROCOG supports the reduction of diesel emissions from all sources. CROCOG recognizes CT*transit*'s efforts to reduce emissions from public transit vehicles, and CROCOG continues to support these efforts. CROCOG continues to encourage CTDOT to include clean diesel equipment on state transportation construction projects as part of bidding requirements.
- 3. Support Electric Bus Program.** CROCOG, CT*transit*, and CTDOT should continue to search for opportunities to support an electric bus program.

Environmental Mitigation

In reviewing CROCOG’s proposed transportation projects for consistency with State and regional land use plans (see discussion above), we determined that the proposed projects in this Plan generally avoid areas of environmental concern. Most of the projects proposed in this long-range plan are just that: long-range conceptual proposals, without specific details as to location and design. As projects are funded and move into the design stage, however, a closer look is taken at any potential environmental impacts and necessary mitigating solutions are taken.

To ensure that the environment is considered in our transportation planning process, CROCOG will consult with representatives of appropriate Federal and State agencies to review issues related to land use management, natural resources, environmental protection, conservation, and historic preservation. These issues will be considered within specific planning studies such as corridor studies, mode specific transportation studies, and future editions of the Regional Transportation Plan.

Recommendations

1. Consult with Officials. Consult with representatives of appropriate federal and state agencies about issues of land use management, natural resources, environmental protection, conservation, and historic preservation.

2. Develop Environmental Mitigation Activities When Required. Work with appropriate federal and state agencies to determine appropriate environmental mitigation activities for any project that has the potential to impact environmentally sensitive areas.
3. Avoid Areas of Environmental Concern. As projects are funded and move into the design stage, take a closer look at environmental impacts and assure that necessary mitigating solutions are taken.
4. Support Green Streets Advancement. Momentum is gathering in support of streets that incorporate sustainable design elements, including green infrastructure. CROCOG will support the inclusion of green infrastructure elements by:
 - a) Encouraging the implementation of green infrastructure elements into corridor studies and roadway reconstruction projects working with partners such as the Metropolitan District Commission (MDC) and DEEP.
 - b) Educating communities in latest “Green Streets” design and maintenance requirements.
 - c) Researching funding opportunities for green transportation implementation.

Demand Management Policy

Many options for reducing congestion focus on increasing the capacity of the transportation system (or transportation supply). An important alternative approach is to reduce, or otherwise modify, the demand for transportation. This does not necessarily mean getting people to make fewer trips. More often demand management is focused on getting people to use an alternate form of transportation (bus or carpool), or to shift their travel to off-peak periods when there is excess capacity.

Examples include:

- staggered work hours to spread peak demand
- flexible work hours to allow more use of transit or ridesharing
- reduced bus fares to encourage use of transit
- telecommuting to eliminate commuting trips
- elimination of employee parking subsidies to encourage transit use
- 4-day work weeks to eliminate commuting trips

CROCOG has studied demand management options as part of several previous studies. The analyses consistently demonstrate that techniques such as increasing parking fees, eliminating employee parking subsidies, or providing transportation allowances to employees can be effective at reducing vehicle miles of travel, increasing transit ridership, and reducing vehicle exhaust emissions. The difficulty with these techniques is that they often rely on voluntary participation

of private employers to implement them. Voluntary programs are often not effective and making them mandatory through legislative action is often politically unpopular.

Ongoing Actions

1. Encourage Transportation Demand Management Programs.

CROCOG should try to integrate demand management into our transportation programs whenever possible. We should also promote federal and state “deduct a ride” programs that use income tax deductions to encourage use of transit and ridesharing instead of driving alone to work. Encourage the State legislature to act as an example to private employers by offering a full transit subsidy to State employees.

2. Support Rideshare Programs and CTrides Initiatives.

CROCOG should continue to support rideshare programs that encourage alternatives to driving alone to work, including continuing CTrides quarterly reporting at CROCOG Transportation Committee meetings. While the primary function of rideshare programs is encouraging commuters to use carpools or vanpools, the various programs in the State also promote public transit as well as transportation demand management initiatives such as telecommuting.

Chapter 10

Financial Plan

This chapter identifies prioritized transportation investments and the revenue sources available to fund them. Since this is a long-range plan, many of the revenue and project/program cost estimates are inexact. However, given reasonable assumptions, the intent is to produce a financially constrained plan whose costs can be accommodated by the revenue stream.

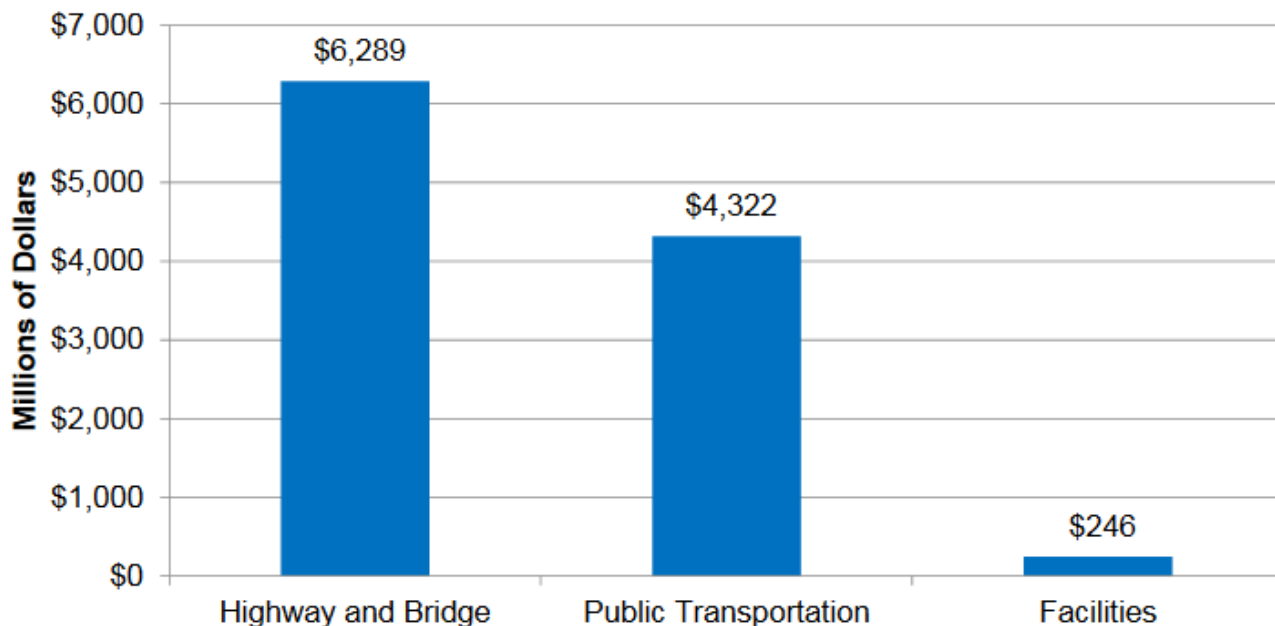


Capital construction on Albany Avenue

Prior to detailing the region’s financial plan, it is important to understand how regionally significant surface transportation (arterials, freeways, and transit) has been, and currently is, funded in Connecticut. These facilities and programs are funded almost exclusively with state and federal funding. As detailed further within this chapter, the main sources of funding are the state’s Special Transportation Fund (STF), the Federal Highway Administration (FHWA), and the Federal Transit Administration (FTA). Within the CRCOG region, any transportation project receiving FHWA or FTA funds must be included in the four-year Transportation Improvement Program (TIP) developed and adopted by CRCOG. The TIP also includes additional details regarding these agencies various funding programs. The statewide capital program is primarily divided into two categories: highways (including bridges, bike,

and pedestrian improvements) and transit, with recent allocations approximating 60% and 40%, respectively, with a relatively small amount dedicated to maintenance facilities. To address the growing gap between available federal funding and transportation system needs, recent expenditures have approximated two-thirds from state sources, and one-third from federal sources. This significant state share is a result of a decade long ramp-up, which contrasts with prior decades when federal funds accounted for 70-80% of CTDOT’s capital program. Figure 10.1 shows these estimated statewide capital plan amounts for 2017–2021. Figure 10.2 breaks down the 2017–2021 statewide capital plan by funding source. In addition to its capital plan investments, the state historically has almost exclusively funded system operation and maintenance costs.

Figure 10.1 – CTDOT FY2017-2021 Estimated Capital Plan Program Amounts



STATEWIDE FIGURES – From CTDOT Long-Range Transportation Plan (Dec. 2017)

The Connecticut Special Transportation Fund

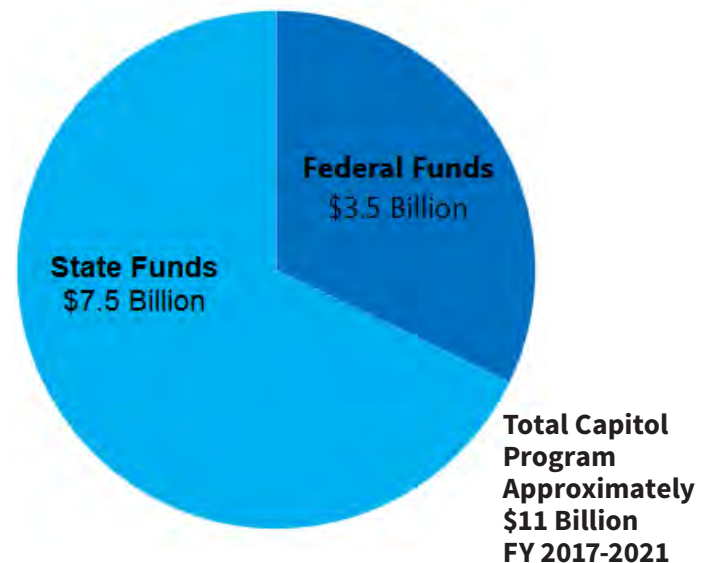
The state side of transportation funding in Connecticut resides in the Special Transportation Fund (STF), established by the Legislature in 1983. The STF funds the state match on federally-assisted projects, the full cost of 100% state-funded projects, and the operating costs of the state DOT and Department of Motor Vehicles . The STF currently issues bonds in the range of \$700-\$800 million per year and manages its debt to attract favorable interest rates.

The level of incoming revenues is the limiting factor on the issuance of bonds and hence on the size and pace of the capital program. The principal sources of STF revenues are the motor fuel tax, motor vehicle receipts, a petroleum products gross earnings tax, and two portions of the state sales tax. In 2018, the Legislature addressed the near-term solvency of the STF by increasing the amount of sales tax revenues dedicated to it. Also, in 2018, voters approved a constitutional amendment imposing a “lockbox” on any revenue source statutorily dedicated to the STF. This allows legislators and the public to be confident that STF revenues—including any potential new sources—cannot be diverted to other purposes.

The Federal Surface Transportation Act

The national system of highway, transit, and rail programs is authorized by Congress in a multi-year Surface Transportation Act, which is commonly renamed (and given a new acronym) at each iteration. The current version of the act—the Fixing America’s Surface Transportation, or FAST Act—was signed into law in 2015. It is a five-year authorization, scheduled to expire at the end of FY 2020 (September 30, 2020). If Congress fails to enact a new multi-year authorization in timely fashion (as has happened in the two most recent cycles), it typically extends the existing authorization on a short-term basis. At the time of this Metropolitan Transportation Plan, the likelihood of new major infrastructure legislation in the 116th Congress is unknown, as is its potential structure. The discussion below reflects the existing structure, which includes formula grants, discretionary grants, and credit programs.

Figure 10.2 – CTDOT Capital Program Funding Sources State vs. Federal 2017-2021



Federal Highway Administration Formula Programs

The FHWA’s contribution to state, regional, and local highway and bridge investments occurs primarily through a series of formula grants, apportioned to the states (and in some cases to their Urbanized Areas) by statutory formula. The principal FHWA formula programs include the following:

- The National Highway Performance Program (NHPP) is the largest of the FHWA formula programs and covers a wide range of highway and bridge investments on the National Highway System (NHS) and, in limited cases, federal-aid highways not on the NHS. Eligible activities include

construction, reconstruction, resurfacing, restoration, rehabilitation, preservation, or operational improvements; some bicycle transportation and pedestrian walkways; and highway safety improvements.

- The Surface Transportation Block Grant (STBG) is the broadest and most flexible of the core FHWA programs. STBG funds projects that preserve and improve any federal-aid highway; bridge and tunnel rehabilitation projects on any public road; pedestrian and bicycle infrastructure; transit capital projects; and several other project categories.
- The Congestion Mitigation and Air Quality (CMAQ) program can fund a variety of highway, transit, and technology projects that support the state’s conformance with federal Clean Air Act standards. Projects must meet specific eligibility requirements and undergo an air quality benefits evaluation. Funding is apportioned to the state, which selects some projects directly and solicits others on a competitive basis from the MPO regions.
- Highway Safety Improvement Program (HSIP) funds projects that provide specific improvements designed to correct identified highway safety problems.

Table 10.1 – FHWA Formula Programs – Connecticut’s FY2018 Apportionments

National Highway Performance Program	\$287.1 million
Surface Transportation Block Grant	\$144.4 million (CRCOG \$20 million)
Congestion Mitigation & Air Quality	\$45.7 million
Highway Safety Improvement Program	\$30.1 million
National Highway Freight Program	\$15.2 million
Metropolitan Planning Program	\$4.8 million
Railway Highway Crossings Program	\$1.4 million
Connecticut Total	\$528.7 million

Table 10.1 summarizes Connecticut’s share of the FHWA formula programs for FY 2018. The statewide total for all programs was \$528.7 million. Because most of these funds can be spent anywhere in the state, the region’s share over time can only be estimated. The CRCOG region has a population of roughly 1.0 million, or 28% of the state’s population of 3.6 million. If the region’s projects were

secured proportionately allocated based on population its estimated annual FHWA formula funding would be under \$150 million, assuming today’s authorization levels.

Federal Transit Administration Formula Programs

The Federal Transit Administration (FTA) also provides formula funding to the Capitol Region, through the programs summarized below. Unlike most FHWA programs, which are apportioned to the state, the FTA programs are based on Urbanized Areas and apportioned to them. The funding is then assigned to transit agencies operating within the Urbanized Area; in CRCOG’s case, these include the Greater Hartford Transit District (GHTD), CTDOT (operating as CT*transit* and CT*fastrak*), and others.

The Section 5307 Urbanized Area Formula Grant Program is the FTA workhorse, providing capital funding for planning, design, construction, acquisition, maintenance, replacement, and other investments in bus and rail transit systems. (Section 5307 funds are generally not eligible for operating expenses in Urbanized Areas of 200,000 or more.)

The other FTA formula programs include: Section 5310, Enhanced Mobility of Seniors and Individuals with Disabilities Program, which includes both capital and operating assistance; Section 5311, Capital & Operating Program for public transportation systems in non-urbanized and small urban areas with populations of less than 50,000; Section 5337, State of Good Repair, which provides capital assistance for maintenance, replacement, and rehabilitation projects of high-intensity fixed

Table 10.2 – FTA Formula Programs – Connecticut’s FY2018 Apportionments

Program	Hatford UZA Apportionment	Springfield UZA Apportionment (CT portion)	Total CRCOG Apportionment
Section 5307 General Purpose Capital Grant	\$24.4 million	\$2.1 million	\$26.3 million
Section 5310 Enhanced Mobility for Seniors, etc.	\$0.8 million	\$0.1 million (approx.)	\$0.9 million (approx.)
Section 5311 Rural Capital & Operating Grant	N/A	N/A	A portion of \$3.2 million funds available statewide*
Section 5337 State of Good Repair	\$1.6 million	N/A	\$1.6 million
Section 5339 Bus & Bus Facilities	\$2.0 million	\$0.2 million (approx.)	\$2.2 million (approx.)

* to Windham Regional Transit District

guideway and bus systems; and Section 5339, Bus & Bus Facilities, which provides capital funding to replace, rehabilitate, and purchase buses and related equipment and to construct bus-related facilities. Figure 10.4 summarizes the FTA apportionments to the Capitol Region, which total less than \$35 million.

Flexing Funds Between Highway and Transit

An important feature of the federal surface transportation funding structure is the ability for states and MPOs to “flex” formula dollars from highway to transit. The FAST Act permits a state to transfer up to 50% of its annual apportionment under the National Highway Performance Program, Surface Transportation Block Grant, CMAQ, Highway Safety Improvement Program, or National Highway Freight Program to any of the others. As a practical matter, this means that the various highway programs can be “flexed” into the Surface Transportation Block Grant, which can be used to fund virtually any federally eligible highway or transit project. While the great majority of FHWA funds are used for highway and bridge projects, Connecticut has used flex funding for several projects, including CT**fastrak**.

All the FHWA and FTA formula grants summarized in these pages are estimated at under \$200 million annually for Capitol Region projects. This funding is expected to recur, at the current level or higher, on an annual basis. Even so (and notwithstanding the flexibility to move dollars between the

highway and transit domains), the current funding levels barely address traditional investment and reinvestment needs, with little room for significant new projects.

Discretionary Grant Programs

The FAST Act structure also provides for several discretionary, highly competitive grant programs, which can fund larger, less routine projects. These include the following:

- FTA’s Section 5309 Capital Investment Grants is commonly known as New Starts/ Small Starts. The CROCOG region is home to a significant New Starts project, the CT**fastrak** busway from Hartford to New Britain. The New Starts contribution was \$275 million, or 48% of total project costs, which was combined with flex funding, several smaller FTA contributions, and the matching 20% local share.
- FTA’s Section 5339 Bus & Bus Facilities Program includes a discretionary component (alongside the formula program mentioned previously). Funding for this grant is \$350 million nationally.
- BUILD (Better Utilizing Investments to Leverage Development) is the new name of the decade-old TIGER program (Transportation Investments Generating Economic Recovery). This program funds projects that enhance economic competitiveness, environmental sustainability, livability, state of good repair, and other statutory goals. In the ten rounds to date, Connecticut has won eight awards, generally in the \$9 to \$20 million range. Congress has typically appropriated \$500 million per year for the TIGER/BUILD program.

- The FAST Act provides a second competitive project grant program, initially known as FastLane and recently renamed INFRA (Infrastructure for Rebuilding America). This program is statutorily reserved for highway and rail freight projects. Unlike the TIGER/BUILD program, INFRA consists principally of large grants, with a minimum award of \$25 million and some much larger. The three rounds to date have totaled approximately \$2.4 billion. Several grants have been awarded in New England, including in Maine, New Hampshire, and the Port of Boston, but none in Connecticut. As CRCOG and CTDOT explore rail and water alternatives to the heavy volume of trucks on I-95, I-91, and I-84, the INFRA program could be highly relevant.

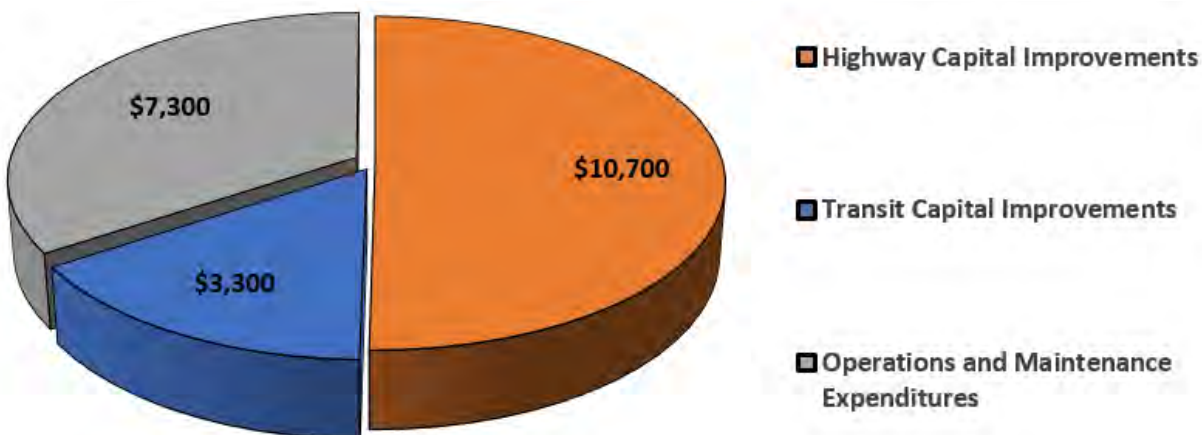
MTP Financial Plan

This MTP outlines a plan for major investments for surface transportation modes within the CRCOG region through 2045. In general, the plan outlines investments in three categories: highway capital projects (including improvements for bridges, bicycles, and pedestrians), transit capital projects, and operations and maintenance

services. The result is identification of fiscally constrained investment needs of \$21.3 billion through 2045, consisting of \$10.7 billion in highway capital improvements, \$3.3 billion in transit capital improvements, and \$7.3 billion in operations and maintenance expenditures. Figure 10.5 shows these total anticipated expenditures in each of the three categories.

To identify highway and transit investment needs, CRCOG and the region’s other transportation agencies (including CTDOT and GHTD), identified, assembled, and prioritized an extensive list of needed capital projects. This list of the region’s projects, including each project’s anticipated funding source and a timeline for funding obligation, can be found in Appendix 5.1. The list’s first five years is very refined, identifying even the smallest of projects, however in later years the plan strives to mainly comprehensively identify major needed investments. Additionally, the list contains many projects (especially transit projects) that span multiple regions, and therefore quantifying their regional expenditures is an inexact effort based on proportioning their costs between regions. Regional allocations and needs for

Figure 10.3 – Expected Regional Transportation Expenditures 2019–2045 (in 000,000s)



highway capital projects, transit capital projects, and operations and management services are explored in further detail in subsequent sections.

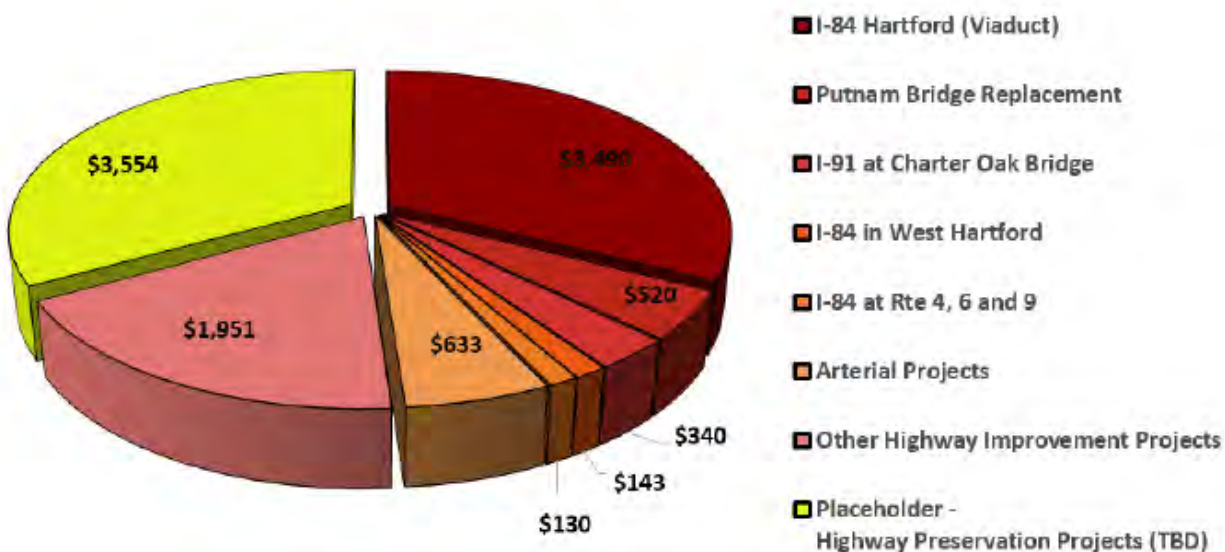
Regional Funding Allocation and Projects - Highways

CTDOT has estimated the anticipated FHWA and state highway funding allocations through 2045 at almost \$34.7 billion statewide. This was determined by compounding estimated federal and state funds of almost \$830 million for fiscal year 2018 at 3% through 2045. As shown in Appendix 5.2, CRCOG’s equitable regional distribution was determined via formula to be just over \$10.7 billion. This formula, agreed upon by both the regions and CTDOT, considered each region’s volume/capacity ratio, vehicle miles traveled, roadway lane miles, and needs for major projects of statewide significance. As mentioned, highway capital improvements are included in the project listing in Appendix

5.1. The list contains over \$7.2 billion in needed highway investments that can be attributed to the CRCOG region, however not listed is an estimated additional \$3.5 billion needed for yet to be identified highway (system preservation) projects. The resulting \$10.7 billion of highway investments matches expected revenues.

By far the plan’s largest highway investment is the \$3.5 billion I-84 Hartford (Viaduct) project, however significant investments are also included for the Putnam Bridge, I-91 at Charter Oak Bridge, and I-84 at Routes 4, 6, and 9 projects. Figure 10.4 shows expected CRCOG highway expenditures, including a break out of some of the major projects. Not included in the fiscally constrained portion of this plan is the I-84/I-91 Interchange Project. This project is in its initial planning phases, but due to its high anticipated cost (likely billions or even tens of billions), it been identified in this plan as an “Unfunded Need”.

Figure 10.4 — Expected Regional Highway Expenditures 2019–2045 (in 000,000s)



Regional Funding Allocation and Projects - Transit

For transit, CTDOT’s estimated total FTA and state funding allocations through 2045 are just over \$14.6 billion statewide. However due to the multi-regional nature of most transit projects, funding allocations were not determined on a regional basis. Instead, projects were initially identified by CTDOT that fulfill transit needs throughout the state and reviewed by the regions for comment and editing. Through the process, transit expenditures utilizing the entire \$14.6 billion of statewide funding were identified.

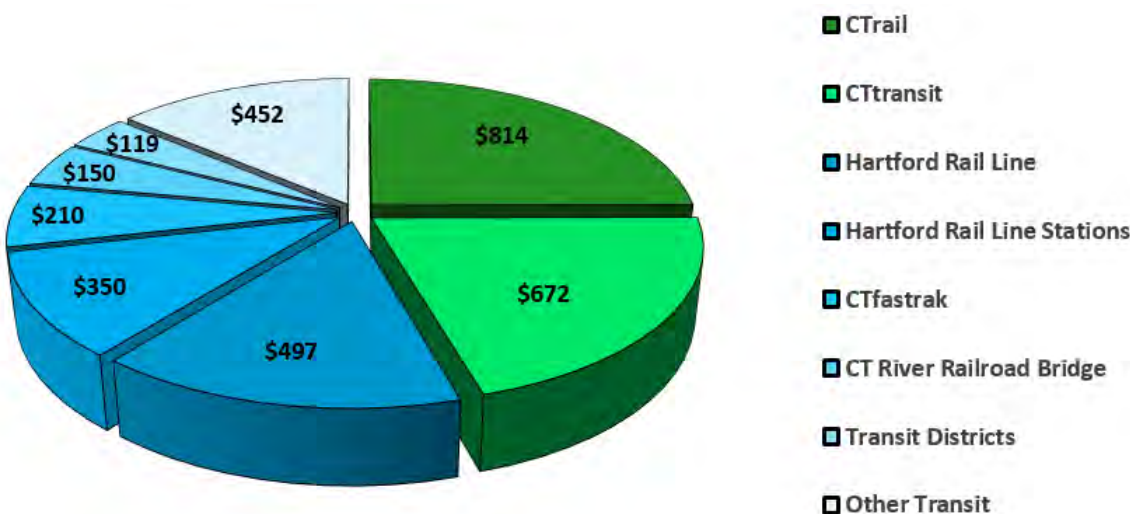
As mentioned, transit capital improvements are included in the project listing in Appendix 5.1. This list illustrates the multi-regional nature of transit, as the list identifies over \$7.7 billion of transit highway investments, however less than a billion of these are solely located within the CRCOG region. Most of the biggest investments span multiple regions, are statewide, or are sometimes hard to attribute to an area (such as the

procurement of rolling stock). By estimating and attributing percentages of statewide and multi-regional projects to CRCOG, it’s estimated just over \$3.2 billion of the total expenditures can be attributed to the region.

Some of the more major regional investments include improvements to the Hartford Line including \$350 million for multiple new rail stations, \$210 million towards CT**fastrak**, \$150 million for the rehabilitation of the rail bridge over the Connecticut River in Hartford, and various investments in rolling stock for CT**transit** and CT**rail**. The unfunded transit needs include a half dozen transit priority corridors leading to and from downtown Hartford.

As mentioned previously, the transit portion of the plan was fiscally constrained on a statewide basis, and therefore the estimated \$3.2 billion that can be attributed to CRCOG conceivably matches its theoretical allotment. Figure 10.7 shows the expected CRCOG transit expenditures, including a break out of some of the major projects.

Figure 10.5 – Expected Regional Transit Expenditures 2019–2045 (in 000,000s)



Operations and Maintenance Program Funding

CTDOT funds its operations and maintenance programs almost entirely with state funds. As a multimodal agency, this includes funding to maintain highways and bridges, and funding for operating and maintaining bus transit, rideshare, rail, and ferries. CTDOT’s 2018 budget for these items is approximately \$620 million statewide. Figure 10.8 shows a summary breakdown of CTDOT’s FY2018 budgeted operations and maintenance items. The two most significant portions of these costs are over 50% for public transit and almost 30% for personal services (which funds the majority of CTDOT’s payroll costs).

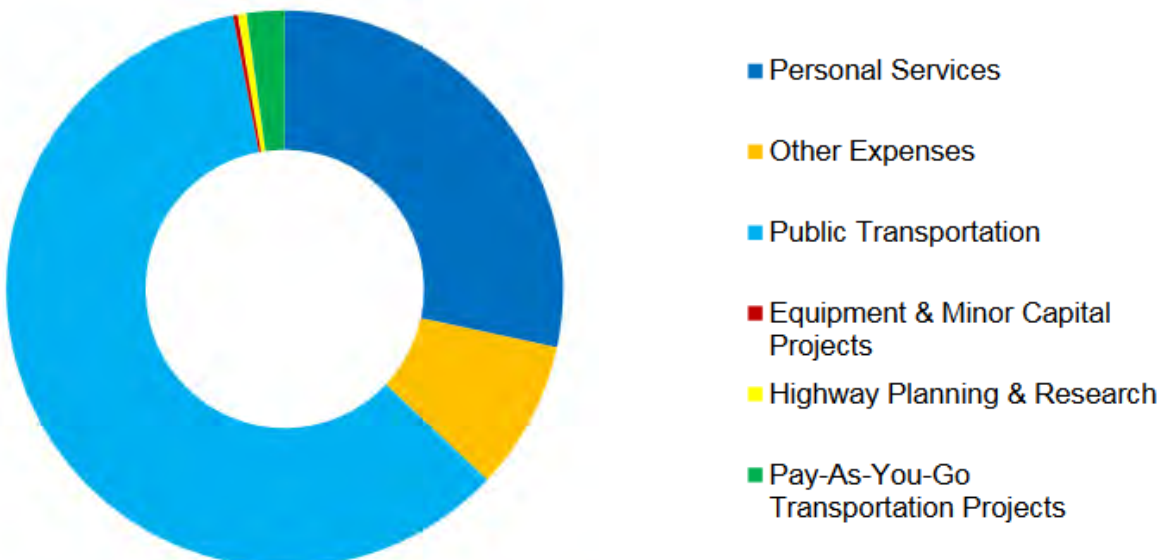
Assuming an increase of 3% annually through 2045, the total expected operations and maintenance these investments totals just under \$26.0 billion. Within CRCOG, these expenditures are proportionately estimated at just under \$7.3 billion.

Timetable for Implementation

The project list appearing in Appendix 5.1 also includes rough timeframe for the expected implementation of each project. This implementation timeframe is generally constrained to match funding availability and has resulted in prioritization within three categories: funding obligation within 5 years, within 10 years, and by 2045. This schedule is merely a financial planning tool that can be revised to reflect changing conditions. Factors such as delays in acquiring environmental permits, priorities elsewhere in the state, and availability of special discretionary funds could alter the schedule substantially.

DRAFT

Figure 10.6 – CTDOT Operations and Maintenance Budget – FY2018



Chapter 11

Innovative Finance

The Capitol Region's existing transportation funding resources, consisting largely of federal grants and the state's Special Transportation Fund, are described in the Financial Plan chapter. Those traditional sources, while obviously critical, fall short of the region's long-term needs and reinforce short-term thinking and strategies. This chapter explores how long-term transportation planning in the Capitol Region can be bolstered by new and innovative financing strategies, of which five are identified for further exploration:



Transit assets, like the newly refurbished Hartford Line and Amtrak train station in Windsor, are opportunities to attract private investment in the form of TOD and other value capture tools .

- Debt financing through the federal TIFIA and RRIF loan programs
- State legislation enabling regional transportation sales tax referenda
- Joint development at rail and bus rapid transit stations
- District value capture strategies, including tax increment financing
- Public-private partnerships to deliver specific transportation projects or components

As evident by this Metropolitan Transportation Plan's (MTP's) large "Unfunded Needs" projects (such as the I-84/I-91 Interchange Reconstruction), the region's needs exceed traditional funding allocations. CRCOG's role in evaluating such projects and influencing their direction remains critical; but their scale, cost, and breadth of impact require that the decision to undertake them, as well as the great majority of their funding, will occur at the state and federal levels. Within this current framework, the strategies identified in this chapter could contribute to overall project costs and feasibility.

There are other major regional projects, however, that could fall mostly, or completely "within CRCOG's reach"- projects like some of the station work on the Hartford Line, elements of the proposed CT**fastrak** expansion, or the half-dozen priority bus transit corridors that CRCOG has identified for improvements. These projects have traditionally been implemented by CTDOT, but with new funding sources they could be driven by CRCOG on behalf of CTDOT

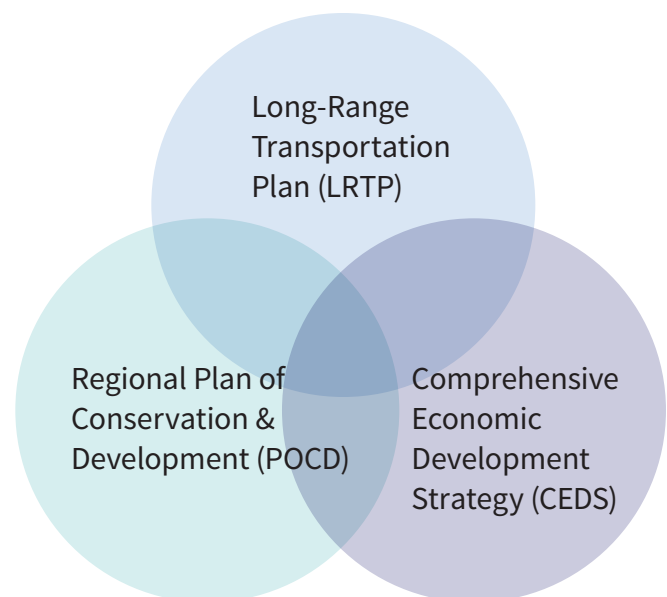
and other regional stakeholders. There are also a myriad of smaller, more local projects—many of them critical to sustainable mobility and development—that could be aggregated at the regional level into a thematic program of complete streets.

Innovative Funding Vision

In developing its MTP, CRCOG recognizes the need not only to identify additional funding, but to address the relationship between transportation funding, economic development, and institutional roles.

There is currently limited history in the Capitol Region (or in any of Connecticut's planning regions) of utilizing innovative financing methods to develop, advance, and fund regionally significant projects. One hurdle is the relatively flat trajectory of the Greater Hartford economy. An absence of steady growth depresses the yield of existing revenue sources, makes it more difficult to raise new

Figure 11.1 — **Coordination of Major Regional Policies**



revenues, and limits the scope of value capture financing methods. Innovative financing methods are mere concepts without the revenues to use them. There is also relatively little explicit linkage between transportation investments and economic development. That linkage is widely understood in the abstract, but there is no concrete “business case”; the Connecticut Institute for the 21st Century is undertaking such an analysis at the time this MTP is being prepared.

In this plan, CRCOG explicitly links long-range transportation planning to the regional Plan of Conservation and Development (POCD) and the region’s Comprehensive Economic Development Strategy (CEDS). CRCOG has previously identified transit-oriented development (TOD) and support for Economic Development Areas of Regional Significance as priorities. Making such coordination more programmatic and place-specific and having the relevant state agencies as partners in that process, would help generate better real-world outcomes, including more revenues.

To aid in such coordination, CRCOG envisions exploring the need for a Transit Oriented Development (TOD) focused agency, perhaps via a state-level “development

cabinet”. The need for a TOD agency is reflected in the current absence of robust coordination between the planning/design of regional transit stations (on the Hartford Line and CT**fastrak**) and the potential for transit-oriented development. With such coordination, transit stations could become growth and revenue generators, potentially even contributing to station design and costs. Union Station could be positioned as the hub of a future Hartford economy connected to Boston and New York by fast and frequent rail service. Windsor Locks Station could be positioned as a hub of bi-state economic development activity drawing on the synergy of Bradley Airport and the nearby downtowns of Hartford and Springfield.

The five strategies outlined below have the potential to support future transportation investments in the Capitol Region, either by raising new revenues, by attracting private capital to implement certain outcomes, or both. These strategies are by no means mutually exclusive, and some or all of them could be implemented in parallel over time. Each of them requires further technical, legal, and financial analysis, not to mention public policy debate, to be adopted.

“ The need for a TOD agency is reflected in the current absence of robust coordination between the planning/design of regional transit stations (on the Hartford Line and CT**fastrak**) and the potential for transit-oriented development.”

Federal Credit Programs: TIFIA and RRIF

In addition to the array of formula and discretionary grants described in the Financial Plan chapter, the federal structure also includes two credit programs, whose role in national transportation policy is slowly expanding. These programs were originally created in 1998, as part of the TEA-21 reauthorization bill, and were most recently reauthorized in the FAST Act.

TIFIA

The Transportation Infrastructure Finance and Innovation Act provides three types of financial assistance: direct federal loans to project sponsors; loan guarantees by the federal government to private lenders; and standby lines of credit that may be drawn on to supplement project revenues. At TIFIA's main borrowing window, project sponsors secure a direct loan from the US Treasury, at the Treasury's cost of money, for terms of up to 35 years and with a potential front-end grace period of up to five years. Eligible applicants include state DOTs, local governments, transportation authorities, public-private partnerships, or any legal entity approved by the Secretary of Transportation. Eligible projects include virtually any highway, transit, or rail project that would be eligible under the corresponding grant programs. Except as noted below, a project must be reasonably anticipated to cost at least \$50 million.

TIFIA is not a source of funds; it is a borrowing program. To use it, projects must have their own dedicated revenue streams. TIFIA loans may be repaid with annual state or local appropriations, private lease payments, transportation sales tax proceeds, tolls, user fees, tax increment or special assessment district revenue streams, or any other non-federal revenues pledged to pay the debt service and adequate to do so. Credit-worthiness is a primary evaluation criterion.

TIFIA not only provides credit on highly favorable terms; it also enjoys an annual appropriation that covers the cost of each project's Credit Risk Premium—the calculated cost to the Treasury of the below-market interest rate and the actuarial probability of default. Empirically, the Credit Risk Premium amounts to about 7% of the loan portfolio; thus, each \$1 of TIFIA appropriation leverages about \$14 in actual loans; since a TIFIA loan can constitute at most 49% of total project cost (and in some cases 33%), each \$1 of TIFIA appropriation leverages well over \$30 in total project investments. Under the FAST Act, the annual appropriation for TIFIA Credit Risk Premium is currently \$300 million—enough to leverage \$4.2 billion in new loans every year and about \$10 billion in total investment.

RRIF

The Railroad Rehabilitation and Improvement Financing Act makes direct Treasury loans for freight and passenger rail projects (including both intercity and regional or commuter services). While broadly similar to TIFIA (35-year loans at the Treasury's cost of money), RRIF is by definition more narrowly targeted and less versatile. Unlike TIFIA, RRIF has no appropriation for Credit Risk Premium; the borrower must pay that significant cost. On the other hand, RRIF can finance up to 100% of project costs, rather than 33% or 49% as in the case of TIFIA. RRIF has a statutory cap of \$35 billion in outstanding loan but is well below that ceiling.

Both Congress and the US Department of Transportation have sought to expand the use of TIFIA and RRIF. The programs are now administered side-by-side in the Department's Build America Bureau. Two very different projects—the Denver Union Station multimodal hub and the MBTA's Positive Train Control program—have actually used side-by-side TIFIA and RRIF loans to create marketable finance strategies.

For a public agency, a TIFIA or RRIF loan is an alternative to conventional tax-exempt bond issuance—trading the traditional tax exemption for the exceptionally low interest rate, long amortization term, and, in the case of TIFIA, the five-year grace period. Neither TIFIA nor RRIF has yet been used in Connecticut, but they could be used in conjunction with the other innovative strategies discussed below or

with an appropriation or pledge of traditional revenues. A range of opportunities could emerge, in the Capitol Region and statewide.

A Regional Sales Tax Measure

In many states outside the northeast, sales tax ballot measures constitute the principal method of funding regional or county-level transportation programs. Many successful referenda address a combination of highway and transit needs, while some are transit-only. In the last quarter-century, transportation sales tax measures have won at the ballot box about 70% of the time, across a broad spectrum of “red” and “blue” states. These approved sales tax ballot measures are often game-changing. The revenue streams they generate are typically used to support large-scale revenue bond issues that enable the affected DOTs, counties, or regional transit agencies to provide matching funds for federally-assisted projects and to fund additional projects on their own. Because percentage-based sales taxes are spread across the entire territory of the affected region or jurisdiction, they grow with the regional economy.

Under existing Connecticut law, there is no such thing as a regional transportation sales tax and no ability to create one. For CROCOG to advance a transportation sales tax initiative would require enabling legislation—presumably a statewide law allowing any MPO to undertake such an initiative at its option. This would be a complex undertaking, not only because it would ultimately involve asking

a regional electorate to approve a tax, but because counties—the unit of government most commonly associated with regional sales tax referenda in other states—have no substantive role in Connecticut. The counties as historic geographic groupings do not correspond to the state’s MPOs or transit districts, as they often do in other parts of the country. Consequently, a transportation sales tax referendum in the Capitol Region would be organized around CROCOG municipalities—either all of them, or (if the enabling legislation allowed) a subset of them, banding together to form a regional sales tax district.

Using sales tax revenues to fund transportation projects has a precedent in Connecticut: as noted previously, two slices of the existing statewide sales tax are dedicated to the Special Transportation Fund. Extending the idea to regional transportation programs would rely on two arguments:

- The new regional tax would be used for regional projects that voters see and experience in their daily lives. Successful referenda generally include a formally adopted list of projects that have been vetted and justified through a public process. Voters know which projects they are voting for, and the mobility, economic, and environmental benefits associated with the program.
- The dedicated sales tax revenues would be protected by a lockbox mechanism similar to that of the STF, and the tax would sunset at a specific date following the term of the revenue bonds.

Transportation Sales Tax Measures: Case Studies

In the last quarter-century, there have been numerous local-option sales tax referenda at the MPO, regional transit agency, county, or big-city level. An illustrative subset of such measures, with emphasis on recent examples, is summarized in Table 11.1 and described in greater detail in Appendix 6. While these case studies represent ballot box victories, not all referendum initiatives end that way. In the last two years, there were high-profile losses in Nashville and Austin, and of the success stories referenced below, several (like Denver and Atlanta) represent victories achieved only after earlier defeats. Others (like Phoenix) face a threat of new referenda seeking to repeal those that were approved.

This sampling of regional sales tax measures provides several important lessons. First, with the exception of the ST3 referendum in Greater Seattle, all of these measures have involved the sales tax only. The inclusion of motor vehicle “car tab” increases in ST3 has created a political and fiscal vulnerability. ST3’s inclusion of a property tax increase has not been replicated elsewhere, and given the sensitivity of property tax rates in Connecticut, would not seem advisable.

Second, some ballot measures have been transit-only, others a mix of highway and transit, and the track record is mixed—both types have won, both have lost, sometimes in the same jurisdiction. Third, while the give-and-take of creating an official, vetted program of projects is invariably controversial,

Table 11.1 — Examples of Regional Transportation Sales Taxes

Metro Region	Description
Salt Lake City	<ul style="list-style-type: none"> • 2000, a regional sales tax referendum to fund the TRAX light rail system. • 2015-2018: new 0.25% local option sales tax increment in several of the region’s counties.
Denver	<ul style="list-style-type: none"> • 2004: regional sales tax approved to fund the FasTracks regional transit expansion program. • The referendum was conducted in the eight-county RTD District. It raised the sales tax in the RTD District from 0.6% to 1.0%, projected to fund approximately \$4.7 billion in capital.
Phoenix	<ul style="list-style-type: none"> • 2015: voters in Phoenix approve city sales tax increase and extension. • Will fund \$31.5 billion, including six new light rail corridors, new BRT, street improvements.
Los Angeles	<ul style="list-style-type: none"> • A history of transportation sales tax wins dating back to 1980, combining roads and transit. • 2016: voters pass Measure M, the largest regional transportation sales tax measure in US history. It removes prior sunset and adds a ½ cent, estimated to generate \$120 billion.
Seattle	<ul style="list-style-type: none"> • A transit-only example. Sound Transit tax measures approved by voters in 1996 and 2008. • 2016: voters approve “ST3”, including sales, motor vehicle excise, and property tax increases, projected to generate \$54 billion in capital.
Atlanta and GA Statewide	<ul style="list-style-type: none"> • 2010: Legislature enables referenda on 1% sales tax in each of 12 regional planning districts. In 2012, nine of the 12 regions vote against, including the 10-county Metro Atlanta region. • 2016: three sales tax referenda approved (Atlanta, transit only and combined roads/transit; Fulton County, combined).
Tampa	<ul style="list-style-type: none"> • Hillsborough County: transit-only referenda defeated in 2010 and 2014. • 2018: 1 cent sales tax approved, projected to raise \$30 billion, split transit and roads.
Northern VA	<ul style="list-style-type: none"> • A different model: a legislatively mandated regional sales tax, rather than voter-approved. Northern Virginia Transportation Authority created by the General Assembly in 2002, including four and five independent cities. Both an MPO and a transportation provider. • In 2013, the General Assembly imposed a sale tax increase in the NVTA district, generating \$250 million annually for transportation.

having such a program has been essential in the winning campaigns. That said, the formal program—“what the voters were promised”—contains the seeds of future controversy if real-world events merit a change in plans, or if cost and schedule issues threaten timely completion of some projects.

Fourth, it is important to get the sunset issue right. With the exception of Los Angeles County’s Measure M (and the Northern Virginia Transportation Authority sales tax, which was not voter-approved), the case studies summarized here all have sunset dates. In the case of the original Georgia T-SPLOSTS, the expiration was only ten years out, making the issuance of long-term bonds impossible. In the other cases, the sunset date ranges from 20 years to 40. From a program standpoint, the longer the better, provided the voters agree. It is also advisable to be conservative in estimating the long-term yield of the sales tax, because if it grows more slowly than assumed, there will be a shortfall relative to expectations.

Finally, it should be noted that in Massachusetts, with institutional conditions broadly similar to those in Connecticut, legislation to allow regional transportation ballot measures was introduced and debated in the 2017-2018 session and is likely to be taken up again in 2019-2020. The proposed Massachusetts law would allow a single municipality, or two or more municipalities that choose to form a district, to levy a surcharge within their boundaries on any one (but only one) of

five existing taxes: the state sales, payroll, motor vehicle excise, or motor fuels tax, or the municipal property tax. Notwithstanding this flexibility, public discussion of the proposed bill has focused almost entirely on the sales tax, which is considered by far the most likely to be pursued.

Once approved by municipal officials, the proposed surcharge would have to be approved by the voters; in a multi-municipal district, the surcharge would take effect only in those municipalities where the referendum received a majority. Proceeds from the surcharge could be used only for transportation projects approved by the affected MPO. If enacted, this bill, like any other, could undergo substantive changes during the legislative process.

A hypothetical transportation sales tax in the Capitol Region. Connecticut currently levies a 6.35% sales and use tax throughout the state, with no provision for a local-option increment. A Capitol Region transportation sales tax, while affected by greater Hartford’s relatively flat economic trends, would still generate significant revenues. Table 11.2 summarizes the results of a high-level, illustrative estimate of the potential revenue yield under different sales tax rate scenarios. This exercise assumes that all 38 municipalities in the CRCOG region would be covered, rather than a subset.

The Connecticut Department of Revenue provides data on retail sales of goods by municipality. The total retail sales of goods in CRCOG region in 2017 was \$47.8 billion. This tax base has grown from 2013 to 2017 at a rate

of about 2.85% annually. This conservative rate of growth is applied to the existing base of retail sales, which is in turn multiplied by four different alternative incremental tax rates (0.2%, 0.25%, 0.5%, and 1.0%). The result is an annual sales tax revenue increase, in 2020 dollars, ranging from just over \$100 million a year to over \$500 million a year.

As shown in Table 11.2, the annual revenue stream from the transportation sales tax could be pledged to pay debt service on bonds for a voter-approved program of Capitol Region transportation projects. This borrowing would range from roughly \$1.5 billion under the lowest sales tax scenario (0.2%) to nearly \$8 billion if the regional tax were a full 1.0%. Whether these bonds would be issued by the state’s Special Transportation Fund on the regional district’s behalf, or by another issuing entity designated by the regional sales tax enabling law, is one of several structural questions that any such initiative would have to address.

Another is whether the regional sales tax

could be used to transform the Greater Hartford Transit District (GHTD) into a more robust transit agency. GHTD is a regional governmental unit formed under Chapter 103a of the Connecticut General Statutes. There are sixteen member municipalities; each appoints one to four members of the Board of Directors based population. GHTD has broad powers to acquire, operate, finance, plan, develop, maintain and otherwise provide land transportation services, including transportation centers and parking facilities. It has the statutory power to issue revenue and general obligation bonds. GHTD owns and operates Hartford Union Station and provides Paratransit service to the Greater Hartford and Greater New Britain regions. GHTD does not have a dedicated source of funding; almost all its revenues come from operating and capital grants (see the earlier discussion of FTA grant programs in the CRCOG region). As part of a regional sales tax initiative, the state could decide to use the GHTD organization and bonding authority to house an enhanced regional transit program.

Table 11.2 – Illustrative Estimate, Capitol Region Transportation Sales Tax

Total Annual Yield 2020			
Alternative 1	Alternative 2	Alternative 3	Alternative 4
Additional 0.20%	Additional 0.25%	Additional 0.50%	Additional 1.00%
\$104,006,890	\$130,008,612	\$260,017,224	\$520,034,448

Potential Sales Tax bond at 5% interest rate				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
20-yr bond	\$1,247,677,411	\$1,559,596,764	\$3,119,193,528	\$6,238,387,057
30-yr bond	\$1,590,914,191	\$1,988,642,738	\$3,977,285,477	\$7,954,570,953

Notes: CT 2018 Series General Obligation Bond – %5 coupon rate
Bond issuance costs, cost of funding a reserve fund, capitalized interest NOT included in calculation

Joint Development

There are two broad strategies for turning transit-oriented development into a transportation revenue source. One is joint development, which is described here; the other is district value capture, which is addressed in the next section. Joint development is the subset of TOD in which a transportation agency is directly involved in the development transaction and derives in cash or in-kind revenues directly from it. This can occur in either of two ways:

On-Site Joint Development

The transportation agency invites development to occur on its own property. Such development can occur on surplus land parcels (such as park-and-ride lots or station construction staging areas), as ancillary commercial development within the four walls of a station, or on air-rights above tracks, busways, or ramps. The developer, which is usually chosen through a competitive procurement, may pay the transportation agency in cash (by buying or leasing the development rights), in-kind (by funding, building, or maintaining station-related facilities or even the station itself), or a combination of the two. Most of the major rail transit agencies in the US have undertaken joint development of this type and have established formal joint development policies. Several agencies—BART in the Bay Area, LA Metro, WMATA in Greater Washington, MARTA in Metro Atlanta, the MBTA in Greater Boston—have delivered multiple projects and have large portfolios of sites in reserve.

Off-Site Joint Development

An adjacent developer funds and/or delivers station improvements, a replacement station, or a new station entirely. Such projects are often developer-initiated, and their viability depends on the economics of the particular site. This is an emerging business model in Greater Boston's MBTA system, where two new stations (Assembly Square on the Orange Line and Boston Landing on the Worcester commuter rail line) have been funded and delivered in whole or in part by adjacent developers. Yawkey Station, on the same commuter rail line, is being significantly improved by the adjoining developer, and at the Lynn River Works a bare platform is to be replaced as a full-service station by the adjacent developer. These examples are described in greater detail in Appendix 6.

Joint Development Versus P3S

In colloquial usage, joint development is often conflated with public-private partnerships (P3s), especially if the developer builds the station. While joint development might loosely be considered a form of P3, it is not what the infrastructure industry and finance industries normally mean by that term. P3 has no single, universally accepted definition, but it generally indicates a long-term, performance-based contract in which a private partner designs, builds, finances, operates, and maintains a traditionally public asset or service—a highway, transit line, wastewater treatment plant, port terminal, or

even a dormitory or prison. The potential use of transportation P3s in the Capitol Region is explored in a later section of this chapter.

Joint development and P3s represent two distinct specializations in the private market. Moreover, P3s have transaction costs, procurement costs, and risk factors that often dictate project cost thresholds far in excess of a \$25 or even \$50 million transit station. For a TOD developer, on the other hand, the transaction costs and risk factors lie primarily in the development itself; the smaller the required contribution to the station, the better.

Joint Development Potential in the Capitol Region

Joint development is potentially relevant to locations in the Capitol Region where there are transit stations and developable land.

Publicly owned land adjoining existing rail stations could be made available for on-site joint development through the issuance of developer RFPs, as could the park-and-ride lots associated with CT*fastrak* stations. In order to undertake such an initiative, however, several hurdles would need to be overcome. First, CTDOT as owner would need to establish a joint development process, create (or obtain through contract) a joint development analytic capacity, and determine, through market outreach and consultation with CROCG and the affected municipalities, which sites are potentially ripe for development. There is potentially a land assembly hurdle as well, since the CTDOT land at a given station may lack sufficient area, contiguity, or

station access to be developable on a stand-alone basis. And station-area development sites may be brownfields, making them priorities for the state's significant array of brownfields redevelopment resources.

A strategy for addressing some or all of these challenges may lie in partnering with the Capital Region Development Authority (CRDA). Created by the Legislature in 2012, CRDA has extensive project development and implementation powers within a designated district covering much of Downtown Hartford. It also encompasses a CRDA Regional District including all of Hartford and thstratee seven contiguous municipalities, where it is authorized to participate in project implementation if requested by local government.

The CRDA Board includes ex officio the Commissioner of CTDOT as well the Commissioner of Economic and Community Development, the Commissioner of Housing, and the Secretary of the Office of Planning and Management. CRDA could thus bring a development cabinet-like set of state program and policy interests. If CTDOT, CROCG, and CRDA chose to explore a joint development implementation role, a detailed analysis of CRDA's enabling legislation (PA 12-147) would be needed to determine if its existing powers are sufficiently aligned with the land assembly and project implementation needs of projects throughout its eight-municipality regional district.

The Capitol Region's most strategic joint development opportunities probably lie in the

future phases of the Hartford Line project and in the replacement of the I-84 Viaduct. In the case of the Hartford Line, the current stations are to be complemented by two entirely new stations (West Hartford and Enfield) and the replacement of three existing shelter stops with full-service, high-platform stations (Newington, Windsor, and Windsor Locks). These stations should be planned with joint development in mind to help fund the stations themselves and their related infrastructure.

To test this concept, a joint development RFP could be issued for one of the new stations, with the developer who gains the TOD rights required to build the station and to fund some or all of its cost. If there is a major adjacent, off-site land owner, they could be encouraged to bid on the project and deliver the station, as in the MBTA examples cited above. If successful, the joint development model could be replicated at each of the remaining stations, or for all of them as a package.

In the case of the I-84 Viaduct, the Lowered Highway Alternative, if adopted, would produce 40-45 acres of new developable land—some of it air rights, some terra firma, and much of it within walking distance of Union Station or the Sigourney Street CT **fastrak** station. Air rights development is commercially challenging (several Boston projects are only now advancing after languishing for years). The key is to have enough terra firma in the development envelope to mitigate the air rights cost premium, and to build at least the footings of the air rights deck as part of the transportation project.

The existing and expanded Union Station and the new TOD in its immediate walkshed could become a multi-modal, mixed-use transportation and development hub, similar to Denver Union Station (which opened in 2014) or Amtrak's legacy stations in Chicago, Baltimore, and Philadelphia, which are at varying stages of the joint development process. These four iconic downtown hubs include commuter rail, Amtrak, local rail transit, and bus terminals. Their designated developers pay for the land parcels, interior commercial space, and air rights, and are responsible for delivering and maintaining portions of the station improvements.

District Value Capture

While joint development captures value from a specific real estate project, district value capture does so from a defined area surrounding a transportation investment. There are two broad categories of district value capture: tax increment financing (TIF) and special assessment districts.

Tax Increment Financing

TIF is legislatively allowed, and is used to varying degrees, in 49 states and the District of Columbia. While state TIF statutes vary in important details, the model consists generally of drawing a defined district around the proposed public improvements and measuring the tax yield in a pre-project Base Year (or "year zero"). The tax yield in subsequent years is then divided into the "base" (which continues to flow in its entirety to applicable

taxing jurisdiction) and the "increment"—some or all of which is set aside in a dedicated fund to help pay for the public improvements. In most states, this can be done either on a pay-as-you-go basis or, for major projects, by using the TIF revenue stream to support TIF revenue bonds. TIF districts typically sunset once the TIF bonds have matured, and from that point on 100% of the district's revenues flow to the taxing jurisdiction. Most TIF statutes involve local government only (municipalities, school districts, and counties) and address only the local property tax; this is the case in Connecticut.

TIF is attractive to the real estate market because it is not a new tax; it is merely an alternative way of spending taxes that would be collected anyway. For the municipality, on the other hand, TIF revenues may be seen as a diversion of resources from other public priorities; local officials must weigh the likelihood that without the TIF-financed public improvements, the increment would not have occurred. An equally fundamental concern is whether the TIF will generate enough revenue to achieve its objective, especially in a relatively flat local economy. If the TIF district consists largely of built-out areas with modest infill opportunities, the incremental uplift may not be substantial. Success is more likely if the district consists mostly of vacant or underutilized properties with a very low base yield, so that most or all of the future revenue is incremental—provided, however, that the site is ripe for development, and that the revenue increment materializes in time to meet the TIF bond debt service obligations.

One strategy to mitigate this risk is to use the federal TIFIA program as the borrowing vehicle for TIF debt. This would take advantage of TIFIA's five-year front-end debt service grace period and 35-year amortization term. The 2015 FAST Act changes to TIFIA allow project costs as low as \$10 million for local infrastructure or TOD infrastructure. Also, the RRIF program can be used as the TIF borrowing vehicle for passenger rail stations; this was a key feature of the Denver Union Station financing package.

Connecticut lacks a strong history of using TIF, largely because its original TIF enabling law was complex and narrow. However, legislative changes enacted in 2015 have made the Connecticut TIF law more flexible and robust, providing terms of up to 50 years terms; local control and approval, which had been lacking previously; the explicit ability to finance public infrastructure as well as private development; the ability to use planned TOD or downtown revitalization rather than a traditional blight finding in justifying a TIF district; and the discretion to capture some or all of the TIF revenues. Under the 2015 law, TIF districts in a municipality cannot exceed, in the aggregate, 10% of the municipality's total valuation.

Providing the numbers work, a Connecticut municipality could use TIF as it exists today to finance a local transportation project, including streets, sidewalks, local shuttles, and other infrastructure components integral to TOD. On the other hand, to use TIF in support of a CTDOT project, especially a corridor-scale project spanning multiple

municipalities, would be more complex, requiring intergovernmental agreements that may not be explicitly contemplated in the 2015 TIF statute. Potential amendments could be considered, using examples from other states:

- **Texas** allows municipalities and counties to create special TIF districts known as Transportation Reinvestment Zones. The TIF revenues must be used for specific transportation projects, and the municipality is explicitly empowered to enter into an agreement with another public entity (including the state DOT) to transfer the TIF funds to them for implementation of the project.
- In **California**, an Enhanced Infrastructure Finance District (EIFD) can finance a variety of public improvements (including highways, streets, and transit) as well as certain private development (such as TOD and affordable housing). An EIFD can be created by a single municipality, multiple municipalities joining together for this purpose, or a county, and an EIFD can enter into a Joint Powers Agreement with the state DOT or a regional transit authority to undertake a project.
- A legislative proposal in **Massachusetts**, which was introduced in the 2017-2018 session and is expected to be reintroduced in 2019-2020, would enable a municipality to create a special TIF district by agreement with the state DOT. The TIF district would fund a specific highway, transit, rail, or ped-bike project undertaken by the DOT, the MBTA, or one of the state's smaller regional

transit authorities. By implication, multiple municipalities along a corridor could form a coordinated series of such districts; it would be desirable if this were authorized explicitly.

Special Assessment District

Special assessment districts (SADs) are the mirror-image of TIF districts. They are established for the same purpose: to generate an annual stream of revenues that can be used to finance a set of value-generating public improvements. In an SAD, however, rather than divert the incremental portion of local taxes that would have been paid anyway, a new surcharge is levied. Usually this surcharge is an addition to the property tax, assessed on an ad valorem basis and collected on the municipal tax bill, but state enabling laws vary. Depending on the state, the surcharge may apply to all property, new development, or a combination of the two; some states, but by no means all, exempt existing residential properties.

The establishment of a SAD typically requires the approval by the owners of a majority of the affected classes of property. At least for those owners opposed to the creation of a SAD, it is less desirable in principle than a TIF. From the municipal perspective, on the other hand, a SAD may be preferable, since it avoids the issue of diverting regular property taxes from the general treasury. Financially, if a SAD includes existing properties, it may provide a revenue stream that is more predictable than that of a TIF and more immediate, since it does not depend on the pace of new development.

Connecticut's 2015 TIF enabling law, described previously, allows a municipality that creates a TIF district the option of also creating, by municipal action, a coterminous SAD. This option might be exercised for two reasons: to hedge the cost of financing the new public projects between the tax increment and a tax surcharge; or to create a reliable revenue stream in the early years of the district—before the anticipated new development has fully materialized—so that the ability to pay TIF bond debt service is assured.

There are interesting examples in several states of robust SAD mechanisms that can be used to finance major transportation improvements. Replicating this concept in Connecticut, particularly in situations unrelated to the 2015 TIF law, would require legislative changes. Virginia, for example, allows the creation of a Transportation Improvement District (TID) to fund transportation projects upon petition by the owners of at least 51% of taxable property in the proposed district. Single-family homes are excluded. The law specifies a statutory maximum rate of up to \$0.40 per \$100 assessed value. To cite two prominent examples, one transit and one highway:

- In 2004, Fairfax County created a TID to levy a special assessment on commercial and industrial properties to help bond-finance the Dulles Metrorail Phase I extension. Landowners representing a majority of the relevant valuation in the Tyson's Corner and Reston-Herndon commercial areas petitioned in favor of the TID.
- Fairfax and Loudon Counties, in conjunction with the Virginia Transportation Board, created the State Route 28 Highway TID. Revenues supported a bond issue to cover about 75% of the costs of this major highway project.

California's Mello-Roos Community Facilities Act allows any county, city, special district, school district, or joint powers authority to create a Community Facilities District (CFD), requiring a two-thirds vote of residents in the proposed district. Because the special tax cannot be based on assessed valuation, it is based on a mathematical formula that takes into account property characteristics such as use, square footage, and lot size. CFDs are allowed to issue debt.

District value capture and joint development are not mutually exclusive. On the contrary, they can be, and often are, used in tandem. An iconic national example is Denver Union Station, where TOD effectively paid nearly \$200 million of the \$489 million cost of the rail, bus, and public realm improvements. On the joint development side, five on-site parcels were sold to the master developer, generating \$38 million in real estate proceeds. On the value capture side, somewhat larger tax increment and special assessment districts were formed (including the on-site joint development as well as several adjacent blocks), generating sufficient annual revenues to support a \$155 million RRIF loan.

In the CROCOG region, rail and CT**fastrak** stations could be fitted with value capture districts, covering any joint

development that might occur as well as the surrounding properties. To the degree that TOD occurs, the joint development contribution and the district's annual revenue stream could combine to fund the new or replacement station as well as the surrounding streets and sidewalks.

Public-Private Partnerships

Public-Private Partnerships (P3s) are long-term, performance-based contractual arrangements between a public sponsor and a private entity (often a consortium of firms) to deliver facilities and services traditionally provided by the public sector. P3 is sometimes referred to as “project finance”, because it involves creation of a Project Company/Special Purpose Vehicle to deliver the project. P3 procurement is frequently applied to projects that are capital-intensive, highly specialized, or both, requiring risk sharing, technical acumen, and innovation on the part of the private partner.

In a P3, the public sponsor typically allows the private entity to collect any relevant user fees (tolls, fares, water bills, dorm rents). For projects that are inherently cash-negative (like US transit lines), the sponsor compensates the private partner through a specialized model, such as availability payments.

Specialized Transportation Elements

There are several examples of specialized procurements that lend themselves to the P3 model and could potentially be replicated in the Capitol Region:

- **Highway or Streetlight LED/SMART Lighting.** P3s have been introduced in recent years to convert fluorescent lighting to SMART LED lighting on both city streets and highways. The Michigan Freeway Lighting project is a 15-year contract to install and maintain 15,000 energy-efficient LED lights, with about \$145 million in capital and maintenance costs. The contractor brings private equity and financing and will increase lighting availability from 70% (operational prior to P3) to 95% (target) and invest in upgrading of old poles.
- **Broadband in DOT right of way.** The Pennsylvania Turnpike Commission is procuring fiber optic cable along the 550-mile Pennsylvania Turnpike and its extensions. The private partner will design, build, finance, operate, and maintain broadband infrastructure over a 30-year period. The project will support the expansion of cashless toll collections, as well as provide connectivity for the agency's administrative buildings, maintenance sheds, tolling systems, traffic cameras and dynamic message signs. Similarly, the Virginia DOT is procuring a private partner to develop statewide fiber optic and wireless broadband system.

- **Bus-shelters.** In 2005, the Washington, DC DOT entered a 20-year Bus Shelter Franchise agreement with Clear Channel to enhance the safety and convenience of bus transportation and provide bus shelters at no cost to the District. Clear Channel provides and maintains the new bus shelters and generates revenue from the sale of advertising on the bus shelters.

Rail Transit Corridors

At least three corridor-scale rail transit lines in the US have been developed as P3s. Described in greater detail in Appendix 6, these include:

- **Denver Eagle Partnership**, which designed, built, financed, operates, and maintains three commuter rail lines emanating from Union Station and operates the Union Station train shed
- **Maryland's Purple Line**, a 21-mile circumferential light rail corridor
- **Florida's Brightline**, a wholly private undertaking combines intercity rail with joint development

Each of these P3 rail corridors interfaces with, but is financially and operationally separate from, other rail transit services. For CTDOT to consider using the P3 model at corridor scale—for example, to complete the double-tracking, new stations, and rolling stock acquisitions on the Hartford Line, or to create the proposed expansion of CT**fastrak**—the threshold question of a stand-alone entity would have to be solved. In theory, a P3 procurement could include operation of the existing Hartford Line or CT**fastrak**, respectively, but CTDOT would

have to determine whether operations could be separated, realistically and practically, from the larger rail and CT**transit** systems.

As part of their finance packages, the Denver Eagle, Purple Line, and Brightline projects each took advantage of Private Activity Bonds (PABs), a federally-enabled mechanism that allows tax-exempt bond financing for certain P3 projects as if they were being built by public agencies. Access to PABs, and other technical support for P3s, is provided by the Build America Bureau of the US DOT, the same Bureau that manages the TIFIA and RRIF programs.

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Implementation Schedule

Ongoing Actions

Innovative Financing

Further explore implementation of the innovative funding strategies

- Review the benefits and challenges of implementing the following:
- Debt financing through the federal TIFIA and RRIF loan programs
 - State legislation enabling regional transportation sales tax referenda
 - Joint development at rail and bus rapid transit stations
 - District value capture strategies, including tax increment financing
 - Public-private partnerships to deliver specific transportation projects or components

Promote Innovative Financing Pilot Projects

Identify and advocate for innovative financing pilot projects that test their viability and the regional market for them

Advance the Idea of a Transit Oriented Development (TOD) Focused Agency

Highlight the need for a Transit Oriented Development (TOD) focused agency, perhaps via a state-level “development cabinet”

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Chapter 12

Environmental Justice

The Capitol Region Council of Governments is committed to fully integrating the principles of environmental justice (EJ) into all its transportation planning programs and activities. These principles include:

- 1. EJ Outreach** – Reaching out to involve minority groups and low-income groups in the planning process
- 2. Addressing EJ Transportation Concerns** – Preventing “disproportionately high and adverse” impacts of transportation decisions on minority groups, low-income, and transit dependent groups
- 3. Equity Assessment** – Assuring these same groups receive a proportionate share of benefits



Transit stop in Hartford, CT

Since the early 2000s, CRCOG has made substantial progress in advancing its commitment to these core principles. The sections below highlight CRCOG's recent efforts and policies in each of these areas.

EJ Outreach

In 2016, CRCOG integrated its Public Involvement Plan, Title VI Program, and Environmental Justice and Limited English Proficiency (LEP) Policies into a single, overarching Public Participation Plan. The latest Public Participation Plan outlines CRCOG's commitment to involving minority and low-income groups in its planning process to develop plans and programs that provide an equitable distribution of benefits and burdens.

To help ensure appropriate outreach at a policy level, CRCOG's Transportation Committee structure includes a representative from the Connecticut Coalition for Environment Justice (CCEJ). This provides an ongoing opportunity for environmental justice communities to be involved in the transportation planning process.

Additionally, CRCOG committed to customizing its outreach efforts to reach underserved populations, including the significant populations of Spanish and Polish speakers within the region. While scoping its transportation studies, CRCOG routinely performs an EJ assessment of the study area to determine any special needs of affected populations. CRCOG routinely publishes legal notices, meeting notices, study summary documentation, and other

relevant information in various formats and publications that target all major affected populations. These notices are provided in Spanish and/or Polish if such populations are being affected. For this MTP, CRCOG published meeting notices in Spanish and Polish language as well as provide translators in the focus group meetings to provide opportunities to LEP populations to participate and provide their opinions and concerns.

Outreach specific to this MTP update effort included hosting an EJ focus group meeting to understand and strategize ideas to better serve and reach various underserved populations and identify their transportation concerns. Participants in the focus group included multiple organizations that routinely work with underserved populations. Representatives from the University of Hartford, Department of Rehabilitation Services, Capital Community College, Center for Latino Progress,

Figure 12.1 – Public meeting for this MTP held at Capital Community College



Way to Go CT and Disability Rights CT provided outreach recommendations and emphasized several transportation concerns of underserved populations, including:

- ADA compliance for all modes of transportation
- Equity over equality, recognizing that people without mode choices require greater consideration
- Implementation of Complete Streets for safety and first/last mile considerations
- Reduction of single occupant vehicle rates
- Improvements to transit services, facilities, and information
- Coordination with community partners to better reach citizenry

Ongoing Actions

1. EJ Analysis. Continue to conduct EJ analysis during the scoping process of all CRCOG initiated studies to determine necessary outreach activities.
2. EJ Representation. Continue the involvement of an Environmental Justice representative on the Transportation Committee.

Addressing EJ Transportation Concerns

The Capitol Region is home to about 375,000 households, about ten percent of which are without access to personal vehicles and are dependent on public transit, biking, and/or walking. Most of these households are concentrated in and around urban areas and therefore access to reliable public transportation as well as safe bike and pedestrian facilities are vital to economic well-being of this population. CRCOG believes the following transportation improvements are crucial to addressing EJ concerns and is committed to supporting efforts which lead to their implementation.

Better Transit Service

The region's regular transit service is not a convenience, but rather a necessity for transit-dependent residents who depend on the service for virtually all their transportation needs. CRCOG, in partnership with CT**transit** and the Connecticut Department of Transportation (CTDOT), has completed a Comprehensive Service Analysis of bus service in the Hartford (2017) and New Britain/Bristol (2018) Divisions of CT**transit**. This study included a detailed review of the existing CT**transit** service and provided recommendations for improving service to meet the region's needs. Recommended improvements to the transit system are further discussed in Chapter 2 of CRCOG's MTP.

Rapid Transit System

CT**fastrak**, Connecticut's first bus rapid transit system, came into service in March 2015 and operates along a bus-only guideway between Hartford and New Britain. CT**fastrak** also provides connections to many local and express bus routes. The CT**rail** Hartford Line began providing commuter rail service in June 2018 between New Haven and Springfield. These rapid transit services have been extremely successful and are exceeding their goals to meet the needs of both transit-dependent and choice riders.

Clean Fuel Vehicles

Diesel emissions can pose a health hazard in urban neighborhoods where asthma rates are often higher than in suburban neighborhoods. The reducing diesel emissions in the region continues to be a priority. To address this, CT**transit** has procured buses that run on biodiesel fuel and hybrid electric powered buses. CTDOT has also begun expanding its fleet to include electric vehicles in other areas of the state and continues to look for opportunities to do so in the Capitol Region.

Pedestrian & Bicycle Safety in Urban Areas

Pedestrian and bicycle safety is an important issue that affects minority, low-income, and transit-dependent households living in more urbanized communities. More than ten percent of the residents in the region do not own an automobile, and for many of them,

walking and riding a bike is an important means of travel. However, pedestrians and cyclists face many safety hazards in urban areas where traffic volumes are high. Data from the UConn Crash Repository showed that the rate of pedestrian crashes in Hartford, which is nearly three times higher than any other town in the region, illustrates the serious nature of these urban hazards.

Recommendations

- 1. Better Bus Service** - CROCOG should continue to support better bus service as part of its environmental justice program. CROCOG should also continue its efforts to address bus stop issues and lack of investment in these critical transit portals.
- 2. Rapid Transit** - Rapid transit services should be designed to serve the needs of transit dependent residents as well as those with access to automobiles. Improving connections to transit stations should be evaluated.
- 3. Support Clean Fuel Vehicles** - Support CT**transit** efforts to reduce transit-related emissions of all types and support efforts to reduce diesel emissions from transit vehicles.
- 4. Pedestrian and Bicycle Safety** - CROCOG's transportation plans, policies, and programs should continue to work toward the goal of improving pedestrian and bicycle safety in urban areas of the region.

Equity Assessment

CROCOG reviews its plans and projects to ensure that there are not any disproportionately high and adverse impacts on minority groups, low-income, and/or transit dependent groups; and to ensure that these same groups receive a proportionate share of benefits. For corridor studies, recommendations are made to better integrate land use and transportation planning in order to mitigate adverse effects on minority, low-income, and/or transit dependent populations. CROCOG also conducts an equity assessment for each major update of the Transportation Improvement Program (TIP). CROCOG's goal is to ensure an equitable process that does not result in a distribution of benefits that is discriminatory.

CROCOG prepares equity assessment for each major update of the TIP to determine whether minority and low-income communities are receiving a fair share of funding and benefits from CROCOG's transportation programs. This analysis first identifies "target areas" with large concentrations of low-income or minority populations. Data from Census 2010 showed approximately 32.3% of the region's population lives inside the minority and low-income target areas. This proportion serves as a general benchmark or guideline for the equity assessment, and it is therefore expected that a similar percentage of the region's transportation funds would be spent in the target areas. While this might not be the case for any single TIP, over the long term the distribution of funds should be roughly proportionate to the distribution of the population.

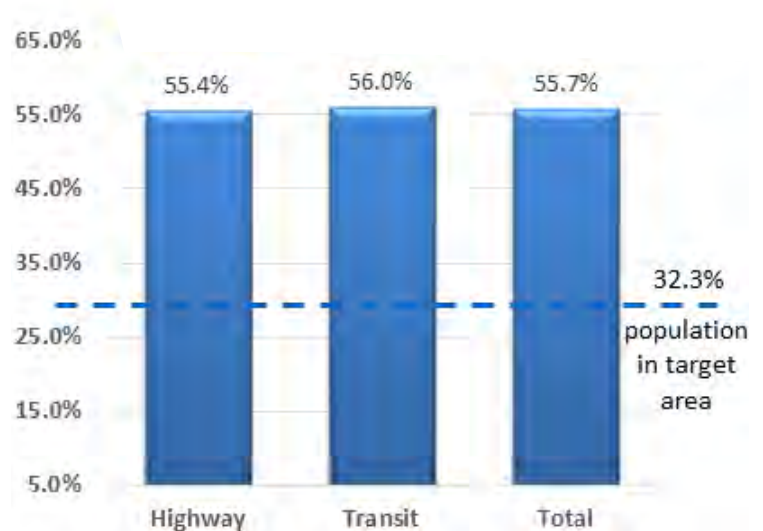
2018-2021 TIP

CROCOG prepared its latest Equity Assessment on the FFY 2018-2021 TIP in July 2017. Based on the results of the equity assessment, there did not appear to be any bias in distribution of transportation funds and projects in the TIP. As illustrated in Figure 12.2, about 55.4% of highway and 56.0% of transit funds are being invested in the target area. This equates to 55.7% of total funding, whereas only 32.3% of the region's population live in the target area. Therefore, CROCOG is investing a higher proportion of transportation funds in the target area than would be expected based on the size of the population in that area.

Longer Term Trend

As mentioned previously, the four-year TIP is only a snap shot of projects programmed for that specific period. Figure 12.3 shows a consistent trend of equitable investment in the target area when compared to the percentage of people living in that area. Currently 32.3% of residents live within the target area in 2017,

Figure 12.2 — Percent of TIP Funds in EJ Target Areas



up from 31.2% in 2015. This increase can be attributed to changes in demographic and socio-economic conditions as well as the change in CRCOG’s regional boundary that was implemented in 2015. When compared to the previous TIP and the new TIP, the highway “share” slightly dropped to 55.4% while the transit “share” rose to 56%. The assessment concluded that over the long term, there continues to be no bias in the distribution of transportation funds and projects listed in the TIP. Figure 12.4 shows the region’s EJ areas along with the FFY 2018-2021 TIP proposed projects overlaid upon the region.

Recommendation

- 1. Equity Assessment** - Continue to perform Equity Assessments on each major TIP update in accordance with CRCOG’s Environmental Justice Policies.

Figure 12.3 – Trend of Funds in Target Areas (%)

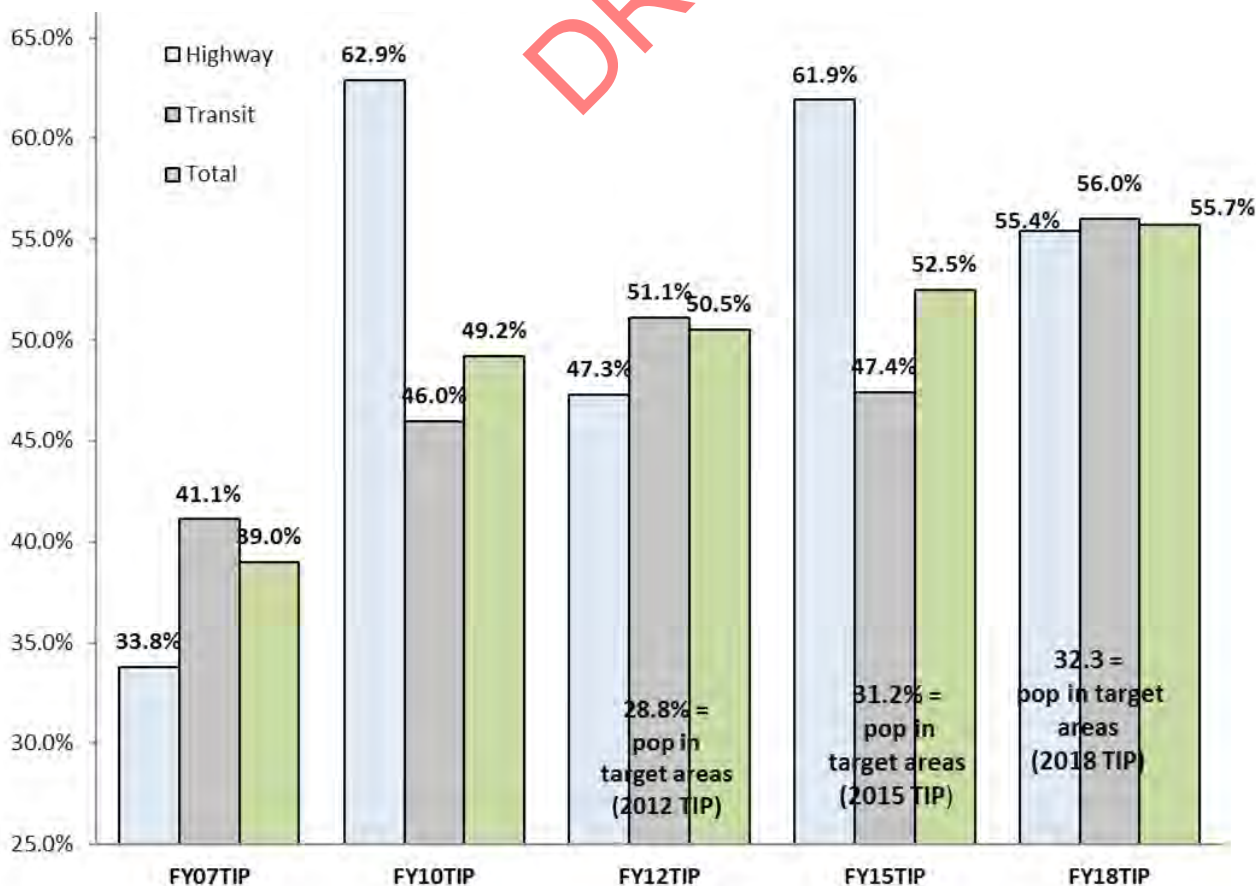
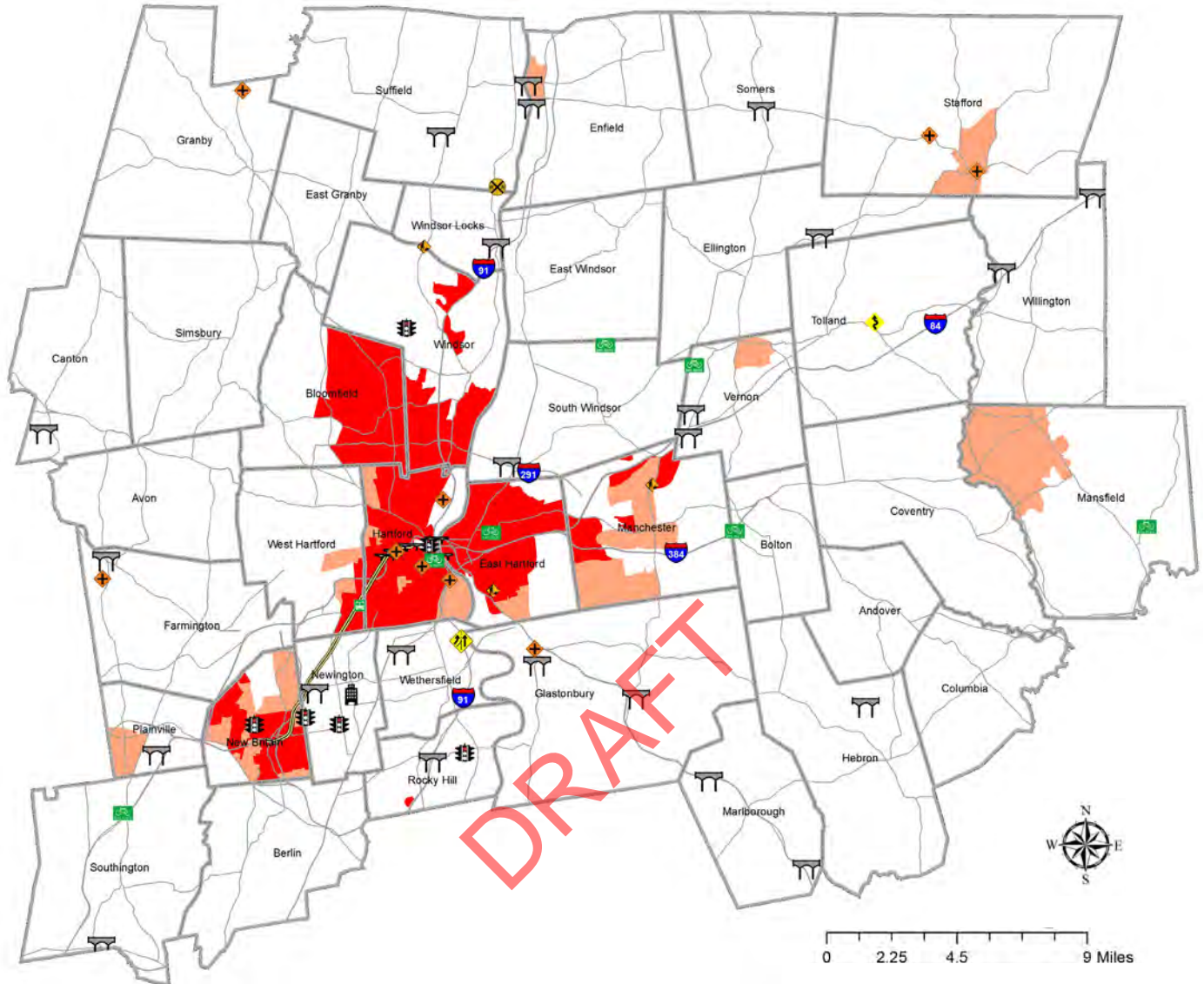


Figure 12.4 – Environmental Justice Target Areas and TIP Projects



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- Projects**
-  Transit-Operation
 -  Bridges
 -  Freeway-operational
 -  Roadway-safety
 -  Roadway-signals
 -  Roadway-reconstruct
 -  Roadway-intersection
 -  Railroad crossing
 -  Bike Ped
 -  Highways Operations

- EJ Target Area**
- Primary Target Area*
 - Secondary Target Area**

* Primary includes any block group that has at least 50% minority population according to the 2010 Census.

** Secondary includes additional census tracts that has at least 20% low-income population (household income 150% or below the Census poverty threshold, by family size) according to the ACS 2011-15 estimate.

Prepared by the
Capitol Region
Council of Governments
June, 2017

Source:
Census2010 SF3 P042
ACS 2011-2015 5 year estimate
Tele Atlas Road Network

Implementation Schedule

Ongoing Actions

Environmental Justice Outreach

EJ Analysis	Continue to conduct EJ analysis during the scoping process of all CROCOG initiated studies to determine necessary outreach activities.
EJ Representation	Continue the involvement of an Environmental Justice representative on the Transportation Committee.

Addressing Environmental Justice Transportation Concerns

Better Bus Service	CROCOG should continue to support better bus service as part of its environmental justice program. CROCOG should also continue its efforts to address bus stop issues and lack of investment in these critical transit portals.
Rapid Transit	Rapid transit services should be designed to serve the needs of transit dependent residents as well as those with access to automobiles. Improving connections to transit stations should be evaluated.
Support Clean Fuel Vehicles	Support CT <i>transit</i> efforts to reduce transit-related emissions of all types and support efforts to reduce diesel emissions from transit vehicles.
Pedestrian and Bicycle Safety	CROCOG's transportation plans, policies, and programs should continue to work toward the goal of improving pedestrian and bicycle safety in urban areas of the region.

Equity Assessment

Equity Assessment	Continue to perform Equity Assessments on each major TIP update in accordance with CROCOG's Environmental Justice Policies.
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Chapter 13

Public Involvement

This chapter summarizes three specific public involvement efforts:

- Related Community Involvement Efforts completed on studies and plans since the publication of the 2015 Long Range Transportation Plan;
- Public / Stakeholder involvement for certain components of this updated plan; and
- Public Involvement activities conducted specifically for this Plan Update.

The following summarizes these efforts.



Public meeting held for the Farmington Gap Closure Study

Related Community Involvement Efforts

Regional Plan of Conservation and Development – May 2014

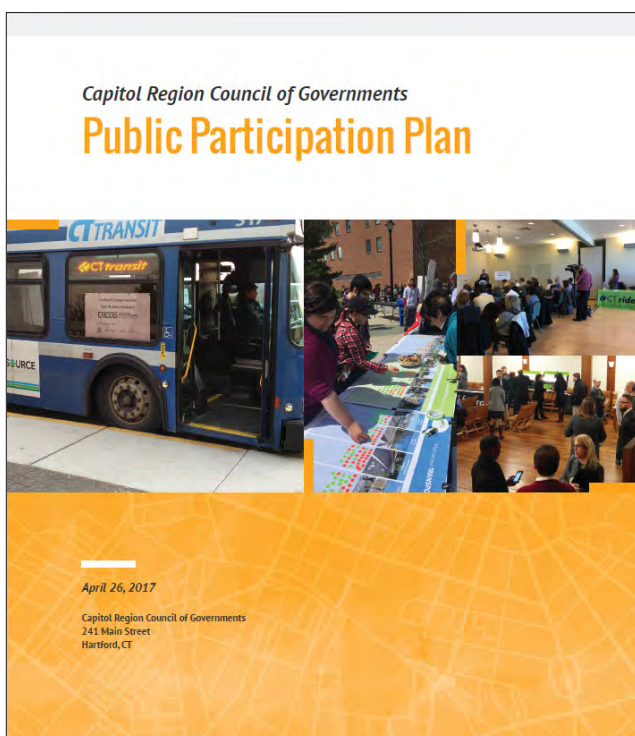
In 2014, CRCOG updated the regional Plan, now entitled, the Capitol Region Plan of Conservation and Development: Vibrant, Green, Connected, Competitive. The update followed the receipt of a Regional Sustainable Communities grant from the U.S. Department of Housing and Urban Development and was meant to integrate sustainable development principles into the plan. At 12 different meetings, CRCOG worked to present new and revised draft chapters of the regional Plan to the CRCOG Regional Planning Commission, whose members provide a liaison back to municipal planning and zoning commissions.

Following the state statutory process, the Draft Regional Plan was posted for a 60-day public comment period in February 2014 and two formal Public Hearings were held in March 2014. All public comments received were compiled in a public comment matrix which organized comments by the chapter or map to which they referred. The matrix also highlighted how each comment was addressed in the updated Plan. This matrix was posted on the CRCOG website and reviewed by the Regional Planning Commission at their April 2014 meeting. At that meeting, the Regional Planning Commission endorsed the plan for review by the CRCOG Policy Board, and the Policy Board approved the Plan at its May 2014 meeting.



Capitol Region Intelligent Transportation Systems Strategic Plan – March 2015

The Capitol Region ITS Strategic Plan was a CTDOT-managed project, however, CROCOG was significantly involved throughout its development. Central Connecticut Regional Planning Agency (CCRPA) and the Lower Connecticut River Valley Council of Governments (RiverCOG) planning staff were invited to all strategic planning meetings and provided input to the Plan. A wide-ranging group of stakeholders provided information about existing conditions and needed transportation technologies. CTDOT highway operations staff, CROCOG staff, and the project consultant held one-on-one meetings with municipal staff (including planners, public works, and traffic signal operators). The team also held a group sessions with first responders and transit operators in the three regions.



2018-2021 Transportation Improvement Program

In FY2017, CROCOG and the Connecticut Department of Transportation (CTDOT) developed the 2018-2021 TIP for the Capitol Region. A draft of the document was released on June 8, 2017, and legal notices appeared in five local papers, including two notices in Spanish, one in Polish, and one in a minority-focused publication. A public information meeting about the TIP was held on June 26, 2017, and the public was invited to provide comments through email, mail, over the phone, in-person, and at Transportation Committee and Policy Board meetings (June 26, 2017 as well as one in early FY2018). At the same time, CROCOG provided an updated Air Quality Conformity Assessment for review and comment. Both documents were adopted in early FY2018. CROCOG also continued to develop its online interactive TIP map. This website presents the TIP in a graphical format with lines and dots representing regional TIP projects. Pop-up boxes and linked PDF files provide all the same detail that is provided in the regular TIP, but in an easier to use, project-focused format. CROCOG maintains a similar website for the non-federal Local Transportation Capital Improvement Program (funded by the State of Connecticut).

Capitol Region Council Of Governments Public Participation Plan – April 2017

CROCOG conducts an extensive multi-modal transportation planning program that is guided by federal regulations and its Public Participation Plan. This Plan update was released in 2017 and explains the methods CROCOG uses to provide open and inclusive public participation in its transportation planning process, allowing individuals who are affected by transportation decisions a say in how decisions are made. The Plan describes CROCOG's goals, policies, and procedures to ensure that all members of the public, including underserved populations, have access to information and opportunities to participate in the transportation planning process for the Hartford metropolitan area. CROCOG's intent is to provide reasonable access to information, timely public notice, and support for early and continued involvement of the public in the regional transportation planning process. The Public Participation Plan serves as a guide for citizens to understand CROCOG's public participation approach and how to get involved in shaping the future of transportation for the 38 communities in the Capitol Region.

Comprehensive Transit Service Analysis

CROCOG initiated a transit study of the CT *transit* Hartford Division in FY2015, and this effort was completed in FY2017. An Advisory Committee was assembled representing key stakeholders to oversee the study; members include CTDOT Policy and Planning, CTDOT Public Transit, CT *transit* (HNS Management), the Greater Hartford Transit District (GHTD), Travelers Parking and Mass Transit, Manchester Community College, Connecticut Coalition for Environmental Justice, City of Hartford, Town of Manchester, Town of West Hartford, Town of Windsor, and Town of South Windsor. During FY2017, an Advisory Committee meetings was held in November 2016. CT *rides*, Way to Go CT, and UConn (THub initiative) were also engaged throughout the study.

A study website (<http://hartfordtransitstudy.com>) provided the latest information and access to key study documents. CROCOG maintained an interested parties list, and these individuals received notifications of all meetings and document review opportunities. Four public outreach events were conducted in November/December 2016. Public notices advertising the events in English and Spanish were posted on CT *transit* local buses. Notices were also sent to Town Clerks and libraries for posting. No requests for translation services were received. The four open house events drew a total of 31 attendees including public officials, bus advocates, transit riders, and other interested individuals. The purpose of these events was to present the final recommendations of the study and receive any remaining public comment. The recommendations of the study

were endorsed by CRCOG’s Transportation Committee and Policy Board in April 2017.

During FY2016, the Comprehensive Transit Service Analysis was expanded to include an analysis of the New Britain/Bristol Divisions of CT**transit**. In FY2017, this extra work effort included coordination with stakeholders including CTDOT Policy and Planning, CTDOT Public Transit, CT**transit** (New Britain Transportation and Dattco), City of New Britain, City of Bristol, Town of Berlin, Town of Southington, and Town of Plainville. A study website (<http://hartfordtransitstudy.com/new-britain-bristol>) provides the latest information and access to key study documents. CRCOG maintains an interested parties list, and these individuals receive notifications of all meetings and document review opportunities.

During FY2017, CRCOG staff worked with their consultant to create an online survey to better understand transit needs and priorities among current and potential bus

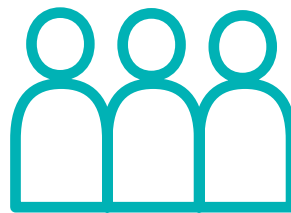
riders in the service area. This survey, which was available online and at public outreach events, received 84 responses. Six public outreach events were conducted in April 2017. Public notices advertising the events were posted on CT**transit** local buses, at town halls, and at libraries. The posters included contact information in English, Spanish, and Polish for individuals to request translation services; no such requests were received. The two open house events drew a total of 22 attendees including public officials, bus advocates, transit riders, and other interested individuals. Four informational sessions at CT**transit** and CT**fastrak** bus stops allowed the study team to engage with additional transit riders and bus drivers who may not be able to attend a traditional evening meeting. The purpose of these events was to receive public comments on potential service scenarios for improving the existing transit system, including consideration of the creation of local bus service in Southington.

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Outreach methods used in the Gap Closure Trail Study



- Newsletters
- Newspaper advertisements
- Press releases



- Public information meetings
- Interactive public workshops
- Study team attendance at public events
- Town council meeting presentations
- Five “pop-up” events in both communities (new britain and plainville)
- Seven community outreach meetings
- 12 Focus groups



- online surveys
- a study website

Regional Complete Streets Inventory, Action Plan, and Policy

This project, funded by a grant from the State of Connecticut, is intended to produce a complete streets plan and policy for the region, replacing the region’s current bike/ped plan. A robust public outreach process was included in the scope of the study, which is ongoing. Activities include:

- Pop-up events at commuting events and festivals
- Two multi-day open planning studios
- Public online surveys
- Interactive mapping exercises
- Translation of materials into Spanish
- Workshops
- Two short-term demonstration projects

The study is anticipated to be completed in mid-2019.

Gap Closure Trail Study

This study aims to complete the Farmington Canal Heritage Trail through Plainville and find a route for a connection to the CT**fastrak** multiuse trail in New Britain. An analysis of LEP and EJ areas in the study area revealed a significant EJ population in New Britain, as well as two LEP groups: Spanish and Polish. This analysis was detailed in a memo distributed to study participants.

A Steering Committee (SC) was formed to guide the study and is comprised of town/city employees, CTDOT staff, local advocacy groups, the Plainville-Southington Health District, and the Connecticut Department of Energy and Environmental Protection.

The SC held their first meeting in FY2016 and adopted a Public Engagement Plan that incorporated the results of the Limited-English Proficiency and Environmental Justice Areas analysis memo and included significant outreach efforts to LEP and EJ populations.

The Public Engagement Plan included a broad array of outreach methods, including public information meetings, interactive public workshops (“charrettes”), newsletters, online surveys, study team attendance at public events, town council meeting presentations, a study website, newspaper advertisements, and press releases. Public information meetings and collaborative workshops have seen robust participation.

While meeting attendance has been strong, the team also employed other methods to increase engagement among people with time constraints. This is especially

Figure 13.1 — Complete Streets public outreach event



true of New Britain, where attendance has lagged behind Plainville. To reach these populations, the team conducted five “pop-up” events in both communities.

Throughout the study period, hundreds of people attended one or more of the seven community outreach meetings that were held at various locations. For each public event, numerous methods were employed to get the word out. Flyers were created for each event, translated into Spanish and Polish, and distributed throughout the area. Particular attention was paid to lower-income areas and areas with a concentration of limited English proficiency individuals in New Britain. Locations included: the YMCA, YWCA, town/city halls, libraries, supermarkets, museums, the New Britain Downtown Visitor’s Center, Central Connecticut State University, cafes, and restaurants. The team also distributed press releases to English, Spanish, and Polish language media outlets. At least one newspaper article was written prior to each meeting. In an effort to increase

engagement during the collaborative workshops, newspaper advertisements (not legal notices) were placed in local Polish and Spanish language newspapers.

Other outreach included town council meetings and newsletters. Team members attended one town council meeting in Southington and two in Plainville. Due to scheduling conflicts, a meeting in New Britain was put off until a later date. One newsletter was also developed, translated into Polish and Spanish, and distributed via email and at public engagement events. The newsletter provided an overview of the study process and gave details about various engagement events. To better engage key stakeholders in the communities, a series of 12 focus groups were held from July 25-29, 2016. Over 40 advocates, elected officials, town staff, and representatives of community groups attended to provide input on the study. Two surveys, translated into Spanish and Polish, were also used to garner feedback.

Figure 13.2 – Route 5 pop-up event



Route 5 Corridor Study In East Windsor

This study is focused on the Route 5 corridor in East Windsor. The corridor extends from the South Windsor town line north to Route 140. It is examining transportation and land use issues throughout the corridor. A major focus is the proposed casino development near the intersection of Routes 5 and 140.

Outreach has included focus groups, newsletters, surveys, and outreach events. Two pop-up events have been held to better engage people. Surveys were also distributed at prominent locations throughout the community. Finally, advisory committee meetings have been open to the public and include a broad spectrum of public officials and private citizens.

Silver Lane Corridor Study In East Hartford

This study is focused on the Silver Lane corridor in East Hartford. The corridor extends from the intersection of Route 15 easterly to the intersection of Forbes Street, a distance of approximately two miles. The study is addressing safety and congestion, transit system, pedestrian/bicycle mobility and assess travel demand growth and its impacts on area roadways including traffic associated with development of underutilized properties.

Stakeholder committee meetings are open to the public and include a broad array of stakeholders. CROCOG also partnered with a bicycle advocacy group to conduct a walk audit of the corridor and to examine the potential for an extension of the East Coast Greenway through the corridor.

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Figure 13.3 – Silver Line stakeholder meeting



Public Involvement – Outreach to the Community for This Plan

Public Notices

Content to come post draft plan release.

Meetings

CROCOG sought input from many stakeholders in the development of this report, including community members, industry experts and regional leaders.

Six Focus Groups were held in the following areas: Finance; Highway System, Congestion Management and Freight; Transit System and Mobility Management; Underserved Population groups; New and Emerging Technologies; and Complete Streets.

CROCOG staff interviewed 12 industry experts and regional leaders.

Public Meetings were held on December 4, 2018 and December 6, 2018 in New Britain and Hartford. Translation service was promoted and provided. Live streams from both meetings are still available (links to websites). The meetings used interactive stations to collect feedback on the regions' transportation assets and deficiencies, as well as opportunities for the attendees to identify missing geographic and modal connections in the northeast super-region.

Figure 13.4 – Interactive station at MTP public meeting in Hartford



Figure 13.5 – MTP public meeting at Capital Community College



Survey

A public online survey was advertised and available for input two months prior to the drafting of plan.

Survey Results

There were 332 unique respondents to the survey. Roughly one-quarter of the respondents indicated they lived in Hartford. Canton and West Hartford had the most respondents after Hartford but the rest of the respondents were fairly evenly distributed throughout the CRCOG region. Most of the respondents (68%) indicated that they primarily travel by privately-owned vehicle. Walking or biking was the second-most popular mode of travel (14%), followed by passengers of privately-owned vehicles and public transit (8% and 7%, respectively).

The majority of respondents (54%) were 'very supportive' of implementing tolling as a transportation funding source. State taxes like a gas, sales and vehicle sales taxes were not as popular but still had the support of the majority of respondents. Local taxes, in all forms, were unpopular.

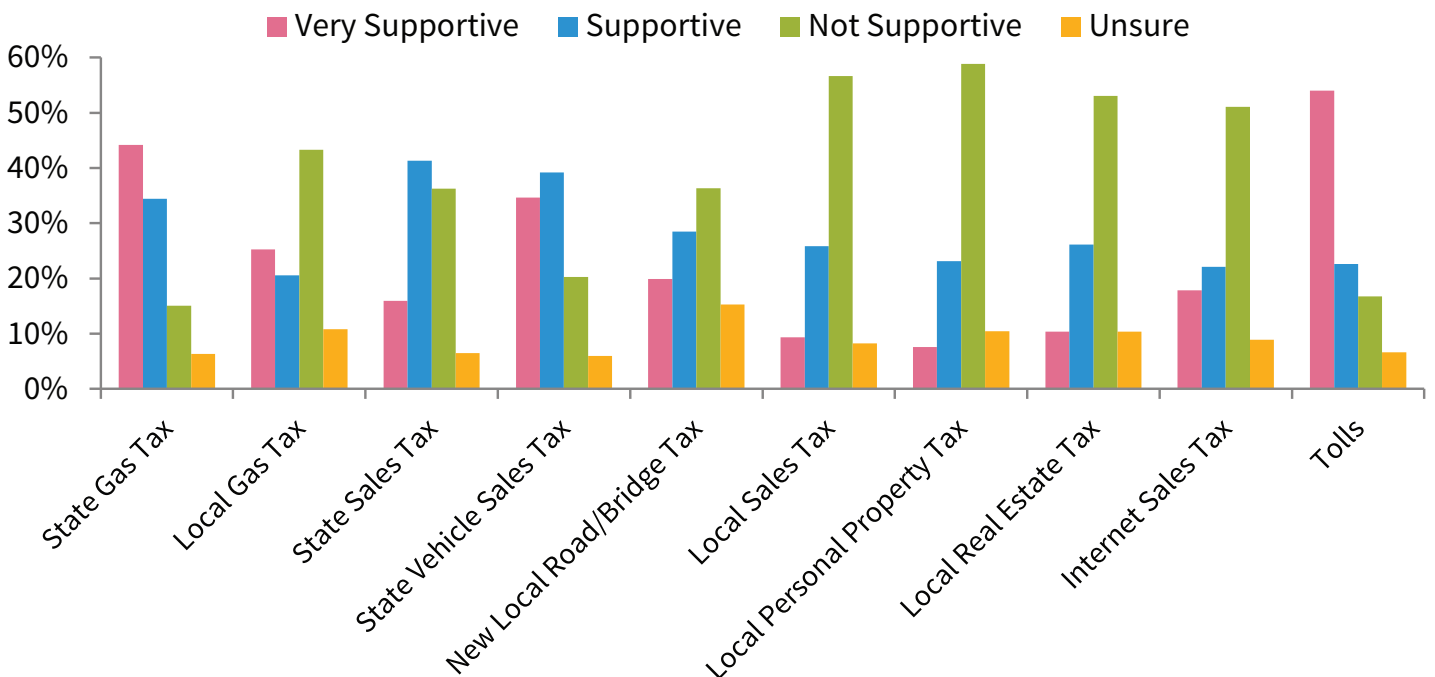
When asked how money should be distributed across the transportation system, respondents believe that 19% of funding should be dedicated to 'Alternatives to Driving'. 'Safety' and 'System Preservation' followed in popularity with 16% and 15%, respectively. 'Innovation' received the least support with 8% of funding. The survey results can be viewed in full in Appendix 8.

Public Comment Period

Content to come after release of draft plan.

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Figure 13.6 – Survey respondents' funding priorities



Appendix 1

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Ozone and PM_{2.5} Air Quality Conformity Determination

of the 2019-2045 Metropolitan Transportation Plans and the
FY 2018-2021 Transportation Improvement Programs Amendments

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1. Executive Summary

This report documents the air quality conformity analysis of the 2018-2021 Transportation Improvement Programs (TIPs) and 2019-2045 Metropolitan Transportation Plans (MTPs) as carried out under the regulations contained in the United States Environmental Protection Agency's (EPA) final rule, published in the November 24, 1993 Federal Register, with subsequent amendments and additional federal guidance published by EPA, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA). The process involved consultation with affected agencies such as EPA, FHWA, FTA, the Connecticut Department of Energy and Environmental Protection (CTDEEP) and the Metropolitan Planning Organizations (MPOs) within the State of Connecticut. The air quality emissions analysis is a responsibility of the Connecticut Department of Transportation (CTDOT), acting as the MPO for this task.

"Conformity" is a requirement of the Federal Clean Air Act Amendments (CAAA) Section 176(c) (42 U.S.C.7506(c)) and EPA conformity regulations (40 CFR 93 Subpart A). These regulations require that each new MTP and TIP be demonstrated to conform to the State Implementation Plan (SIP) before the MTP and TIPs are approved by the MPO or accepted by the United States Department of Transportation (USDOT). This ensures that the MTP and TIPs are consistent with air quality goals and that progress is being made towards achieving and maintaining Federal air quality standards. A conformity determination is undertaken to estimate emissions that will result from an area's transportation system. The analysis must demonstrate that those emissions are within limits outlined in state air quality implementation plans.

Under the transportation conformity regulation, the principal criteria for a determination of conformity for transportation plans and programs are:

- The TIP and MTP must pass an emissions budget test using a motor vehicle emissions budget (MVEB) that has been found to be adequate by EPA for transportation conformity purposes, or an interim emission test;
- The latest planning assumptions and emission models specified for use in conformity determinations must be employed;
- The TIP and MTP must provide for the timely implementation of transportation control measures (TCMs) specified in the applicable air quality implementation plans; and
- Interagency and public consultation.

As the federal air quality districts for ozone and PM_{2.5} include several counties and various planning regions, the emission analysis must be coordinated to include the TIPs and MTPs of several regions.

The CTDOT performs this coordination role. Each region submits its draft TIP and MTP to the CTDOT and the CTDOT in turn combines the TIPs and MTPs for all appropriate regions and conducts the analysis on each pollutant's impact for each air quality district in relation to the established MVEBs.

For the 2019-2045 MTP, summer day emission estimates for ozone precursors, volatile organic compounds (VOC) and nitrogen oxides (NO_x), and annual emission estimates for particulate matter 2.5 microns or smaller (PM_{2.5}) and NO_x as a precursor were developed for years 2018, 2025, 2035, and 2045 forecast years. These emission estimates were calculated using EPA's Motor Vehicle Emission Simulator (MOVES2014b).

The results of this analysis, in Tables 1 and 2 below show that the 2019-2045 MTP and the 2018-2021 TIP mobile emissions are within the MVEBs for all forecast years per pollutant. This analysis provides a basis for a determination of conformity for the 2019-2045 MTP and the FY 2018-2021 TIP.

Table 1: Ozone Conformity - NOx and VOC Emissions Budget Test Results

Year	Ozone Area	Tons per day					
		Series 31G		Budgets		Difference	
		VOC	NOx	VOC	NOx	VOC	NOx
2018	CT Portion of NY-NJ-CT Area	16.61	23.74	17.6	24.6	- 0.99	- 0.86
	Greater CT Area	14.96	21.18	15.9	22.2	- 0.94	- 1.02
2025	CT Portion of NY-NJ-CT Area	12.39	13.94	17.6	24.6	- 5.21	-10.66
	Greater CT Area	11.18	12.53	15.9	22.2	- 4.72	- 9.67
2035	CT Portion of NY-NJ-CT Area	7.27	8.45	17.6	24.6	-10.33	-16.15
	Greater CT Area	6.49	7.53	15.9	22.2	- 9.41	-14.67
2045	CT Portion of NY-NJ-CT Area	6.41	7.85	17.6	24.6	-11.19	-16.75
	Greater CT Area	5.76	7.01	15.9	22.2	-10.14	-15.19

Table 2: PM2.5 Conformity - Direct PM2.5 and NOx Emission Budget Test Results

Year	PM2.5 Area	Tons per year					
		Series 31G		Budgets		Difference	
		Direct PM _{2.5}	NOx	Direct PM _{2.5}	NOx	Direct PM _{2.5}	NOx
2018	CT Portion of NY-NJ-CT Area	318.1	7,837.5	575.8	12,791.8	-257.7	-4,954.3
2025	CT Portion of NY-NJ-CT Area	221.6	4,707.9	516.0	9,728.1	-294.4	-5,020.2
2035	CT Portion of NY-NJ-CT Area	169.2	2,987.4	516.0	9,728.1	-346.8	-6,740.7
2045	CT Portion of NY-NJ-CT Area	152.4	2,803.5	516.0	9,728.1	-363.6	-6,924.6

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2. What is Transportation Conformity?

Transportation conformity is a planning process required by the CAA Section 176(c), which establishes the framework for improving air quality to protect public health and the environment. The goal of transportation conformity is to ensure that FHWA and FTA funding and approvals are given to highway and public transportation activities that are consistent with air quality goals.

The CAA requires that metropolitan transportation plans, TIPs, and Federal projects conform to the purpose of the SIP. Conformity to a SIP means that such activities will not cause or contribute to any new violations of the National Ambient Air Quality Standards (NAAQS); increase the frequency or severity of NAAQS violations; or delay timely attainment of the NAAQS or any required interim milestone. Conformity requirements apply in areas that either do not meet or previously have not met air quality standards for ozone, carbon monoxide, particulate matter, or nitrogen dioxide. These areas are known as “nonattainment areas” or “maintenance areas”, respectively.

Connecticut contains nonattainment areas for ozone (O₃) and maintenance areas for carbon monoxide (CO) and PM_{2.5}.

For MTP and TIP conformity, the determination shows that the total emissions from on-road travel on an area’s transportation system are consistent with the MVEBs and goals for air quality found in the state’s SIP. A conformity determination demonstrates that implementation of the MTP or TIP will not cause any new violations of the air quality standard, increase the frequency or severity of violations of the standard, or delay timely attainment of the standard or any interim milestone.

This document was developed by the CTDOT to demonstrate that the MTP and TIP, as updated, are in compliance with the MVEBs for the nonattainment and maintenance areas that fall within the state’s planning boundary. In accordance with EPA regulation 40 CFR 93 Subpart A, this conformity determination is being issued in response to the adoption of new MTPs.

In addition, the conformity determination demonstrates compliance with the congestion management process in transportation management areas (23 CFR §450.322), development and content of the MTP (23 CFR §450.324), and fiscal constraints for MTPs and TIPs (40 CFR §93.108-119).

3. Nonattainment and Maintenance Areas in Connecticut

a. Ozone Nonattainment Areas

Ozone is an extremely reactive, colorless gas comprised of three atoms of oxygen. Ozone exists naturally in a layer of the earth's upper atmosphere known as the stratosphere, where it shields the earth from the sun's harmful ultraviolet rays. However, ozone found close to the earth's surface, called ground-level ozone, is a component of smog and a harmful pollutant. Ground-level ozone is produced by a complex chemical reaction between VOCs and NO_x in the presence of sunlight.

Mobile source NO_x emissions form when nitrogen and oxygen atoms chemically react inside the high pressure and temperature conditions in an engine. VOC emissions are a product of partial fuel combustion, fuel evaporation and refueling losses caused by spillage and vapor leakage.

Exposure to ozone has been linked to a number of respiratory health effects, including significant decreases in lung function, inflammation of airways, and increased symptoms such as cough and pain when breathing deeply. High concentrations of ozone can also contribute to reductions in agricultural crop production and forest yields, as well as increased susceptibility of plants to disease, pests and other environmental stresses

such as harsh weather. This pollutant alone contributes to the majority of unhealthy air quality days in Connecticut, as measured by the Air Quality Index (AQI).

EPA revised the ozone NAAQS in 2008. On May 21, 2012, EPA published rules in the Federal Register (77 FR 30160) that established the approach for classifying nonattainment areas, set attainment deadlines, and revoked the 1997 ozone standard for transportation conformity purposes. Areas designated nonattainment for the 2008 ozone NAAQS were classified into one of the following categories based on the severity of their ozone problem: Marginal, Moderate, Serious, Severe, or Extreme. EPA also established attainment dates for each area classification.

In May 2016, EPA determined that 11 Marginal areas did not attain the 2008 ozone standards by the July 20, 2015 attainment date, that these areas do not qualify for a 1-year attainment date extension and that they must be reclassified as Moderate based on their 2012-2014 air quality data. Both the Greater Connecticut and the Connecticut portion of the New York-Northern New Jersey-Long Island (NY-NJ-CT) nonattainment areas were two of the eleven areas.¹ The “bump- up” designation to Moderate was effective on June 3, 2016.

In this action, the EPA also established a due date of January 1, 2017, by which states with newly-reclassified Moderate areas must submit SIP revisions to address Moderate nonattainment area requirements for those areas. The reclassified areas must attain the 2008 ozone standards by the July 20, 2017 moderate attainment deadline.

On March 20, 2017, EPA notified CTDEEP that EPA had determined the 2017 MVEBs for the Greater Connecticut ozone nonattainment area, submitted as a SIP revision by CTDEEP to EPA on January 17, 2017, to be adequate for transportation conformity purposes. On May 31, 2017, EPA published its adequacy finding in the Federal Register (82 FR 24859) and the MVEBs became effective on June 15, 2017 for transportation conformity purposes.

On June 4, 2018, EPA published a final rule that designated new nonattainment areas for the 2015 Ozone NAAQS (83 FR 25776). These designations were effective on August 3, 2018. Therefore, conformity of transportation plans and TIPs for the 2015 Ozone NAAQS must be demonstrated by August 3, 2019. This analysis demonstrates conformity to the new 2015 Ozone NAAQS for both Connecticut non-attainment areas.

On October 1, 2018, EPA published a final rule approving certain SIP revisions relating to the 2008 8 hour NAAQS (83 FR 49297), including approval of the MVEB as shown in Table 3.

Table 3: Approved Motor Vehicle Emissions Budgets - Ozone

Year	Area	VOC (tons/summer day)	NOx (tons/summer day)
2017	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT Ozone Area	17.6	24.6
2017	Greater Connecticut Ozone Area	15.9	22.2

¹ Source: Table 4 in 77 FR 30160, subsequently revised based on a decision by the DC Circuit Court of Appeals (NRDC vs EPA; No. 12-1321; Decision date 12/23/2014).

b. PM2.5 Maintenance Area

Fine particulate matter, also called PM_{2.5}, is a mixture of microscopic solids and liquid droplets suspended in air, where the size of the particles is equal to or less than 2.5 micrometers (about one-thirtieth the diameter of a human hair). Fine particles can be emitted directly (such as smoke from a fire, or as a component of automobile exhaust) or be formed indirectly in the air from power plant, industrial and mobile source emissions of gases such as sulfur dioxide and nitrogen oxides.

The health effects associated with exposure to fine particles are serious. Scientific studies have shown significant associations between elevated fine particle levels and premature death. Effects associated with fine particle exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. While fine particles are unhealthy for anyone to breathe, people with heart or lung disease, asthmatics, older adults, and children are especially at risk.

In December of 2004, EPA signed the final rulemaking notice to designate attainment and nonattainment areas with respect to the PM_{2.5} NAAQS, becoming effective April 5, 2005. In Connecticut, Fairfield and New Haven Counties were included in the New York-Northern New Jersey-Long Island, NY-NJ-CT PM_{2.5} nonattainment area. On June 20, 2007, PM_{2.5} budgets were found to be adequate for the early progress SIP. CTDEEP submitted a re-designation request and maintenance plan for the Connecticut portion of the NY-NJ-CT area on June 22, 2012. The plan demonstrated that Connecticut's air quality met both the 1997 annual and the 2006 24-hour PM_{2.5} NAAQS due to a combination of national, regional and local control measures implemented to reduce emissions and presented a maintenance plan that ensures continued attainment through the year 2025. The end of the maintenance period was established as 2025, consistent with the CAA section 175A(a) requirement that the plan provide for maintenance of the NAAQS for at least 10 years after EPA formally approves the re-designation request.

EPA subsequently determined that the 2017 and 2025 MVEBs in the maintenance plan were adequate for transportation conformity purposes and effective as of February 20, 2013. On September 24, 2013, EPA published its approval of the PM_{2.5} re-designation request, establishing October 24, 2013 as the effective date of re-designation to attainment/maintenance for Connecticut's portion of the NY-NJ-CT area for both the 1997 annual and 24-hours PM_{2.5} NAAQS. Table 4 summarizes Connecticut's current PM_{2.5} MVEBs.

Table 4: Approved Motor Vehicle Emissions Budgets – PM_{2.5}

Year	Area	Direct PM _{2.5} (tons/year)	NO _x (tons/year)
2017	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT PM _{2.5} Area	575.8	12,791.8
2025	Connecticut portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT PM _{2.5} Area	516.0	9,728.1

c. Carbon Monoxide Maintenance Areas

Carbon monoxide is produced by the incomplete burning of carbon in fuels, including gasoline. High concentrations of CO occur along roadsides in heavy traffic, particularly at major intersections and in enclosed areas such as garages and poorly ventilated tunnels. Peak concentrations occur during the colder months of the year when CO vehicular emissions are greater and meteorological inversion conditions occur more frequently, trapping pollutants near the ground.

There were formerly three CO nonattainment areas in the state. These were the Southwestern portion of the state, the New Haven-Meriden-Waterbury area, and the Hartford-New Britain-Middletown area. The remainder of the state was in attainment for CO. Attainment was demonstrated in each of the nonattainment areas and, subsequently, they were designated as full maintenance areas. On September 13, 2004, EPA approved a CTDEEP submittal for a SIP revision for re-designation of these areas to limited maintenance plan status, thus eliminating the need for budget testing. Effective January 2, 2016, the Hartford-New Britain-Middletown area was in full attainment status. The New Haven-Meriden-Waterbury area completed the maintenance period effective December 4, 2018 while the Southwestern Connecticut area will be effective May 10, 2020. In the future, “hot-spot” carbon monoxide analyses will be performed to satisfy “project level” conformity determinations.

d. PM10 Attainment Area – Limited Maintenance

EPA previously designated the City of New Haven as nonattainment with respect to the NAAQS for particulate matter with a nominal diameter of ten microns or less (PM10). The PM10 nonattainment status in New Haven was a local problem stemming from activities of several businesses located in the Stiles Street section of the city. Numerous violations in the late 1980's and early 1990's of Section 22a-174-18 (Fugitive Dust) of CTDEEP regulations in that section of the city led to a nonattainment designation (CTDEEP, 1994: Narrative Connecticut Department of Energy and Environmental Protection, State Implementation Plan Revision, For PM10, March 1994). Corrective actions were subsequently identified in the SIP and implemented, with no violations of the PM10 NAAQS since the mid-1990s.

On October 13, 2005, EPA published in the Federal Register (70 FR 59690), approval of a request by CTDEEP for a limited maintenance plan and re-designation of the New Haven nonattainment area to attainment for the PM10 NAAQS. This direct final rule became effective on December 12, 2005.

All construction activities undertaken in the City of New Haven are required to be performed in compliance with Section 22a-174-18 (Control of Particulate "Emissions") of the CTDEEP regulations. All reasonable available control measures must be implemented during construction to mitigate particulate matter emissions, including wind-blown fugitive dust, mud and dirt carry out, and re-entrained fugitive emission from mobile equipment.

As with limited maintenance plans for other pollutants, emissions budgets are considered to satisfy transportation conformity's “budget test”. However, future “project level” conformity determination may require “hot spot” PM10 analyses for new transportation projects with significant diesel traffic in accordance with EPA's Final Rule for “PM2.5 and PM10 Hot-Spot Analyses in Project-level Transportation Conformity Rule PM2.5 and PM10 Amendments; Final Rule (75 FR 4260, March 24, 2010) which became effective on April 23, 2010.

e. State of Connecticut Nonattainment/Attainment Maps

Figure 1: Connecticut Ozone Nonattainment Areas and PM2.5 Attainment/Maintenance Area

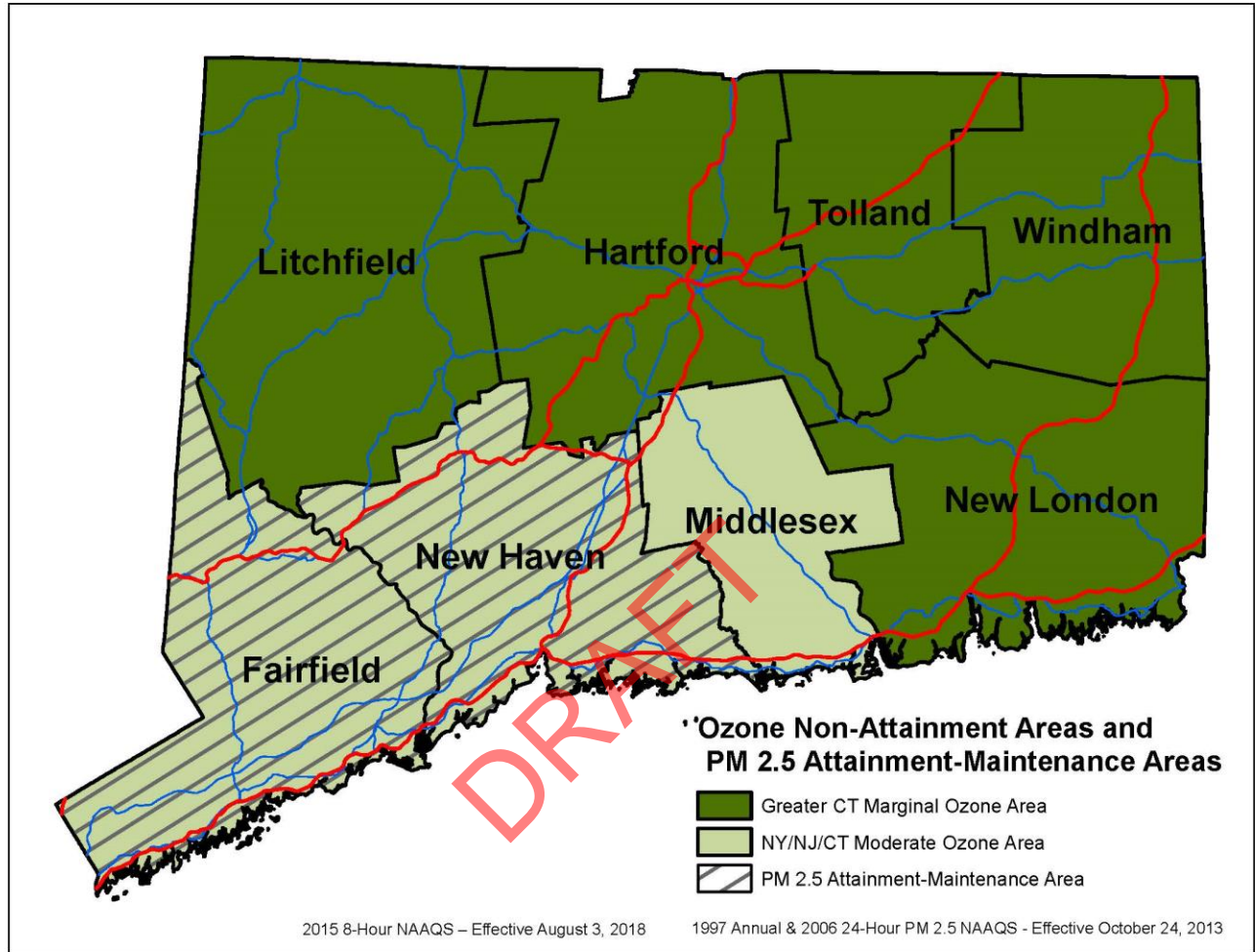
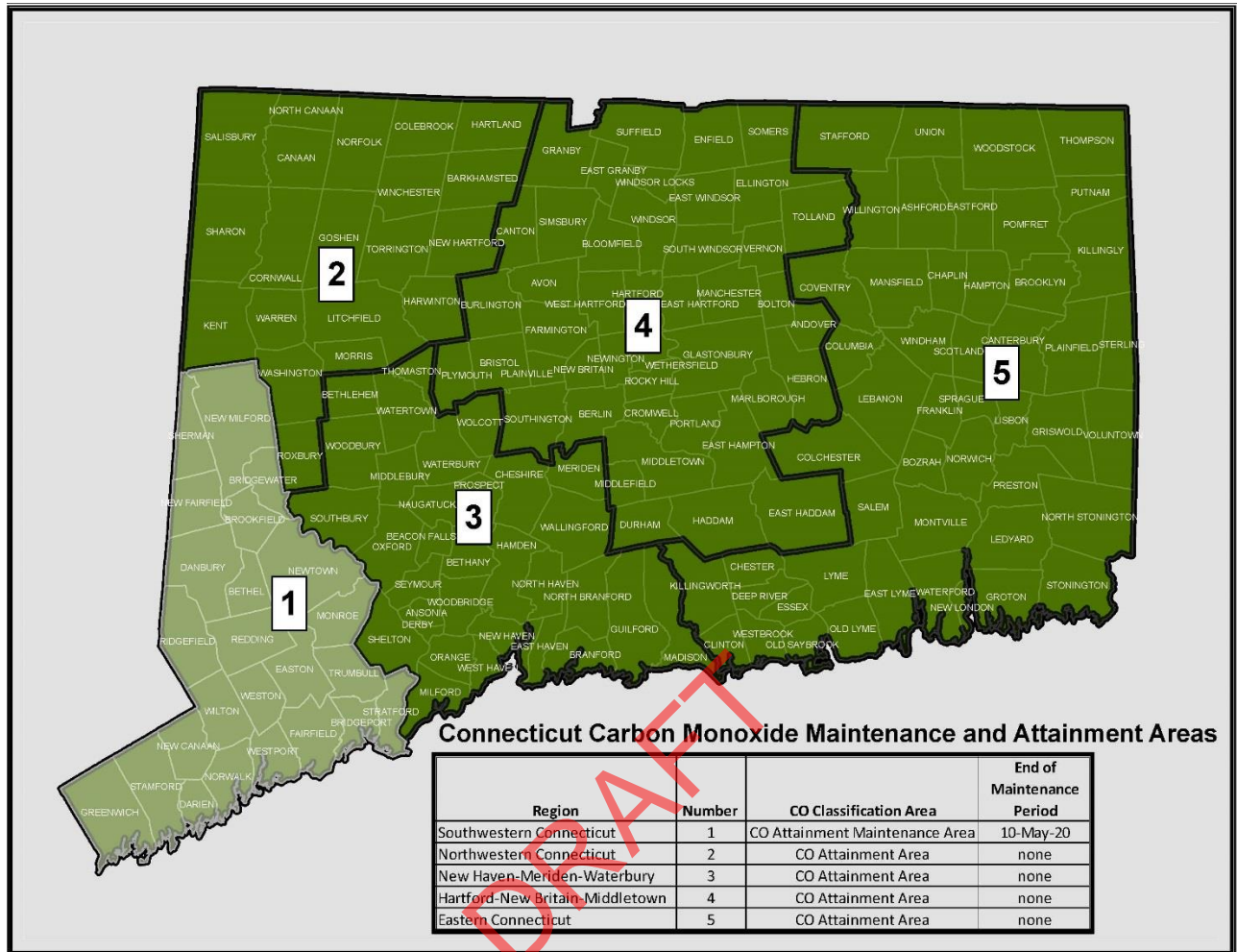


Figure 2: Connecticut Carbon Monoxide Maintenance and Attainment Areas



4. How Does Connecticut Demonstrate Conformity?

a. Transportation Planning Work Program

CTDOT's FY 2019-2020 Transportation Planning Work Program contains a description of all planning efforts, including those related to air quality, to be sponsored or undertaken with federal assistance during FY 2019 and 2020. Included with this program are several tasks directly related to CTDOT's responsibilities under Connecticut's air quality SIP. Additional functions, such as those supporting the preparation of project level conformity analysis, are funded under project related tasks. This work program is available at CTDOT for review.

b. Interagency Consultation

The conformity rule requires that Federal, State, and local transportation and air quality agencies establish formal procedures to ensure interagency coordination on critical issues. Interagency consultation is a collaborative process between organizations on key elements of the transportation and air quality planning and provides a forum for effective state and local planning and decision making.

Key organizations included in the interagency consultation are FHWA, FTA, EPA, CTDOT, CTDEEP and the MPOs.

Some goals of interagency consultation are to:

- Ensure all agencies meet regularly and share information;
- Identify key issues early in the process;
- Enable well-coordinated schedules for TIP/MTP conformity determinations and SIP development; and
- Allow collaborative decision on methodologies, assumptions and conformity test selections.

A list of attendees and call-in participants of the Interagency Consultation Meeting is included in Appendix C along with a copy of the minutes from the meeting.

c. Public Consultation

The transportation conformity process must also include public consultation on the emissions analysis and conformity determination. This includes posting of relevant documentation and analysis on a “clearinghouse” webpage maintained through the interagency consultation process. All MPOs in the affected nonattainment or maintenance areas must provide thirty-day public comment periods and address any comments received. For this transportation conformity determination, all Connecticut MPOs will hold a thirty-day public comment period.

If any public comments were received, they will be attached and can be found in Appendix E.

d. Scenario Years

The “Action Scenario” is the future transportation system that will result from full implementation of the TIPs and MTP.

VOC/NOx emission analysis was conducted for ozone season summer day conditions for the following years:

- 2018 (Attainment year and near term analysis year)
- 2025 (Interim modeling year)
- 2035 (Interim modeling year)
- 2045 (Metropolitan Transportation Plan horizon year)

PM2.5 emission analysis was conducted for the same years but for annual average conditions.

e. Other Planning Documents

The enactment of Section 81 of Connecticut Public Act 13-277 repealed Section 13b-15 of the Connecticut General Statutes, no longer mandating a biennial Master Transportation Plan effective July 1, 2013. The Department's Capital Plan has been expanded to include much of the project information that was formerly included in the Master Transportation Plan. In addition, the Existing Systems document, the Statewide Long Range Transportation Plan and "Let's GO CT!" contain other information that was included in various Master Transportation Plans.

5. Latest Planning Assumptions and Emissions Model

a. VMT

Vehicle miles of travel (VMT) estimates were developed from CTDOT's statewide network-based travel demand model, Series 31G. The 2018 travel model network, to the extent practical, represents all state highways and major connecting non-state streets and roads, as well as the rail, local bus, and expresses bus systems that currently exist. Future highway networks for 2020, 2025, 2028, 2030, 2035 and 2045 and transit networks for 2020, 2025, 2030, and 2045 were built by adding Statewide Transportation Improvement Program (STIP), TIP and MTP projects (programmed for opening after 2018) to the 2018 network year. These networks were used to run travel demand models and conduct emissions analyses for the years 2018, 2025, 2035, and 2045. Projects for each model analysis year for which network changes were required are listed in Appendix B.

It should be noted that TIP and MTP projects which have negligible impact on trip distribution and/or highway capacity have not been incorporated into the network. These include, but are not limited to, geometric improvements of existing interchanges, short sections of climbing lanes, intersection improvements, transit projects dealing with equipment for existing facilities and vehicles, and transit operating assistance. Other projects that reduce the number of vehicle trips, VMT or both may not be included. Such projects include ridesharing and telecommuting programs, bicycling facilities, clean fuel vehicle programs or other possible actions. These types of considerations, while not explicitly accounted for in the travel demand model, will continue to reduce the emissions levels in the regions. Essentially, those projects that do not impact the travel demand forecasts are not included in the networks and/or analysis.

The network-based travel model used for this analysis is the model that CTDOT utilizes for transportation planning, programming and design requirements. This travel demand model uses demographic and land use assumptions based on the 2011-2015 American Community Survey 5-Year Estimates population and Connecticut Department of Labor 2015 employment estimates. Population and employment projections for the years 2020, 2030, 2040 and 2050 were developed by the Connecticut Department of Transportation, Travel Demand and Air Quality Modeling Unit.

The model uses a constrained equilibrium approach to allocate trips among links. The model was calibrated using 2015 ground counts and 2015 Highway Performance Monitoring System (HPMS) Vehicle Miles of Travel data.

In addition, the Employer Commute Options (ECO) Program has been made available to all employers and is incorporated in the travel demand model. It is felt that this process is an effective means of achieving Connecticut's clean air targets. Funding of this effort under the Congestion Mitigation and Air Quality Improvement (CMAQ) program is included in the TIP for FY 2018-2021. It is estimated that this program, if fully successful, could reduce VMT and mobile source emissions by 2% in Southwest Connecticut.

Peak hour directional traffic volumes were estimated as a percentage of the Average Daily Traffic (ADT) on a link-by-link basis. Based on automatic traffic recorder data, 9.0 percent, 8.5 percent, 8.0 percent and 7.5 percent of the ADT occurs during the four highest hours of the day. A 55:45 directional split was assumed. Hourly volumes were then converted to Service Flow Levels (SFL) and Volume to Capacity (V/C) ratios calculated as follows:

$$\text{SFL} = \text{DHV} / \text{PHF} * \text{N}$$

$$\text{VC} = \text{SFL} / \text{C}$$

where: DHV = Directional Hourly Volume

PHF = Peak Hour Factor = 0.9

N = Number of lanes

C = Capacity of lane

Peak period speeds were estimated from the 2000 Highway Capacity Manual based on the design speed, facility class, area type and calculated V/C ratio. On the expressway system, Connecticut-based free flow speed data was available. This data was deemed more appropriate and superseded the capacity manual speed values. The expressway free flow speeds were updated in 2005.

For the off-peak hours, traffic volume is not the controlling factor for vehicle speed. Off-peak link speeds were based on the Highway Capacity Manual free flow speeds as a function of facility class and area type. As before, Connecticut-based speed data was substituted for expressway travel, where available, and was also updated in 2005.

ShoreLine East, Hartford Rail Line, New Haven Rail Line, and its branch line schedules were updated in 2018 to reflect new headways and routes. Rail station boardings were then calibrated to 2015 actual counts in 2018 for both A.M. peak period and Midday off-peak service along all Connecticut rail lines.

Two special cases exist in the travel demand modeling process. These are centroid connectors and intrazonal trips:

- Centroid connectors represent the local roads used to gain access to the model network from centers of activity in each traffic analysis zone (TAZ). A speed of 25 mph is utilized for these links; and
- Intrazonal trips are trips that are too short to get on to the model network. VMT for intrazonal trips is calculated based on the size of each individual TAZ. A speed of 20 to 24 mph is utilized for peak period and 25 to 29 mph for off-peak.

The Daily Vehicle Miles of Travel (DVMT) is calculated using a methodology based on disaggregate speed and summarized by inventory area, functional classification, and speed. The annual VMT and speed profiles developed by this process are then combined with the emission factors from the MOVES2014b model to produce emission estimates for each scenario and time frame.

b. Emissions Model

For this transportation conformity analysis, the MOVES model, specifically MOVES2014b, was used to estimate on-road vehicle emissions for the action scenarios. MOVES is a state-of-the-science emission modeling system, developed by EPA, that estimates emissions for mobile sources at the national, county, and project level for criteria air pollutants, greenhouse gases, and air toxics.

MOVES estimates exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles. It also uses a vehicle classification system based on the way vehicles are classified in the FHWA's Highway Performance Monitoring System (HPMS). Other parameters include VMT by vehicle and road type, vehicle hours traveled (VHT) by vehicle and road type, the number of each type of vehicle in the fleet, vehicle age distribution, model year, travel speed, roadway type, fuel information, meteorological data, such as ambient temperature and humidity, and applicable control measures such as reformulated gasoline (RFG) and inspection and maintenance (I/M) programs. Local inputs were cooperatively developed by CTDEEP and CTDOT, where applicable, using EPA recommended methods.²

The HPMS Vehicle Mix file was updated to reflect the average vehicle mix for the 2015-2017 timeframe. A Three year average was determined to be a more accurate representation of actual vehicle mix than the previous one year counts as the CTDOT rotates traffic and vehicle counts on a three year basis.

CTDEEP supplemented the 2011 DMV vehicle registration data with 2018 DMV vehicle registration data for motorcycle (source type 11) and school buses (source type 43).

In November 2012, EPA confirmed by telephone to CTDEEP that future conformity determinations utilizing newer versions of MOVES can be made by comparing emission results to the existing budgets based on older versions of MOVES. As new MVEBs are determined by EPA to be adequate for each area, they will be used to make conformity determinations.

For the ozone analysis, MOVES was only run to obtain VOC and NOx emissions on a typical summer weekday to compare to the ton per summer day ozone MVEBs. For the PM2.5 analyses, an annual emissions run was conducted for PM2.5 and NOx to compare to the ton per year PM2.5 MVEBs. All runs also included the National Low Emission Vehicle (NLEV) program in 2008 and all future years.

6. Conformity Tests and Air Quality Emissions Results

For the NY-NJ-CT ozone nonattainment area, VOC and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is 2017 or later.

For the Greater Connecticut ozone nonattainment area, VOC and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is 2017 or later.

For the NY-NJ-CT PM2.5 maintenance area, PM2.5 and NOx transportation emissions from the Action Scenarios must be less than the 2017 transportation emission budgets if analysis year is between 2017 and 2024.

For the NY-NJ-CT PM2.5 maintenance area, PM2.5 and NOx transportation emissions from the Action Scenarios must be less than the 2025 transportation emission budgets if analysis year is 2025 or later.

No tests for CO are required because the CO areas have been approved by EPA for Limited Maintenance Plan status.

² "MOVES2014, MOVES2014a, and MOVES2014b Technical Guidance: Using MOVES to Prepare Emission Inventories for State Implementation Plans and Transportation Conformity", EPA-420-B-18-039, August 2018.

The following tables show the MOVES2014b modeled emissions for both ozone and PM2.5 areas compared to the applicable MVEBs for each pollutant. In all cases the transportation program and plan meets the required conformity tests.

Table 5: Ozone Conformity - NOx and VOC Emissions Budget Test Results

Year	Ozone Area	Tons per day					
		Series 31G		Budgets		Difference	
		VOC	NOx	VOC	NOx	VOC	NOx
2018	CT Portion of NY-NJ-CT Area	16.61	23.74	17.6	24.6	- 0.99	- 0.86
	Greater CT Area	14.96	21.18	15.9	22.2	- 0.94	- 1.02
2025	CT Portion of NY-NJ-CT Area	12.39	13.94	17.6	24.6	- 5.21	-10.66
	Greater CT Area	11.18	12.53	15.9	22.2	- 4.72	- 9.67
2035	CT Portion of NY-NJ-CT Area	7.27	8.45	17.6	24.6	-10.33	-16.15
	Greater CT Area	6.49	7.53	15.9	22.2	- 9.41	-14.67
2045	CT Portion of NY-NJ-CT Area	6.41	7.85	17.6	24.6	-11.19	-16.75
	Greater CT Area	5.76	7.01	15.9	22.2	-10.14	-15.19

Table 6: PM2.5 Conformity - Direct PM2.5 and NOx Emission Budget Test Results

Year	PM2.5 Area	Tons per year					
		Series 31G		Budgets		Difference	
		Direct PM _{2.5}	NOx	Direct PM _{2.5}	NOx	Direct PM _{2.5}	NOx
2018	CT Portion of NY-NJ-CT Area	318.1	7,837.5	575.8	12,791.8	-257.7	-4,954.3
2025	CT Portion of NY-NJ-CT Area	221.6	4,707.9	516.0	9,728.1	-294.4	-5,020.2
2035	CT Portion of NY-NJ-CT Area	169.2	2,987.4	516.0	9,728.1	-346.8	-6,740.7
2045	CT Portion of NY-NJ-CT Area	152.4	2,803.5	516.0	9,728.1	-363.6	-6,924.6

Emission Summary Tables are posted in Appendix D.

This analysis in no way reflects the full benefit in air quality from the transportation plan and program. The network-based modeling process is capable of assessing the impact of major new highway or transit service. It does not reflect the impact from the many projects, which are categorically excluded from the requirement of conformity. These projects include numerous improvements to intersections, which will allow traffic to flow more efficiently, thus reducing delay, fuel usage and emissions. Included in the TIP, but not reflected in this analysis, are many projects to maintain existing rail and bus systems. Without these projects, those systems could not offer the high level of service they do. With them, the mass transit systems function more efficiently, improve safety, and provide a more dependable and aesthetically appealing service. These advantages will retain existing patrons and attract additional riders to the system. The technology to quantify the air quality benefits from these programs is not currently available.

Changes in the transportation system will not produce significant emissions reductions because of the massive existing rail, bus, highway systems, and land development already in place. Change in these aspects is always at the margin, producing very small impacts.

As shown in this analysis, transportation emissions are declining dramatically and will continue to do so. This is primarily due to programs such as federal heavy-duty vehicle standards, reformulated fuels, enhanced inspection and maintenance programs, and Connecticut’s low emissions vehicle (LEV) program.

7. Conclusions

CTDOT has assessed its compliance with the applicable conformity criteria requirements of the 1990 CAAA. Based upon this analysis, it is concluded that all elements of CTDOT's transportation program and the Metropolitan Transportation Plans conform to applicable SIP and 1990 CAAA Conformity Guidance criteria and the approved transportation conformity budgets.

8. Contact Information

Please direct any questions you may have on the air quality emission analysis to:

Connecticut Department of Transportation
Bureau of Policy and Planning
Division of Coordination, Modeling and Crash Data
Travel Demand / Air Quality Modeling Unit
2800 Berlin Turnpike
Newington, CT. 06111
(860) 594-2032
Email: Judy.Raymond@ct.gov

All MOVES modeling files and runstreams are available for review upon request on the Department's MOVES FTP site. The files will remain available during the 30-day public review period.

9. Appendices

In addition to the information required for a conformity determination, the following is attached:

- Appendix A: Acronyms
- Appendix B: List of Projects Included in Conformity Analysis by Network Year
- Appendix C: Interagency Consultation Meeting
- Appendix D: Emissions Summary Tables
- Appendix E: Public Comments (if Any)

Appendix A
Acronyms

DRAFT

Acronym	Meaning
ADT	Average Daily Traffic
AQI	Air Quality Index
CAAA	Clean Air Act Amendments (1990)
CO	Carbon Monoxide
CFR	Code of Federal Regulations
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CMAQ	Congestion Mitigation and Air Quality Improvement Program
DHV	Design Hourly Volume
DVMT	Daily Vehicle Miles of Travel
ECO	Employee Commute Option
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FTP	File Transfer Protocol
FR	Federal Register
HPMS	Highway Performance Monitoring System
I/M	Inspection Maintenance Program
MTP	Metropolitan Transportation Plan
MOVES	Mobile Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
MVEB	Motor Vehicle Emission Budget
NAAQS	National Ambient Air Quality Standards
NLEV	National Low Emission Vehicle
NO _x	Nitrogen Oxides
PHF	Peak Hour Factor
PM _{2.5}	Fine Particulate Matter less than 2.5 micrometers
PM ₁₀	Fine Particulate Matter less than 10 micrometers
SFL	Service Flow Levels
SIP	State Implementation Plan
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TCM	Transportation Control Measure
TIP	Transportation Improvement Program
U.S.C.	United States Code
U.S. DOT	U.S. Department of Transportation
V/C	Volume to Capacity
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

Appendix B

List of Projects Included in Conformity Analysis by Network Year

DRAFT

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG		Various	CTFastrak	CTFastrak Stations & Fixed Guideway	2015
GBVMPO	0036-0179	Derby	Route 8	Reconstruct interchanges 16 & 17; extend Pershing Drive & construct local roads	2016
CNV MPO	0017-0182	Bristol	Route 6	Addition of a second through lane on Route 6 Eastbound from Carol Drive to Peggy Lane	2018
CNV MPO	0051-xxxx	Waterbury	Various	TIGER Grant includes various roadway changes including reconstruction/extension of Jackson Street. Extension will meet at Freight Street and continue to West Main	2018
CRCOG	0051-0259	Farmington	I-84/Route 4/Route 6	Interchange BSWY	2018
CRCOG		Hartford	Hartford Line	Hartford Line - Existing Stations - Hartford	2018
GBVMPO	0138-0211	Stratford	Route 1	Addition of a through lane on Rt 1 Southbound from Nobel Street to Soundview Avenue	2018
MULTIPLE	0170-2296	Berlin	Hartford Line	Hartford Line - Existing Stations - Berlin	2018
MULTIPLE	0170-2296	Various	Hartford Line	Hartford Line - Grade Crossing Elimination Program	2018
MULTIPLE	0170-2296	Meriden	Hartford Line	Hartford Line - Existing Stations - Meriden	2018
MULTIPLE	0170-2296	Wallingford	Hartford Line	Hartford Line - Existing Stations - Wallingford	2018
MULTIPLE	0320-0015	Various	Hartford Line	Hartford Line-Windsor Station (FDP 9/16/2020)	2018
MULTIPLE	0320-0016	Various	Hartford Line	Hartford Line-Windsor Locks (FDP 10/2/2019)	2018
MULTIPLE	Various	Various	Hartford Line	Hartford Line	2018
WESTCOG	0102-0325	Norwalk	Route 1	Addition of a through lane on Rt. 1 Northbound from France Street to Rt. 53	2018
WESTCOG	0135-0301	Stamford	Atlantic Street	Reconstruction of I-95 off ramps and Atlantic Street in vicinity of Metro North Railroad Bridge No. 08012R	2018
CNV MPO	0151-0273	Waterbury	I-84	Upgrade Expressway - Phase 3 (80%)	2020
CNV MPO	0124-xxx	Seymour	Route 113	Between Interchange 22 and 23 to improve access	2020
CNV MPO	0124-xxxx	Seymour	Route 8	Realign interchange with new extension of Derby Road	2020
CNV MPO	0126-xxxx	Shelton	Route 8	Interchange 11 - Construct new SB entrance ramp, Widen Bridgeport Avenue	2020
CNV MPO	0126-xxxx	Shelton	Route 714	Between Huntington Avenue and Constitution Boulevard	2020
GBVMPO	0015-0371	Bridgeport	Seaview Ave	Seaview Avenue corridor: Operational improvements to corridor, and north of Rt 1 to provide access for proposed Lake Success Business Park and future local developments	2020
GBVMPO	0015-xxxx	Bridgeport	Route 130	Reconstruct and widen Rt 130 from Stratford Avenue bridge to Yellow Mill bridge	2020
GBVMPO		Stratford	Main St/Route 113	Main St Complete Street Implementation: Narrow Main St. from 4 lanes to 3, add buffered bike lanes, expand sidewalks and increase landscaped buffer	2020
WESTCOG	0034-0347	Danbury	SR 806 (Newtown Rd)	Improvements: Old Newtown to Plumtrees and Eagle to Industrial Plaza Rd	2020
WESTCOG	0008-xxxx	Danbury	White Street	Operational Improvements on White Street at Locust Avenue and Eighth Avenue	2020
CNV MPO	0080-0128	Middlebury	I-84/Route 63/Route 64	Improvements on Routes 63, 64 & I-84 WB Interchange 17: Build new connector road and realign existing state routes	2025
CNV MPO		Beacon Falls	NRG	NRG Beacon Falls -- Phase II: Naugatuck River Greenway: Extend the road diet along South Main Street and install a multi-use trail	2025
CNV MPO		Beacon Falls	NRG	NRG Beacon Falls -- Phase III: Naugatuck River Greenway: Extend the road diet along North Main Street and install a multi-use trail from about Depot Street to Church Street	2025
CNV MPO		Prospect	Route 69	Route 69 Traffic & Pedestrian Improvements: Optimize signal timing. Provide a lead or lag phase for the NB Route 69 approach left turners and prohibit the SB left turn onto Scott Road	2025
CNV MPO		Thomaston	US Route 6	Main St Safety Improvements: Narrowing lanes, eliminating one of the EB Main St lanes west of the ramps, and providing turn (deceleration) lanes into Pleasant St	2025
CNV MPO		Waterbury	SR 801	East Main St Spot Improvements & Lane configurations: Reconfigure to provide a uniform road width and number of lanes – one travel lane in each direction	2025
CNV MPO		Waterbury	SR 801	Safety improvements East Main Street: Remove 1 through lane in eastbound direction between Cherry Street and Brass Mill Dr. Shorten pedestrian crossing distances.	2025
CNV MPO		Waterbury	CT Transit	Lakewood Road Bus: Add new 1 hour headway service along Lakewood Road. Stagger service with 422 to reduce headways to one half hour on trunk.	2025
CRCOG	0042-0317	East Hartford	Route 2	Rt. 2 Operational & Safety Improvements Between Exits 3 and 5	2025
CRCOG	0055-0142	Granby	10/202	Major Intersection Improvement at CT 20/189	2025
CRCOG	0063-0703	Hartford	I-91/Route 15	Relocation & Reconfigure Interchange 29 (CN)	2025
CRCOG	0131-0190	Southington	CT 10	NHS - Remove Br 00518, reconstruct CT10/322 intersection	2025

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG	0155-0171	West Hartford	I-84	I-84 West Hartford Exits 40 & 42	2025
CRCOG		Manchester	I-84	Auxiliary lanes between Exits 62 and 63	2025
CRCOG		Manchester	I-84	Auxiliary lanes between Exits 63 and 64/65	2025
GBVMPO	0015-0368	Bridgeport	Route 700	Lafayette Circle realignment: Realign from a large, irregular one-way circulating configuration to several more typical roadway intersections connecting several city streets	2025
GBVMPO	0036-0184	Derby	Route 34	Reconstruct and widen Main Street from Bridge St. to Ausonio Dr. to 4 travel lanes	2025
GBVMPO	0138-0248	Stratford	I-95	Interchange 33: Reconstruct the partial interchange and replace it with a full-directional, diamond interchange.	2025
GBVMPO		Fairfield	Route 58 at Black Rock Tpke.	Provide a 4-leg single-lane roundabout: Modify access with Moritz Pl and Rt. 58 to be right-in/right-out access preceding roundabout. Remove access from Rt 58 to Whitewood Dr.	2025
GBVMPO		Fairfield	Route 58	Formalize left lane southbound as a dedicated left-turn lane	2025
GBVMPO		Fairfield	Route 58	Widen Black Rock Turnpike transition from 2 lanes to 4 in area of Samp Mortar to Tahmore Drive	2025
GBVMPO		Monroe	Route 25	Additional Southbound through lane; Widening on Purdy Hill Rd and Judd Rd for an exclusive left, exclusive through, and an exclusive right turn lanes.	2025
GBVMPO		Seymour	New Road	Route 42 & Route 67 Connector: Construct new connector arterial (2 lanes) between Route 42 in Beacon Falls and Route 67 in Seymour.	2025
GBVMPO		Seymour	WBL	Relocate the Seymour Rail Station to north of Route 67 as part of TOD redevelopment project	2025
GBVMPO		Stratford	Main St/Route 113	Main St Complete Street Implementation: Narrow Main St. from 4 lanes to 3 (Barnum Ave to Fenelon Pl) Single lane in each direction w/a center turn lane.	2025
MULTIPLE	0096-0204	Newtown	I-84	Exit 11 Intersection Improvements at Rt. 34/SR 490	2025
RiverCOG	0082-0316	Middletown	Route 9/Route 17	Rt. 9 / Rt. 17 Operational & Safety Improvements at Ramp (Reconfigure Rt 17 On-ramp to Rt 9 NB)	2025
RiverCOG	0082-0318	Middletown	Route 9	Rt. 9 Removal of Lights in Middletown	2025
SCCOG	0085-0146	Montville/Salem	Route 85	Corridor Improvements South of CT 82	2025
SCCOG	0120-0079	Montville	Route 85	Addition of a second through lane on Route 85 Northbound - north of Chesterfield Rd to south of Deer Run	2025
SCCOG	0120-0094	Salem	Route 85	Corridor Improvements North of CT 82	2025
SCCOG		Colchester	Route 2	Interchange improvements at Exit 17, add eastbound on-ramp, westbound off-ramp	2025
SCCOG		Norwich/New London	CT Transit	New BRT-like service - Norwich and New London	2025
SCCOG		Various	SEAT	25% increase in service frequency,	2025
WESTCOG	0102-0297	Norwalk	East Ave	Reconstruction @ Metro North Br No. 42.14	2025
SCCOG		Norwich	Route 82	Removal of a through lane on Rt 82 eastbound from west of Pine St to west of Fairmont St	2028
CNV MPO		Naugatuck	Route 8	Interchange 27 Improvements: Widening SB off-ramp on structure at Interchange 27 to provide right turn lane; Close NB off-ramp to North Main St; Close SB on-ramp from North Main St;	2030
CNV MPO		Naugatuck	Route 8	Interchange 28/29 Improvements: Close SB on-ramp from Exit 29 and SB off-ramp to North Main St; Install barrier to provide local access between Platts Mill Rd & North Main St; New SB on-ramp from local	2030
CRCOG	0109-xxxx	Plainville	New Britain Ave	Add lane from New Britain Ave/Cooke Street to Hooker Street	2030
GBVMPO	0036-xxxx	Derby	Route 8	Route 8 Interchange 16 and 17; Construct new NB ramps. Close old ramps	2030
GBVMPO	0126-xxxx	Shelton	Route 8	Interchange 14 - Construct new SB entrance ramp	2030
GBVMPO		Bridgeport	I-95	Reconstruct and modify the southbound approach I-95 project to eliminate the weave section created by the entrance to Rt 8/25 from Washington Ave followed by the exit to Myrtle Ave.	2030
GBVMPO		Bridgeport	Route 8/Route 25	Construct a third lane for Rt 8 northbound from the split to the vicinity of off-ramp to Rt 15.	2030
GBVMPO		Fairfield	Mill Plain Road	Addition of lane to southbound approach from I-95 ramps to US 1	2030
GBVMPO		Fairfield	Route 58	Reduce Rt. 58 to one travel lane in each direction - Black Rock Tpke and Burroughs Dr	2030
GBVMPO		Fairfield	Route 58	Provide a 4-leg single-lane roundabout with a right-turn bypass lane for SB approach at Burroughs Dr & Katona Dr	2030
GBVMPO		Fairfield	Route 58	Narrow Rt 58 to one through lane in each direction. Shoprite to Stillson Rd	2030
GBVMPO		Fairfield	Route 58	Narrow Rt. 58 to one through lane in the southbound direction. Old Navy to Fairfield Woods Rd	2030
GBVMPO		Shelton	SR 714	Widening of Bridgeport Avenue to provide a consistent 4-lane cross section with turn lanes from Trumbull town line to Constitution Boulevard	2030
MULTIPLE	0320-0012	Various	Hartford Line	Hartford Line-North Haven Station (FDP 7/1/2020)	2030
MULTIPLE	0320-0013	Newington	Hartford Line	Hartford Line - Future Stations - Newington	2030
MULTIPLE	0320-0014	West Hartford	Hartford Line	Hartford Line - Future Stations - West Hartford	2030

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
MULTIPLE	0320-0017	Enfield	Hartford Line	Hartford Line - Future Stations - Enfield	2030
MULTIPLE	0034-xxxx	Various	I-84	Add lane between Interchanges 3 and 4. Between Interchanges 12 and 13	2030
SCCOG		New London	I-95	Close exit 84E to Williams Street	2030
SCCOG		Norwich	12/2	Convert downtown circulation to two-way, convert Chelsea Harbor Drive to local parking/park facility, streetscape - Water Street to carry Chelsea Harbor Drive traffic	2030
SCCOG		Preston	Route 2A	New Parallel 2-lane Route 2A Bridge (Add Second Span to Mohegan Pequot Bridge)	2030
SCCOG		Windham	Plains Road/Route 203	New Road Connecting Plains Road to Route 203	2030
SCROG	0014-xxxx	Branford	Route 1	Widening East Haven Town Line to Alps Road (Echlin Road Private)	2030
SCROG	0014-xxxx	Branford	Route 1	Widening Route 146 to Cedar Street	2030
SCROG	0014-xxxx	Branford	Route 1	Widening Cedar Street to East Main	2030
SCROG	0014-xxxx	Branford	Route 1	Widening East Main to I-95 Exit 55	2030
SCROG	0014-xxxx	Branford	Route 1	Widening I-95 Exit 55 to Leetes Island Road	2030
SCROG	0059-xxxx	Guilford	Route 1	Widening Bullard Road extension to Route 77	2030
SCROG	0059-xxxx	Guilford	Route 1	Widening State Street to Tanner Marsh Road	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Washington Avenue to Route 40	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Route 40 to Todd Street	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening Todd Street to Shepard Avenue	2030
SCROG	0061-xxxx	Hamden	Route 10	Widening River Street to Cheshire Town Line	2030
SCROG	0061-xxxx	Hamden/North Haven	Route 5	Widening Olds Street (Hamden) to Sackett Point Road	2030
SCROG		Orange	NHL	NHL - New Stations/Parking - Orange	2030
SCROG	0079-xxxx	Meriden	Route 5	Widening Wallingford Town Line to Olive Street (Route 71)	2030
SCROG	0083-xxxx	Milford	Route 162	Widening from West of Old Gate Lane to Gulf Street/Clark Street to Route 1	2030
SCROG	0092-0649	New Haven		Long Wharf access Plan Widen I-95 (in separate project), Eliminate Long Wharf Drive to expand park, add new road from Long Wharf Drive	2030
SCROG	0092-xxxx	New Haven/Woodbridge	Route 69	Widening from Route 63 to Landin Street	2030
SCROG	0092-xxxx	New Haven/Woodbridge	Route 63	Widening from Dayton Street (NH) to Landin Street (Wdbrg)	2030
SCROG	0098-xxxx	North Branford	Route 80	Widening from East Haven Town Line to Doral Farms Road and Route 22 to Guilford Town Line	2030
SCROG	0106-xxxx	Orange	Route 162	Widening from West Haven Town Line to US 1	2030
SCROG	0148-xxxx	Wallingford	Route 5	Widening from South Orchard Street. to Ward Street and Christian Road to Meriden Town Line	2030
SCROG	0148-xxxx	Wallingford	Route 5	Widening from Route 71 overpass South of Old Colony Road to Route 68	2030
SCROG	0156-xxxx	West Haven	Route 122	Widening from Route 1 to Elm Street	2030
SCROG	0156-xxxx	West Haven	Route 1	Widening from Campbell Avenue to Orange Town Line	2030
SCROG	0156-xxxx	West Haven	Route 162	Widening from Elm Street to Greta Street	2030
SCROG	0156-xxxx	West Haven	Route 162	Widening from Bull Hill Ln to Orange Town Line	2030
WESTCOG	0018-0124	Brookfield	US 202	Widening South of Old State Road to Route 133	2030
WESTCOG	0034-0288	Danbury	Route 6	Add lane from Kenosia Avenue easterly to I-84 (Exit 4)	2030
WESTCOG	0102-0269	Norwalk	Route 7/Route 15	Upgrade to full interchange at Merritt Parkway (Route 15)	2030
WESTCOG	0102-0312	Norwalk	Route 7/Route 15	Reconstruction of Interchange 40 Merritt Parkway and Route 7 (Main Avenue).	2030
WESTCOG	0102-0358	Norwalk	Route 7	Rt. 7/Rt. 15 Interchange Reconstruction and Reconfiguration	2030
WESTCOG	0034-xxxx	Danbury	Route 6	Add lane from I-84 (Exit 2) East to Kenosia Avenue	2030
WESTCOG	0034-xxxx	Danbury	Route 37	Add lane from Route I-84 (Exit 6) Northerly to Jeanette Street	2030
WESTCOG	0034-xxxx	Danbury	Route 37	Add lane from Route 53 (Main Street) northerly to I-84 (Exit 6)	2030
WESTCOG	0034-xxxx	Danbury	Kenosia Ave	Add lane Kenosia Avenue from Backus Avenue to Vicinity of Lake Kenosia	2030
WESTCOG	0034-xxxx	Danbury	Backus Ave	Add lane Backus Avenue from Kenosia Avenue to Miry Brook Road	2030
WESTCOG	0034-xxxx	Danbury	Route 53	Add lane from South Street northerly to Boughton Street	2030
WESTCOG	0096-xxxx	Newtown	New Road	New Road across Old Fairfield Hills Hospital Campus, From Route 6 South to Route 860	2030
WESTCOG	0403-xxxx	Stamford	CT Transit	Route 1 BRT - Norwalk/Stamford	2030
CRCOG		Manchester	New Road	Buckland: Redstone Rd Extension - Modify existing I-84E off-ramp at Exit 62 to provide access from the existing ramp to proposed structures over Buckland Street and existing on-ramp to I-84 eastbound.	2035
CRCOG		Rocky Hill	Elm Street	Elm Street Connector Roadway - Create an extension from Corporate Place to Elm Street	2035

MPO	Project #	Town	Route/Street Number	Project Description	Network Year
CRCOG		Simsbury	Route 10	Rt.10 between Ely Lane and Wolcott Rd - build parallel road west of Rt.10 between Hoskins Rd and north through new development properties.	2035
CRCOG		Windsor Locks	Bradley Park Road	Bradley Airport-East Granby - Bradley Park Road Extension	2035
CRCOG		Windsor Locks	Northern Bradley Connector	A new Northern Bradley Connector Roadway is recommended to connect Rt. 75 near Bradley Airport to Rt. 190 over the Connecticut River.	2035
GBVMPO		Monroe/Trumbull	Route 25	Major widening of Main Street (Rt. 25) to four lanes with turn lanes at major intersections from the end of the divided section north of Rt. 111 to the Monroe-Newton town line.	2035
GBVMPO		Stratford	I-95	Interchanges 31 & 32: Reduce the number of ramps and provide separation of the interchanges, relocating and constructing a new diamond interchange at Rt. 130	2035
GBVMPO		Bridgeport	NHL	NHL - New Stations/Parking - Barnum	2040
MULTIPLE		Various	WBL	Operations: Expand service along the Waterbury branch line to provide 30-minute headways during the AM & PM peak periods	2040
CNV MPO		Various	I-84	I-84 Widening: Increase I-84 to three lanes west of Waterbury	2045
CNV MPO		Various	WBL	Operations: Expand service along the Waterbury branch line to provide 30-minute headways during the AM & PM peak periods	2045
CRCOG	0051-0259	Farmington	I-84	I-84 Interchange at Rt. 4 & Rt. 6 in Farmington	2045
GBVMPO		Bridgeport/Fairfield	I-95	I-95 Northbound Widening Between Exits 19 and 27A (Phase 1 - Route 8 Connector)	2045
GBVMPO		Bridgeport/Fairfield	I-95	I-95 Northbound Widening Between Exits 19 and 27A (Phase 2 - Exits 19-25)	2045
GBVMPO		Bridgeport/Fairfield/Stratford	Route 1	Provide lane continuity over its entire length by widening US Rt. 1 to a uniform four travel lanes with left turn lanes at signalized intersections. Westport/Fairfield line to Stratford/Milford line	2045
GBVMPO		Trumbull	Route 25	Rt. 25 at Whitney Avenue: Construct a partial interchange to provide access to and from Whitney Ave	2045
MULTIPLE		Stamford/Darien/Norwalk	I-95	I-95 Northbound Widening Between Exits 9 and 19	2045
MULTIPLE	0173-xxxx	Statewide	I-95	Widen I-95 between Stamford to Bridgeport (PE), \$99 million total	2045
MULTIPLE		Various	SLE	SLE - Extension of Rail Service to Rhode Island	2045
SCCOG	0044-xxxx	East Lyme/New London	I-95	Placeholder - Widen I-95 b/t I-395 and Gold Star Bridge	2045
SCCOG	0044-xxxx	East Lyme/New London	I-95	Placeholder - Widen I-95 b/t I-395 and Gold Star Bridge - extend the frontage roads between the two projects 2 lanes additional in each direction (mainline and frontage road combined)	2045
SCCOG	0172-xxxx	Old Saybrook/New London	I-95	Placeholder - Widen I-95 from the Baldwin to Gold Star Bridge (3 lanes in each direction)	2045
SCCOG		East Lyme	I-95	I-95 Exit 70 to Exit 74 widening from Baldwin to I-395 Interchange	2045
SCCOG		Niantic	SLE	SLE - Niantic Station	2045
SCCOG		Various	I-95	I-95 Spot Improvements East of Thames River to Rhode Island State Line (at Exits 88,89 and 90)	2045
SCCOG		Waterford	I-95	I-95 Improvements between Exit 80 and Exit 82A	2045
SCROG		Branford	I-95	I-95 Northbound Widening from Branford Exit 54 to Exit 56	2045
WESTCOG		Darien/Norwalk	I-95	I-95 Northbound & Southbound Widening & Reconfiguration Between Exits 13 & 16	2045
WESTCOG		Greenwich/Stamford	I-95	I-95 Southbound Widening Between Exits 1 and 7 and Replacing Bridge #0001	2045

Appendix C
Interagency Consultation Meeting

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**Interagency Consultation Meeting
2019-2045 Metropolitan Transportation Plan
Connecticut Department of Transportation
November 19, 2018 Room 2141
GoTo Meeting**

Attendees:

Ken Shooshan-Stoller – FHWA
Erik Shortell – FHWA
Kurt Salmoiraghi - FHWA
Leah Sirmin - FTA
Ariel Garcia – EPA
Eric Rackauskas – EPA
Louis Corsino - CTDEEP
Tom Malone – CRCOG
Devon Lechtenberg - CRCOG
Rob Aloise – CRCOG
Christian Meyer – CNVMPO
Zachary Guarino – CNVMPO
Matt Fulda – CTMetro COG
Patrick Carlton – CTMetro COG
Mark Hoover – CTMetro COG
Robert Haramut – LCRVCOG
Kate Rattan – SECCOG
Kristen Hadjstylianios – Western COG
Jamie Bastian – Western COG
Robbin Cabelus - CTDOT
Maribeth Wojenski – CTDOT
Judy Raymond – CTDOT
Kasey Faraci – CTDOT
Edgar Wynkoop - CTDOT
Grayson Wright – CTDOT
Sara Radacsi – CTDOT
Matthew Cegielski – CTDOT
Steven Giannitti - CTDOT
Greg Pacelli – CTDOT

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The Interagency Consultation Meeting was held to review projects submitted for the 2019-2045 MTP.

The Conformity Documents will be electronically distributed to the MPOs, FHWA, FTA, EPA and CTDEEP. The MPOs will need to hold a 30-day public review and comment period. At the end of this review period, the MPO will hold a Policy Board meeting to endorse the Air Quality Conformity determination.

There was also a brief discussion on the travel demand model and emissions software planning assumptions employed in the conformity analysis. CTDEEP is updating the Vehicle Registration Data and should have it available for use by the end of November 2018.

The schedule for the 2019-2045 Metropolitan Transportation Plan Conformity Determination Analysis is as follows:

- MPOs transmit signed and dated Concurrent Form to judy.raymond@ct.gov by November 20, 2018
- CTDOT Travel Demand Model Unit performs the air quality analysis and sends the Air Quality Conformity Determination Report electronically to all MPOs in early February 2019
- MPOs advertise and hold a 30-day public review and comment period for the Air Quality Conformity
- MPOs hold a Policy Board meeting approving and endorsing the Air Quality Conformity and transmit resolutions to judy.raymond@ct.gov after Policy Board meeting.

It is important that all MPOs follow this schedule to ensure that the MTP Conformity Determinations can go forward on schedule.

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PLANNING ASSUMPTIONS
Ozone and PM_{2.5}
2019-2045 Metropolitan Transportation Plan
November 19, 2018

Planning Assumptions for Review	Frequency of Review*	Responsible Agency	Year of Data
Socioeconomic Data	At least every 5 years	CTDOT	2015 ACS Data 2015 DOL
DMV Vehicle Registration Data	At least every 5 years	CTDEEP	2018**
State Vehicle Inspection and Maintenance Program	Each conformity round	CTDEEP	Same as currently approved I&M SIP
State Low Emission Vehicle Program	Each conformity round following approval into the SIP	CTDEEP	Same as SIP
VMT Mix Data	At least every 5 years	CTDEEP	2018***
Analysis Years – PM _{2.5}	Each conformity round	CTDOT/CTDEEP	2018, 2025, 2035, 2045
Analysis Years – Ozone	Each conformity round	CTDOT/CTDEEP	2018, 2025, 2035, 2045
Emission Budget – PM _{2.5}	As SIP revised/updated	CTDEEP	2018: PM2.5 575.8 NOx 12,791.8 2025: PM2.5 516.0 NOx 9,728.1
Emission Budget – Ozone	As SIP revised/updated	CTDEEP	NY Area: VOC 17.6 NOx 24.6 Gr. CT: VOC 15.9 NOx 22.2
Temperatures and Humidity	As SIP revised/updated	CTDEEP	X
Control Strategies	Each conformity round	CTDEEP	X
HPMS VMT	Each conformity round	CTDOT	2015

* Review of Planning Assumptions does not necessarily prelude an update or calibration of the travel demand model.

** Data updated in 2018 based on 2011 DMV registration data and 2018 motorcycle and school bus registration data

*** Data available 2018 based on an average of 2015-2017

Appendix D
Emission Summary Tables

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Pollutants		2018 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	Subtotal	Hartford	Litchfield	New London	Tolland	Windham	Subtotal	
1	Hydrocarbons	7.8429	1.6358	7.0339	16.5127	7.8208	1.7419	2.5621	1.4183	1.2897	14.8328	31.3455
3	Nox	10.8518	2.4853	10.4053	23.7424	11.3999	1.8162	3.9036	2.2179	1.8427	21.1802	44.9226
79	NM Hydrocarbons	7.4463	1.5435	6.6463	15.6361	7.4085	1.6828	2.4178	1.3315	1.2249	14.0655	29.7016
87	VOC	7.9078	1.6403	7.0660	16.6142	7.8747	1.7877	2.5727	1.4197	1.3028	14.9575	31.5717

Pollutants		2025 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	Subtotal	Hartford	Litchfield	New London	Tolland	Windham	Subtotal	
1	Hydrocarbons	5.9434	1.2084	5.3267	12.4785	6.0399	1.2773	1.8854	1.0503	0.9844	11.2373	23.7158
3	Nox	6.3261	1.4598	6.1517	13.9376	6.8527	1.0129	2.2877	1.3191	1.0594	12.5318	26.4694
79	NM Hydrocarbons	5.5579	1.1174	4.9398	11.6151	5.6226	1.2263	1.7426	0.9619	0.9207	10.4741	22.0892
87	VOC	5.9232	1.1920	5.2723	12.3875	5.9986	1.3059	1.8615	1.0302	0.9830	11.1791	23.5666

Pollutants		2035 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	Subtotal	Hartford	Litchfield	New London	Tolland	Windham	Subtotal	
1	Hydrocarbons	3.4633	0.7223	3.2878	7.4734	3.5915	0.7110	1.1078	0.6373	0.6107	6.6583	14.1317
3	Nox	3.7052	0.8875	3.8597	8.4524	4.0978	0.5244	1.4034	0.8571	0.6426	7.5253	15.9776
79	NM Hydrocarbons	3.1410	0.6437	2.9414	6.7261	3.2356	0.6744	0.9839	0.5578	0.5552	6.0070	12.7331
87	VOC	3.3891	0.6963	3.1804	7.2658	3.4938	0.7251	1.0655	0.6063	0.5999	6.4905	13.7564

Pollutants		2045 Emission Quantities (Tons/Day)										
		NY/NJ/CT Non-Attainment Area				Greater CT Non-Attainment Area						Statewide
ID	Name	Fairfield	Middlesex	New Haven	Subtotal	Hartford	Litchfield	New London	Tolland	Windham	Subtotal	
1	Hydrocarbons	3.0452	0.6457	2.9196	6.6104	3.1976	0.6161	0.9849	0.5754	0.5492	5.9231	12.5336
3	Nox	3.4243	0.8293	3.6006	7.8542	3.8143	0.4667	1.3158	0.8148	0.6011	7.0127	14.8669
79	NM Hydrocarbons	2.7335	0.5685	2.5800	5.8820	2.8486	0.5817	0.8632	0.4964	0.4945	5.2844	11.1664
87	VOC	2.9732	0.6201	2.8127	6.4059	3.1007	0.6298	0.9426	0.5441	0.5383	5.7556	12.1615

County	Total Energy Consumption 91 (Joules/Day)	2018 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	County Total
Fairfield	4.4265E+16	3994.21623	123.36123	29.34219565	11.80939687	164.51282
New Haven	4.15247E+16	3843.30617	117.79660	24.81758188	10.98438051	153.59856
Totals	8.57898E+16	7837.52240	241.15783	54.15978	22.79378	318.11139

County	Total Energy Consumption 91 (Joules/Day)	2025 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	County Total
Fairfield	3.88056E+16	2388.69194	71.22119	31.93961191	12.55215974	115.71296
New Haven	3.6392E+16	2319.18481	67.15783	27.0412736	11.6731486	105.87225
Totals	7.51976E+16	4707.87675	138.37902	58.98089	24.22531	221.58521

County	Total Energy Consumption 91 (Joules/Day)	2035 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	County Total
Fairfield	3.27937E+16	1471.09154	39.64026	33.73769155	13.0972526	86.47520
New Haven	3.21317E+16	1516.28868	38.81126	31.18423878	12.6882525	82.68376
Totals	6.49254E+16	2987.38022	78.45152	64.92193	25.78551	169.15896

County	Total Energy Consumption 91 (Joules/Day)	2045 Pollutant Emission Quantities (Tons/Day)				
		NOx	PM 2.5			
		3 Oxides of Nitrogen	110 Engine Exhaust	116 Brakewear	117 Tirewear	County Total
Fairfield	3.19346E+16	1376.02777	30.88100	32.74441427	13.13581643	76.76123
New Haven	3.15232E+16	1427.50157	30.55733	32.18442155	12.9399948	75.68175
Totals	6.34578E+16	2803.52935	61.43833	64.92884	26.07581	152.44298

Appendix E
Public Comments

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Appendix 2

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Appendix 1 Chapter 7 New and Emerging Technologies

CTDOT is developing a Traffic Signal Management Plan to be completed in 2019 and a Strategic Plan for Implementing CVs/AVs in Connecticut, which will be used to highlight the current status of CV/AV technologies and their high-level impacts, and justify next step strategies, investments and partnerships. The plan outlines CV/AV interests and needs by bureau/office, identifies Connecticut's mission, vision, goals and objectives, presents an internal organizational structure for the implementation of CV/AV in the state, and provides an action plan with roles and responsibilities separated into four time frames (immediate, near term, mid-term and long term). The plan is scheduled to be published in fall 2018. CTDOT is also looking to update their existing Statewide ITS Architecture to include CV/AV applications. They have programmed approximately \$2.5 million for CV/AV projects in the Capital Program for 2019 (pending approval).

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Appendix 3

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Compendium of CRCOG Memoranda on Federal Performance Measures

Compiled December 3, 2018
for **Initial Performance Period of 2018-2022**

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Policy Board Resolution: PM2's & PM3's (10) Targets	Pg.9
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Memo - October 5, 2018: Discussion of Performance Targets (Final Resolution) Abridge Version (contained previous memoranda)	Pg. 55
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FHWA Goal	Performance Area	Performance Measure	Initial Targets / Due Dates
Safety (PM1)	Injuries & Fatalities	<ul style="list-style-type: none"> Number of fatalities Fatality rate (per 100 million vehicle miles traveled) Number of serious injuries Serious injury rate (per 100 million vehicle miles traveled) Number of non-motorized fatalities and non-motorized serious injuries 	State & MPO: 257 or less ¹ State & MPO: 0.823 or less ¹ State & MPO: 1,571 or less ¹ State & MPO: 5.03 or less ¹ State & MPO: 280 or less ¹
		<ul style="list-style-type: none"> Percentage of pavements on the Interstate System in Good condition Percentage of pavements on the Interstate System in Poor condition Percentage of pavements on the non-Interstate NHS in Good condition Percentage of pavements on the non-Interstate NHS in Poor condition 	State Targets for 2020 & 2022: See drop down on left side of webpage
structure Condition (PM2)	Bridge Condition	<ul style="list-style-type: none"> Percentage of NHS bridges classified as in Good condition Percentage of NHS bridges classified as in Poor condition 	MPO Target Due Date: 11/16/2018 ²
	Performance of the NHS, Freight, and CMAQ Measures (PM3)	<ul style="list-style-type: none"> Percent of person miles traveled on the Interstate System that are reliable Percent of person miles traveled on the non-Interstate NHS that are reliable Truck Travel Time Reliability Index Annual hours of peak-hour excessive delay per capita Percent of non-single-occupant vehicle travel On-Road Mobile Source Emissions reduction 	State Targets for 2020 & 2022: See drop down on left side of webpage MPO Target Due Date: 11/16/2018 ²
FTA Goal	Performance Area	Performance Measure	Initial Targets / Due Dates
Transportation Asset Management	Rolling Stock	<ul style="list-style-type: none"> Percentage of revenue vehicles (by type) that exceed the Useful Life Benchmark (ULB) 	State & MPO: 0% ³ , 7% ⁴ , 14% ⁵ , 17% ⁶
	Equipment	<ul style="list-style-type: none"> Percentage of non-revenue service vehicles (by type) that exceed the ULB 	State & MPO: 0% ⁷ , 7% ⁸ , 17% ⁹ , 20% ¹⁰
	Facilities	<ul style="list-style-type: none"> Percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale 	State & MPO: 0%
	Infrastructure	<ul style="list-style-type: none"> Percentage of track segments (rail fixed-guideway only) that have performance restrictions 	State & MPO: 2%
Safety	Fatalities	<ul style="list-style-type: none"> Total number reportable fatalities and rate per total vehicle revenue miles by mode 	State Target Due Date: TBD
	Injuries	<ul style="list-style-type: none"> Total number reportable injuries and rate per total vehicle revenue miles by mode 	MPO Target Due Date: TBD ²
	Safety Events	<ul style="list-style-type: none"> Total number reportable events and rate per total vehicle revenue miles by mode 	
	System Reliability	<ul style="list-style-type: none"> Mean distance between major mechanical failures by mode 	

¹ 5 year moving average (2011-2015) for 2018 Safety Targets.

² Maximum 180 days after the State sets target

³ FY2018 target for Tier I and II Commuter Rail Locomotive, Commuter Rail Passenger Coaches, Commuter Self-Propelled Passenger Cars, and Ferry Boat

⁴ FY2018 target for Tier II Trolley

⁵ FY2018 target for Tier I and II Articulated Bus, Bus and BR Over-the-Road Bus

⁶ FY2018 target for Tier I Cutaway Bus and Minivan

⁷ FY2018 target for Tier I Steel Wheel Vehicles

⁸ FY2018 target for Tier I and II Rubber and Tire Vehicles

⁹ FY2018 target for Tier II Van and Minivan

¹⁰ FY2018 target for Tier I and II Automobiles and Sport Utility Vehicles

DRAFT

Part 1:
CRCOG Policy Board Resolutions for
CTDOT Performance Targets

DRAFT

DRAFT

AUTHORIZING RESOLUTION

FOR ENDORSEMENT OF THE STATE OF GOOD REPAIR PERFORMANCE TARGETS SET BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION

WHEREAS, the Federal Transit Administration (FTA) and FTA regulations governing federal transportation assistance prescribe new requirements for Metropolitan Planning Organizations (MPOs) to coordinate with transit providers, set performance targets, and integrate those performance targets and performance plans into their planning documents. As per 23 CFR 450.324 and 23 CFR 450.326, MPOs are required to reference performance targets and performance-based planning into their Transportation Improvement Programs (TIPs) and Metropolitan Transportation Plans by October 2018; and

WHEREAS, FTA established four State of Good Repair (SGR) Performance Measures in asset categories of Rolling Stock, Equipment, Facilities, and Infrastructure. The SGR Performance Targets for these measures were set by the Connecticut Department of Transportation (CTDOT) in coordination with the transit providers, including Metro-North Railroad, CTtransit, and all the rural and urban Transit Districts to comply with a January 1, 2017 deadline; and

WHEREAS, each MPO is required to establish SGR performance targets for each FTA Performance Measure and for each asset class offered within the metropolitan planning area, as per 23 CFR 450.306 (d)(3), 180 days after the transit providers have set their respective performance targets, or by July 1, 2017; and

WHEREAS, the SGR Performance Measure Targets set by CTDOT have been reviewed by the Policy Board of the Capitol Region Council of Governments and align with regional goals for transit asset management;

NOW THEREFORE BE IT RESOLVED THAT, the Capitol Region Council of Governments does hereby endorse the State of Good Repair Performance Measure Targets established by the Connecticut Department of Transportation as the regional performance targets for the MPO.

CERTIFICATE

I certify the above is a true copy of a resolution adopted by the Transportation Committee, acting on behalf of the Policy Board, at its meeting held on June 26, 2017.

BY: 

Lisa Heavner, CRCOG Secretary

DATE: 7/5/17

DRAFT

RESOLUTION REGARDING TARGETS FOR SAFETY PERFORMANCE MEASURES ESTABLISHED BY CTDOT

WHEREAS, the Capitol Region Council of Governments (CRCOG) has been designated by the Governor of the State of Connecticut as the Metropolitan Planning Organization responsible, together with the State, for the comprehensive, continuing, and cooperative transportation planning process for the Capitol Region; and

WHEREAS, the Highway Safety Improvement Program (HSIP) final rule (23 CFR Part 490) requires States to set targets for five safety performance measures by August 31, 2017, and

WHEREAS, the Connecticut Department of Transportation (CTDOT) has established targets for five performance measures based on five year rolling averages for:

- (1) Number of Fatalities,
- (2) Rate of Fatalities per 100 million Vehicle Miles Traveled (VMT),
- (3) Number of Serious Injuries,
- (4) Rate of Serious Injuries per 100 million VMT, and
- (5) Number of Non-Motorized Fatalities and Non-motorized Serious Injuries, and

WHEREAS, the CTDOT generally discussed safety performance measures with the 8 Metropolitan Planning Organizations (MPOs) in Connecticut at the February 22, 2017 Safety Target Setting Coordination and Training Workshop; and at the December 2016 and the April 2017 RPO Coordination meetings, and

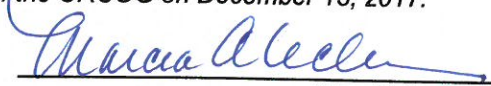
WHEREAS, the CTDOT has officially adopted the safety targets in the Highway Safety Improvement Program annual report dated August 28, 2017, and the Highway Safety Plan dated June 2017, and

WHEREAS, the CRCOG may establish safety targets by agreeing to plan and program projects that contribute toward the accomplishment of the aforementioned State's targets, or establish its own target within 180 days of the State establishing and reporting its safety targets,

NOW THEREFORE, BE IT RESOLVED, that the MPO Policy Board has agreed to support CTDOT's 2018 targets for the five safety performance targets as attached herein, and

BE IT FURTHER RESOLVED, that the MPO Policy Board will plan and program projects that contribute to the accomplishment of said targets.

CERTIFICATE: The undersigned duly qualified CRCOG Board Member certifies that the foregoing is a true and correct copy of a resolution adopted by the voting members of the CRCOG on December 13, 2017.



Marcia LeClerc
Capitol Region Council of Governments

12/13/17
Date

DRAFT

RESOLUTION REGARDING TARGETS FOR TEN PERFORMANCE MEASURES ESTABLISHED BY CTDOT

WHEREAS, the Capitol Region Council of Governments (CRCOG) has been designated by the Governor of the State of Connecticut as the Metropolitan Planning Organization responsible, together with the State, for the comprehensive, continuing, and cooperative transportation planning process for the Capitol Region; and

WHEREAS, the National Performance Management Measures final rule (23 CFR Part 490) requires States to set targets for ten performance measures by May 20, 2018, and

WHEREAS, the Connecticut Department of Transportation (CTDOT) has established targets for four pavement performance measures for:

- (1) Percentage of Pavements on the Interstate System in Good condition,
- (2) Percentage of Pavements on the Interstate System in Poor condition,
- (3) Percentage of Pavements on the non-Interstate NHS in Good condition,
- (4) Percentage of Pavements on the non-Interstate NHS in Poor condition,
- (5) Percentage of NHS Bridges classified as in Good Condition (by deck area),
- (6) Percentage of NHS Bridges classified as in Poor Condition (by deck area),
- (7) Percentage of Person-miles traveled on the Interstate System that are reliable,
- (8) Percentage of Person-miles traveled on the non-Interstate System that are reliable,
- (9) Truck Travel Time Reliability Index,
- (10) Total Emissions Reduction,

WHEREAS, the CTDOT generally discussed performance measures with the 8 Metropolitan Planning Organizations (MPOs) in Connecticut at the March 27 and May 8 RPO coordination meetings as well as on other occasions during the course of this new Federal mandate,

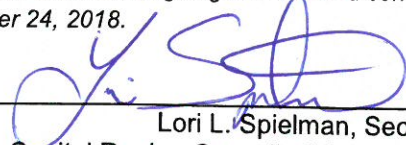
WHEREAS, the CTDOT has officially adopted the ten targets in the State Long Range Transportation Plan in March 2018,

WHEREAS, the CRCOG may establish performance targets by agreeing to plan and program projects that contribute toward the accomplishment of the aforementioned State's targets, or establish its own target within 180 days of the State establishing and reporting its performance targets,

NOW THEREFORE, BE IT RESOLVED, that the MPO Policy Board has agreed to support CTDOT's 2018 targets for the ten performance targets as previously discussed and endorsed, and

BE IT FURTHER RESOLVED, that the MPO Policy Board will plan and program projects that contribute to the accomplishment of said targets.

CERTIFICATE: The undersigned duly qualified CRCOG Board Member certifies that the foregoing is a true and correct copy of a resolution adopted by the voting members of the CRCOG on October 24, 2018.


Lori L. Spielman, Secretary
Capitol Region Council of Governments

10-24-18

Date

DRAFT

Part 2:
Background to FHWA Performance
Measures and Targets

DRAFT

DRAFT

To: Transportation Committee
From: Rob Aloise, Principal Transportation Engineer
Jennifer Carrier, Director of Transportation Planning
Date: March 19, 2018
Subject: Transportation Performance Measures and Target Setting

This memorandum provides an update on CTDOT and CRCOG's efforts in complying with federally required Transportation Performance Measures and Target Setting. The attached table summarizes each of the FHWA and FTA performance measures. The table was previously provided to the committee in September 2017, however it's status column has been updated to apprise the committee of the latest for the following measures:

- FHWA - Safety (PM1)
- FHWA - Infrastructure Condition (PM2)
- FHWA - Performance of the NHS, Freight, and CMAQ Measures (PM3)

Background

MAP-21 and the FAST Act legislation required US-DOT to establish transportation performance measures, and required States and Regions to set performance targets for those measures. The Federal Transit and Federal Highway Administrations have established a performance management framework through a series of federal rulemakings, each of which contains requirements and deadlines for transit providers, Metropolitan Planning Organizations (MPOs), and state DOTs. The attached table identifies the specific performance measures and dates that initial targets are to be set by CTDOT and the MPOs. Following each State established target, MPOs will have up to 180 days either to confirm that target, or set their own for the region. It's required that these measures be regularly monitored and reported with new targets typically set in 2 or 4 year timeframes.

CRCOG staff will be monitoring and coordinating with CTDOT regarding complying with all federal performance measure mandates. This will include reviewing state targets and providing recommendations to the Transportation Committee regarding the appropriate targets for the region. It is anticipated that staff will be seeking Transportation Committee and Policy Board approvals of motions to set each regional target. Penalties for non-compliance are stiff, with the possibility of a reduction of participating federal transportation funding levels. There are also consequences for not meeting identified performance targets, which could result in a loss of flexibility in how federal funds are programmed.

FHWA and FTA Transportation Performance Measures

March 2018

FHWA Goal	Initial Target Due Dates	Performance Area	Performance Measure	Status
Safety (PM1)	State: 8/31/2017 MPO: 2/27/2018	Injuries & Fatalities	<ul style="list-style-type: none"> Number of fatalities Fatality rate (per 100 million vehicle miles traveled) Number of serious injuries Serious injury rate (per 100 million vehicle miles traveled) Number of non-motorized fatalities and non-motorized serious injuries 	On December 13, 2017, CRCOG's Policy Board endorsed CTDOT's 2018 Safety Performance Targets as the regional performance targets for the MPO
Infrastructure Condition (PM2)	State: 5/20/2018 MPO: 11/16/2018*	Pavement Condition Bridge Condition	<ul style="list-style-type: none"> Percentage of pavements on the Interstate System in Good condition Percentage of pavements on the Interstate System in Poor condition Percentage of pavements on the non-Interstate NHS in Good condition Percentage of pavements on the non-Interstate NHS in Poor condition Percentage of NHS bridges classified as in Good condition Percentage of NHS bridges classified as in Poor condition 	CTDOT is evaluating Pavement and Bridge Conditions and will be updating the regions regarding data-set and target setting progress on March 27, 2018
Performance of the NHS, Freight, and CMAQ Measures (PM3)	State: 5/20/2018 MPO: 11/16/2018*	Performance of the National Highway System (NHS) Freight Movement /Economic Vitality Congestion Reduction Environmental Sustainability	<ul style="list-style-type: none"> Percent of person miles traveled on the Interstate System that are reliable Percent of person miles traveled on the non-Interstate NHS that are reliable Truck Travel Time Reliability (TTTR) Index Annual hours of peak-hour excessive delay per capita Percent of non-single-occupant vehicle travel On-Road Mobile Source Emissions reduction 	CRCOG has calculated historical metric results for Performance of the NHS and Freight Movement/Economic Vitality and has attended a February 27 th technical meeting with CTDOT to discuss. CRCOG has begun analysis of historical Congestion Reduction and Environmental Sustainability data.
FTA Goal	Initial Target Due Dates	Performance Area	Performance Measure	Status
Transportation Asset Management	State: 1/1/2017 MPO: 6/30/2017	Rolling Stock Equipment Facilities Infrastructure	<ul style="list-style-type: none"> Percentage of revenue vehicles (by type) that exceed the Useful Life Benchmark (ULB) Percentage of non-revenue service vehicles (by type) that exceed the ULB Percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale Percentage of track segments (rail fixed-guideway only) that have performance restrictions 	On June 26, 2017, CRCOG's Transportation Committee (acting on behalf of the Policy Board) endorsed CTDOT's State of Good Repair Performance Targets as the regional performance targets for the MPO
Safety	State: TBD MPO: TBD*	Fatalities Injuries Safety Events System Reliability	<ul style="list-style-type: none"> Total number reportable fatalities and rate per total vehicle revenue miles by mode Total number reportable injuries and rate per total vehicle revenue miles by mode Total number reportable events and rate per total vehicle revenue miles by mode Mean distance between major mechanical failures by mode 	States and MPOs are awaiting final federal rulemaking on this measure including finalized target due dates

* Maximum 180 days after the State sets target

To: Transportation Committee
From: Jennifer Carrier, Director of Transportation Planning
Rob Aloise, Principal Transportation Engineer
Date: May 15, 2018
Subject: Transportation Performance Measures and Target Setting

This memorandum provides an update on the Connecticut Department of Transportation's (CTDOT) efforts to comply with federally required Transportation Performance Measures and Target Setting. As a reminder, CTDOT must set 2-year and 4-year targets by May 20, 2018 for ten (10) FHWA performance measures covering 5 general areas, summarized below. After CTDOT establishes targets, CRCOG has 180 days (until November 16, 2018) to either adopt/support each CTDOT target, or set our own.

- Pavement Conditions
- Bridge Conditions
- Performance of the National Highway System (NHS)
- Performance of Freight
- CMAQ Program – On-Road Mobile Source Emissions

Performance targets for highway safety and transit asset management have already been established by our region. Performance targets for congestion reduction do not need to be set until November 2022 and we are awaiting federal guidance and final rule-making for transit safety performance targets.

Background

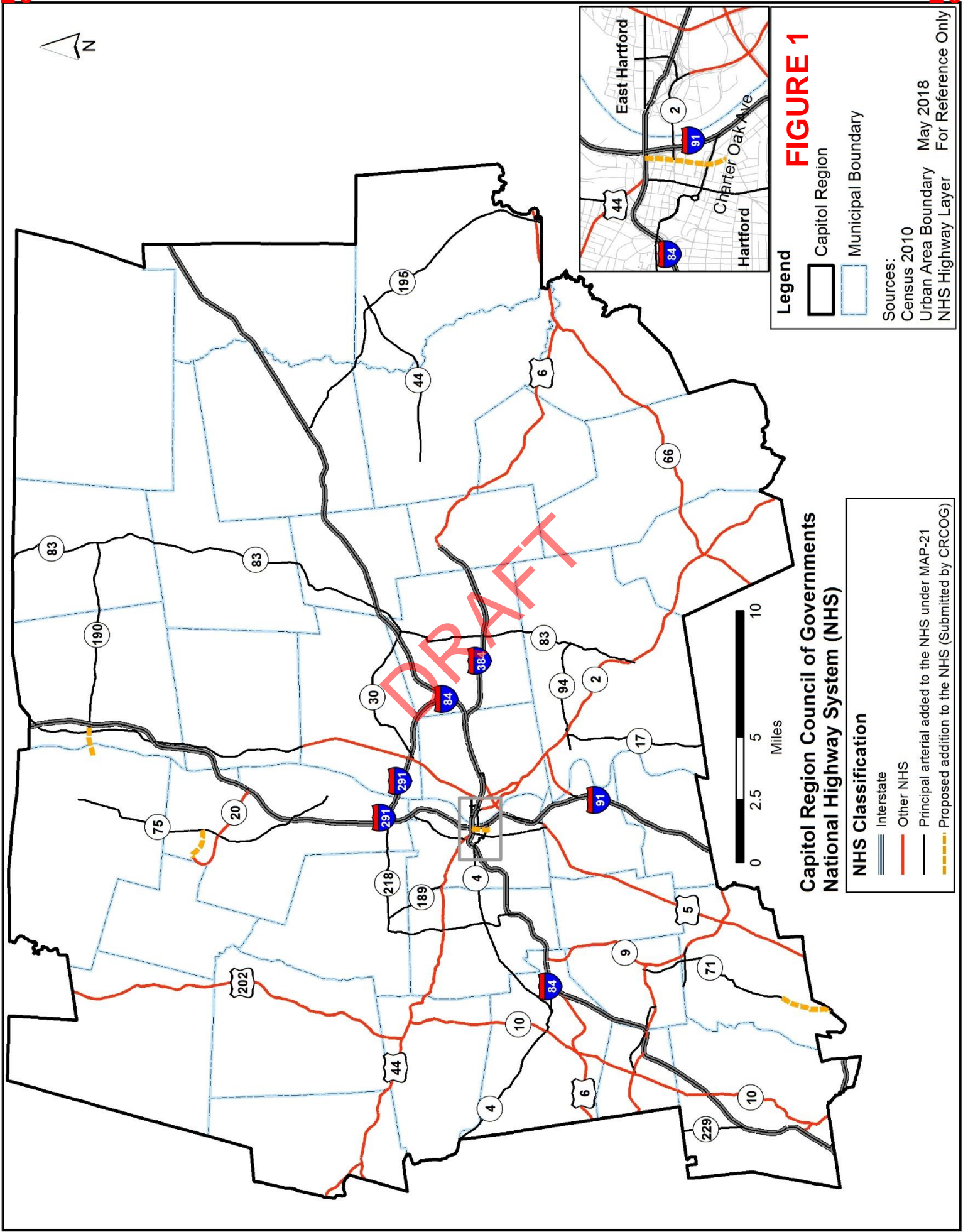
CTDOT met with the regions on May 8th to discuss their methodology for developing specific performance targets. The attached sheets summarize each performance area along with CTDOT's targets. This information should assist us in framing the discussion in our region as we work to understand and establish targets.

One item to specifically note, federal guidance focuses the performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.

Next Steps

There are a number of complicated components to consider when establishing performance targets however it is an important assignment and opportunity for our region. CRCOG staff recommends the following next steps, in an effort to meet the upcoming November regional deadline and more transparently link transportation funding with performance goals. We would be interested in discussing this in more detail at the May 21st Transportation Committee meeting.

- Establish a performance measures working group to discuss these measures and targets in more detail
- Begin to outline goals and objectives for each performance area, linking them back to the Long Range Transportation Plan (LRTP), which will be updated in the coming months.
- Begin to outline projects in CRCOG's Transportation Improvement Program (TIP) that fit within each performance area, ensuring projects are advanced
- Begin to outline new initiatives and projects that work to address performance
- Regularly coordinate with CTDOT given their management of the NHS within our region (e.g. ensure we receive updates as it relates to pavement and bridge conditions and investments within our region)



Pavement Conditions

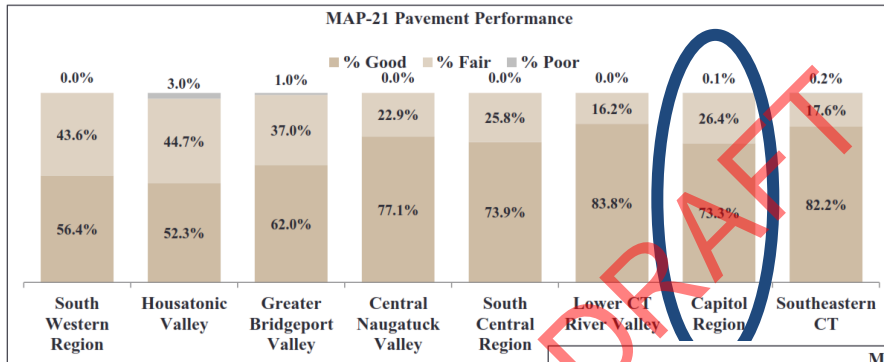
The four performance measures include:

- Percentage of Pavements on the Interstate System in Good condition
- Percentage of Pavements on the Interstate System in Poor condition
- Percentage of Pavements on the non-Interstate NHS in Good condition
- Percentage of Pavements on the non-Interstate NHS in Poor condition

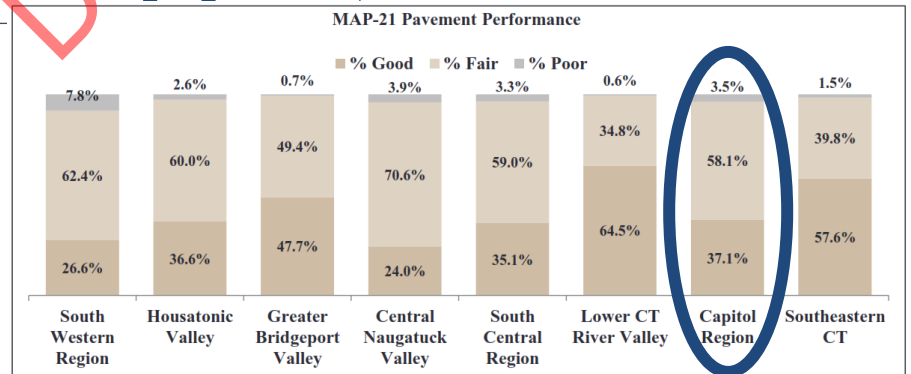
To understand these measures it is important to have the following background:

- CTDOT uses dTIMs, developed by Deighton Associates, as their asset management system. The program encompasses strategic planning components with maintenance, operations and capital investment decision-making aspects.
- CTDOT's Pavement Management System, consists of three major components: a system to regularly collect highway condition data; a computer database (ROADWARE Vision) to process, sort, and store the collected data, and dTIMS to evaluate repair or preservation strategies and suggest cost-effective projects to maintain highway conditions.
- The below graphics represent pavement conditions within our region, compared to other regions.

Percentage of Pavements on the Interstate System in Good/Poor Condition



Percentage of Pavements on the non-Interstate NHS in Good/Poor Condition



Condition

CTDOT's pavement condition performance targets are to the right. The current conditions column reflects what CTDOT provided to the Federal Highway Administration (FHWA) last year in their Highway Performance Monitoring System (HPMS) submittal. HPMS is required of all states and is primarily used when assigning federal highway funding to states.

Pavement Condition Measures	Asset (unit of measure)	Current Condition (HPMS submittal 6/2017)		2-year targets (2020)		4-year targets (2022)	
		Good %	Poor %	Good %	Poor %	Good %	Poor %
• % of Interstate system in "Good" and "Poor" condition • MAX % Poor (Interstates): 5%	Interstate Pavement (lane miles)	66.2	2.2	65.5	2.0 Better	64.4	2.6
• % of National Highway System in "Good" and "Poor" condition	Non-Interstate NHS Pavement (lane miles)	37.9	8.6	36.0	6.8 Better	31.9	7.6

Bridges

The four performance measures include:

- Percentage of NHS Bridges classified as in Good condition
- Percentage of NHS Bridges classified as in Poor condition


To understand these measures it is important to have the following background:

- CTDOT uses dTIMs, developed by Deighton Associates, as their asset management system. The program encompasses strategic planning components with maintenance, operations and capital investment decision-making aspects.
- CTDOT’s Bridge Management System starts with the current status of the bridge, accounts for programmed work and adjusts for predicted decay. Major bridges are analyzed individually by engineers and spreadsheets and all other structures are analyzed by dTIMS. Bridge inputs to dTIM include current bridge condition data, deterioration curves, scheduled projects, treatments and costs, budgets, time spans, inflation and discount rates.
- The below graphics represent bridge conditions within our region, compared to other regions.

Percentage of NHS Bridges classified as in Good/Poor condition

MPO	NHS-NBI Bridges (Deck Area - ft ²)	Locally Owned NHS-NBI Bridges	FAST Act National Performance Management Measures	
			% Good (by deck area)	% Poor or % Structurally Deficient (by deck area)
1 - South Western	2,183,450	0	3.3%	19.1%
2 - Housatonic Valley	920,157	2	22.0%	7.4%
3 - Northwest Hills (RPO)	273,510	0	22.7%	10.0%
5 - Central Naugatuck Valley	1,917,348	1	9.7%	34.2%
7 - Greater Bridgeport Valley	3,765,462	0	24.8%	6.3%
8 - South Central Region	4,014,609	4	42.8%	6.0%
10 - Capitol Region	8,567,699	5	13.6%	15.7%
11 - Lower CT River Valley	1,418,300	2	11.0%	16.2%
13 - Southeastern CT	2,832,830	0	7.4%	23.0%
15 - Northeastern CT (RPO)	377,273	0	15.3%	12.6%
TOTAL	26,270,638	14	18.1%	14.9%

CTDOT’s bridge performance targets are summarized to the right. The current conditions column reflects what CTDOT provided to the Federal Highway Administration (FHWA) last year in their Highway Performance Monitoring System (HPMS) submittal. HPMS is required of all states and is primarily used when assigning federal highway funding to states.



Bridge Condition Measures

- % of NHS Bridges in “Good” and “Poor” condition
- **Max % poor: 10 (MAP-21)**

Asset (unit of measure)	Current Condition (NBI submittal 3/2017)		2-year targets (2020)		4-year targets (2022)	
	Good %	Poor %	Good %	Poor %	Good %	Poor %
NHS Bridge (deck area)	18.1	15.0	22.1	7.9	26.9	5.7
			Better	Better	Better	Better

National Highway System (NHS) Performance

The three performance measures include:

- Percent of person-miles traveled on the Interstate System that are reliable
- Percent of person-miles traveled on the non-Interstate NHS that are reliable
- Annual hours of peak-hour excessive delay per capita (CTDOT will establish in 2022; CROCOG not required to set this target until 2022 given our region is less than 1 million population.)

To understand these measures it is important to have the following background:

- Data come from the National Performance Management Research Data Set (NPMRDS), which provides an average travel time in seconds for each segment and 15-minute period
- Reliability is defined as the Level of Travel Time Reliability (LOTTR) and it is a ratio of the longer travel times (defined by 80th percentile) to a normal travel time (defined by the 50th percentile)
- If LOTTR is less than 1.5, it is considered to be reliable
- LOTTR is calculated for each road segment on an annual basis for the AM, Midday, PM, and Weekend time periods, the maximum determines a segment’s overall reliability (e.g. AM LOTTR: 1.49, Midday LOTTR: 1.38, PM LOTTR: 1.63, Weekend LOTTR: 1.35, Overall Segment LOTTR = 1.63, and is therefore Unreliable)
- The percentage of reliable person-miles comes from the sum of all “reliable” segments compared to the sum of all segments. Person-miles are a factor of a segment’s length, annual traffic volume and occupancy factor (persons per vehicle). CTDOT assumed an occupancy factor of 1.7. (e.g. 1.5 mile segment * 95,000 vehicles *1.7 occupancy factor = 242,250 person-miles for that segment)
- CTDOT used the Mobility Measurement in Urban Transportation (MMUT) pooled fund program based at Texas A&M University to perform data analysis on NPMRDS and prepare the performance targets; CROCOG staff has been using other statistical software (including excel and R software programs) when calculating the same measures
- The below illustrates a general example expanding upon the above:

Segment	AM LOTTR	Midday LOTTR	PM LOTTR	Weekend LOTTR	Overall	Reliability
Segment A	1.49	1.38	1.63	1.35	1.63	Unreliable
Segment B	1.48	1.35	1.49	1.31	1.49	Reliable

Segment	Length (miles)	Annual Traffic Volume	Occupancy Factor	Person-Miles	Percentage
Segment A (Unreliable)	1.5	95,000	1.7	242,250	50.25%
Segment B (Reliable)	1.7	83,000	1.7	239,870	49.75%
Total				482,120	100.00%

CTDOT’s NHS performance targets for the State of Connecticut are illustrated to the right.

System Reliability Measures

- % person-miles of Interstate that are “reliable”
- % person-miles of non-Interstate NHS that are “reliable”

System (unit of measure)	Current Condition	2-year targets (2020)	4-year targets (2022)
	Reliable %	Reliable %	Reliable %
Interstate (person-miles)	78.3	75.2	72.1
Non-Interstate NHS (person-miles)	83.6	80.0	76.4

Reliability declines in all cases

Freight Performance

The freight performance measure includes:

- Truck Travel Time Reliability Index (TTTR)

To understand this measure it is important to have the following background:

- Data come from the National Performance Management Research Data Set (NPMRDS), which provides an average travel time in seconds for each segment and 15-minute period
- Reporting is divided into 5 time periods: morning peak (6-10 am); midday (10am – 4 pm) and afternoon peak (4-8 p.m.) Mondays through Fridays; weekends (6 a.m.-8 p.m.); and overnights for all days (8 p.m.-6 a.m.).
- Truck Travel Time Reliability Index (TTTR) is a ratio of the 95th percentile time to the 50th percentile time (also called normal time) for each segment. The TTTR Index is generated by multiplying each segment’s largest ratio of the five periods by its length, then dividing the sum of all length-weighted segments by the total length of Interstate.
- CTDOT used the Mobility Measurement in Urban Transportation (MMUT) pooled fund program based at Texas A&M University to perform data analysis on NPMRDS and prepare the performance targets; CRCOG staff has been using other statistical software (including excel and R software programs) when calculating the same measures
- The below illustrates a general example expanding upon the above:

Segment	AM TTTR	Midday TTTR	PM TTTR	Weekend TTTR	Overnight TTTR	Largest TTTR	Segment Length
Segment A	1.8	1.7	1.9	1.4	1.2	1.9	1.5 miles
Segment B	1.9	1.8	2.0	1.5	1.2	2.0	1.3 miles

Segment	Largest TTTR	Segment Length (miles)	Length-Weighted Segment
Segment A	1.9	1.5	2.85
Segment B	2.0	1.3	2.60
	Calculated TTTR	Sum of Segment Lengths	Sum of Length-Weighted Segments
TTTR Index	1.94	2.8	5.45

CTDOT’s freight performance targets for the State of Connecticut are illustrated to the right and below along with the regional findings. The below graphics represent freight conditions within our region, compared to other regions.

Freight Movement Measure

- Truck Travel Time Reliability (TTTR) index

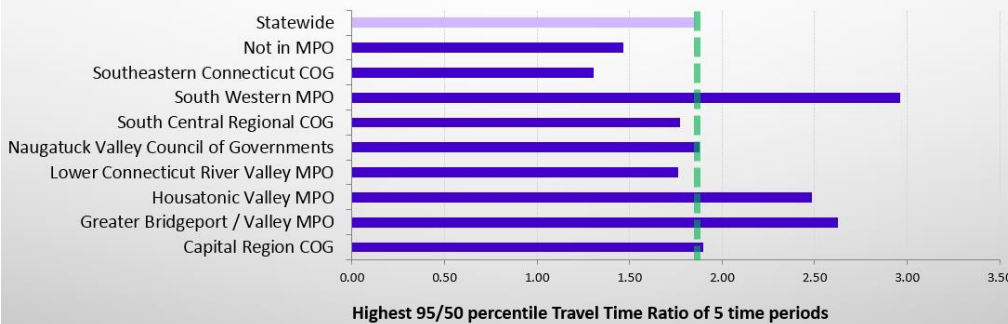
TTTR index = 95th / 50th perc.
The higher the ratio, the worse the reliability

System (unit of measure)	Current Condition	2-year targets (2020)	4-year targets (2022)
	TTTR	TTTR	TTTR
Interstate (Truck Travel Time Reliability Index)	1.75	1.79	1.83

Reliability gets worse

Truck Travel Time Reliability

Weekday { 6-10AM, 10AM-4PM, 4-8PM }
Weekend { 6AM-8PM, 8PM-6AM }



Congestion Mitigation and Air Quality (CMAQ) Program – On-Road Mobile Source Emissions

The CMAQ Program – On-Road Mobile Source Emission measure includes:

- Total Emissions Reduction (kg/day)

To understand these measures it is important to have the following background:

- Emissions components for CMAQ funded projects include Volatile Organic Compounds (VOCs), Nitrogen Oxide (NOx), and Particulate Matter (PM2.5)
- Emissions benefits are counted only on the year funds are first obligated (e.g. When CTfastrak opened in 2015, the emissions reduction was only able to be shown in 2015 per federal guidelines when there were also actual benefits in years following).
- CTDOT has relayed that there is variability in yearly obligations under the CMAQ program and mega-projects have significant impacts on the overall emissions reductions.
- Emissions reduction estimates for each CMAQ funded project by pollutant and precursor are identified here: https://fhwaapps.fhwa.dot.gov/cmaq_pub/

CTDOT’s air quality performance targets, denoting anticipated future additional reductions to emissions for the State of Connecticut, are illustrated below.



Air Quality Measure

- Total Emissions Reduction
- From projects entered into the CMAQ Public Access system in previous year

Emissions Component	Current Measurements (CMAQ Public Access as of 2017)		2-year targets (2020)	4-year targets (2022)
	2-year cumulative kg/day	4-year cumulative kg/day	2-year cumulative kg/day	4-year cumulative kg/day
VOC	10.820	263.890	19.320	30.140
NOx	34.680	462.490	67.690	102.370
PM2.5	1.040	12.950	1.632	2.674

DRAFT

Part 3:
FHWA Performance Measures
and Targets

DRAFT

DRAFT

To: Transportation Committee
From: Jennifer Carrier, Director of Transportation Planning
 Jillian Massey, Senior Transportation Planner
Date: November 3, 2017
Subject: Safety Performance Measures

It has recently been brought to CRCOG's attention that CTDOT has established targets for safety performance measures. They were included in the Highway Safety Plan (HSP) sent by CTDOT to the National Highway Traffic Safety Administration (NHTSA) (approved on August 18, 2017) and the Highway Safety Improvement Program (HSIP) annual report sent by CTDOT to FHWA (approved on September 26, 2017). The purpose of this memo is to begin the conversation of safety performance measures with the Committee and to begin working toward endorsing targets with our Metropolitan Planning Organization (MPO).

Federal Regulations

Federal regulations (23 CFR 490.207 (a) (National performance management measures for the Highway Safety Improvement Program) state that MPOs shall establish performance targets for each of the measures identified in the HSIP by **February 27, 2018**. CRCOG's Policy Board acts as the MPO for the Hartford Urbanized Area, and is advised by the Transportation Committee. The five (5) safety performance measures that MPOs are required to set targets for include:

- Number of Fatalities
- Rate of Fatalities (per 100 million VMT)
- Number of Serious Injuries
- Rate of Serious Injuries (per 100 million VMT)
- Number of Non-motorized Fatalities plus Serious Injuries

To provide MPOs with flexibility, federal regulations allow MPOs to support the State targets or establish their own targets. CRCOG will be required to integrate safety goals, objectives, performance measures and targets into the transportation planning process. We will, in our Long Range Transportation Plan, have to identify the anticipated effect of the TIP toward achieving targets and link investment priorities in the TIP to those safety targets. Consequences for not meeting identified performance targets could result in a loss of flexibility in how federal funds are programmed.

CTDOT Safety Targets

CTDOT safety targets were issued to NHTSA and FHWA without being vetted with the Regional Planning Organizations (RPOs). CTDOT has acknowledged this disconnect and has agreed to better coordinate with the RPOs for the 2019 target setting exercise. The following identifies the five (5) safety performance measures. CTDOT's targets are based on a 5-year rolling average. Also included are segments from the HSP and HSIP in Attachments A through E.

- To maintain the five year (2011-2015) moving average of 257 Fatalities during the five year (2014-2018) period.

- To maintain the Fatality rate per 100 M VMT from the five year (2011-2015) moving average of .823 during the five year (2014-2018) period.
- To maintain the five year (2011-2015) moving average of 1,571 Serious (A) Injuries during the five year (2014-2018) period.
- To maintain the five year (2011-2015) moving average of 5.03 Serious (A) Injuries per 100M VMT during the five year (2014-2018) period.
- To maintain the five year moving average of 280 Non-motorized Fatalities and Serious Injuries.

CRCOG Safety Targets

CRCOG reviewed national and regional trends in safety data. Approximately 30% of fatalities and 22% of serious injuries in the last 5 years in Connecticut have occurred in the Capitol Region. Crashes associated with distracted and impaired (under the influence of alcohol or drugs) driving within our region have been on the increase since 2015. The number of distracted driving related crashes increased from 9,392 in 2015 to 10,924 in 2016 and the number of impaired driving related crashes increased from 883 in 2015 to 937 in 2016. Furthermore, fatalities have been on the rise (about 6%) nationally since 2015.

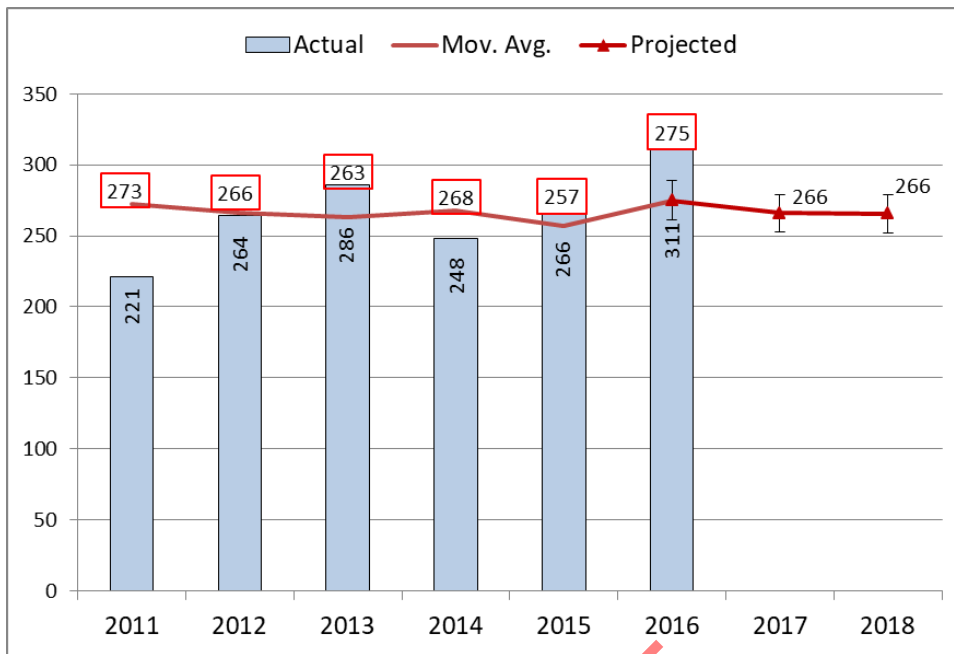
CTDOT is encouraging CRCOG to support the targets set by the CTDOT, as most MPOs in the country are doing for this first year of performance measure target setting. Should we decide to support and endorse the CTDOT's targets, the Unified Planning Work Program (UPWP) will need to be amended to outline roles and responsibilities for the Department and the MPO with regards to performance measures. If we elect to establish our own targets they would apply to all public roads in the region and we would need to estimate vehicle miles traveled (VMT) for all of these roads.

As we begin to review the material and consider safety performance targets we may want to consider the following:

- Fatalities and serious accidents are on the rise and our state's small geography may support CRCOG adopting CTDOT's targets for this first year. CTDOT's targets "maintain" 5-year averages which are good assumptions given crashes are on the rise. CRCOG can work in the coming year to assess what other regions are doing nationally and get a better handle on VMTs within the region (this incorporates understanding daily traffic on all public roads).
- CRCOG will be advancing a regional safety plan in the next couple of years (a joint effort with DOT and the regions). This regional plan can help us pinpoint safety patterns and areas of concerns.
- If we adopt CTDOT targets we may want to request CTDOT coordinate quarterly meetings with Regional Planning Organizations to collaborate on safety efforts and reaching targets.
- Continuing to work closely and collaborate with the Safety Circuit Rider program to address safety on local roads and understand best practices as it relates to safety projects.
- Consider amending our rating criteria or funding set-aside amounts on certain funding programs (e.g. LOTCIP, TA Set-Aside) to support projects that address safety.

We would be interested in your opinions in the coming months. Feel free to contact either of us if you have any comments or concerns: jcarrier@crcog.org or jmassey@crcog.org.

Fatalities 2011-2016

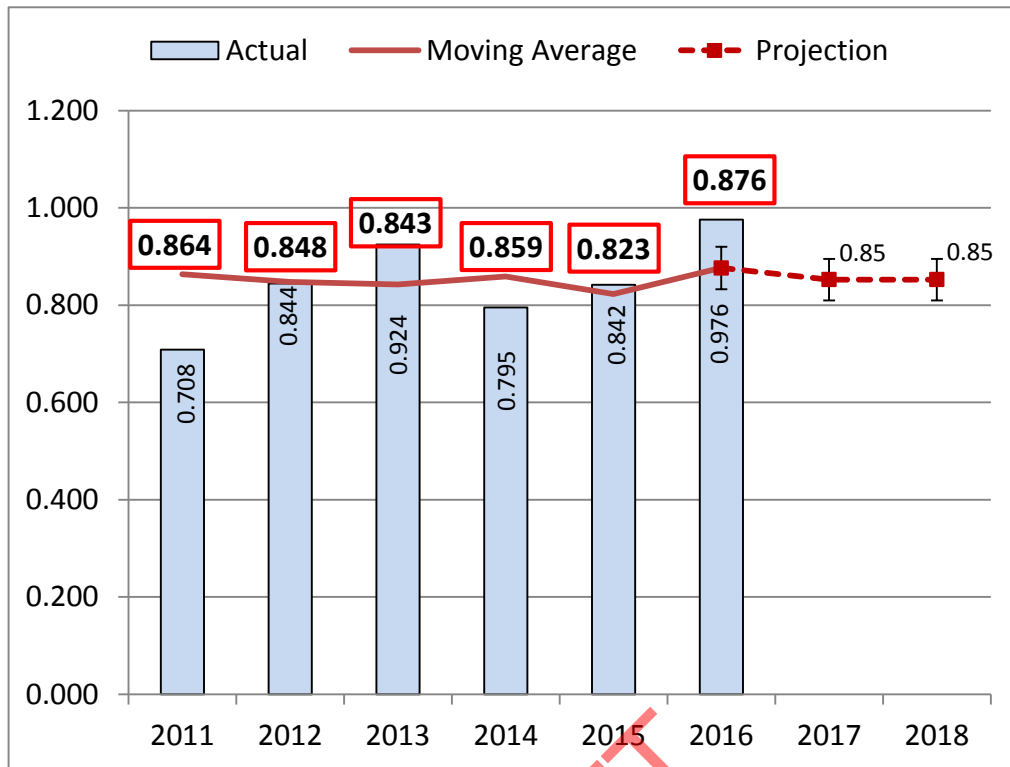


Source: FARS Final 2015/Connecticut Department of Transportation 2016 Crash File

To maintain the five year (2011-2015) moving average of 257 Fatalities during the five year (2014-2018) period.

- While fatality figures have fluctuated during the five year reporting period, the five year moving average and trend has continued to decrease for the 2011-2015 baseline period.
- Although the five year moving average decreased during the 2011-2015 baseline period, preliminary 2016 data show the fatality total of 311 and the five year moving average of 275 to represent an increase in the five year moving average.
- 2017 data show current fatality trends to keep pace with 2016 for the year to date.
- For this reason, the fatality trend is expected to increase during the planning period. Collaboration with SHSP targets has led to the choice to maintain the current five year moving average.

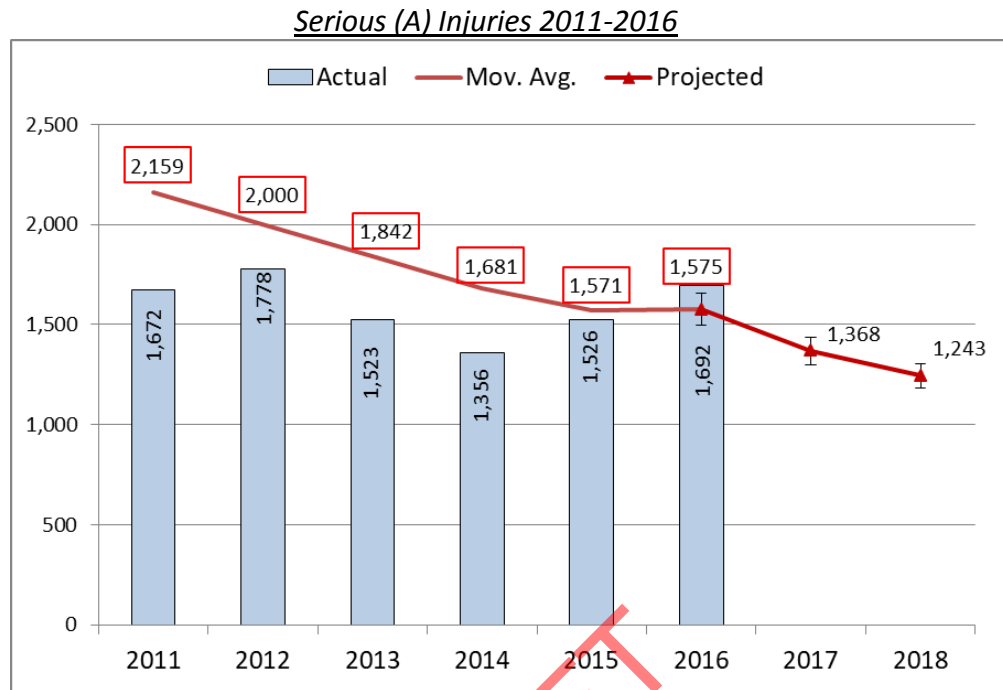
Fatality Rate per 100 M VMT 2011-2016



Source: FARS final files 2011-2014, Annual Report File 2015, CT Crash Data Repository 2016

To maintain the Fatality rate per 100 M VMT from the five year (2011-2015) moving average of .823 during the five year (2014-2018) period.

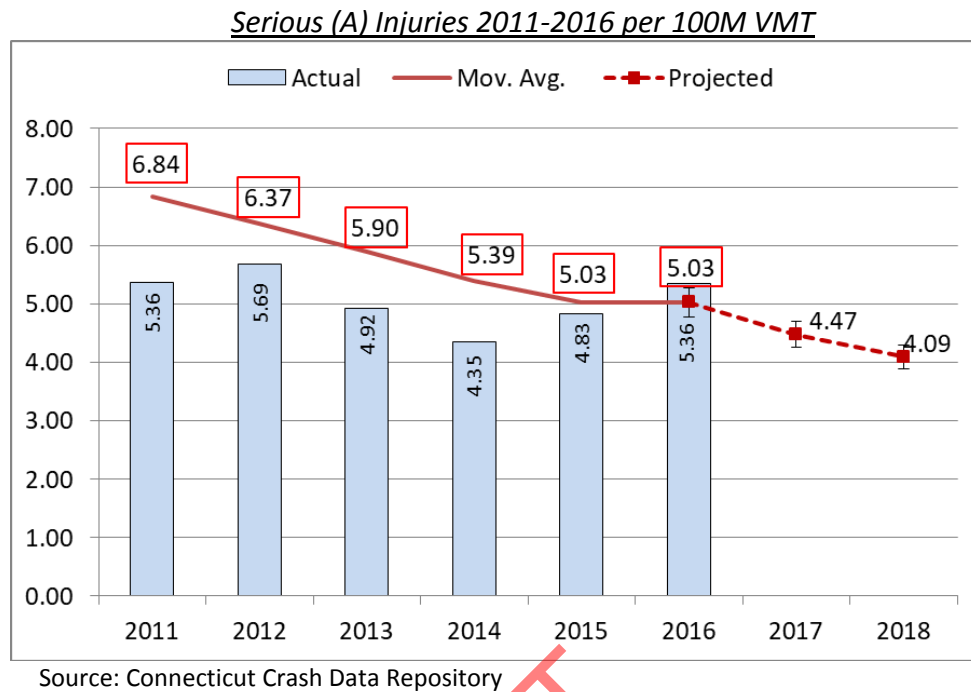
- The five year moving average decreased from .864 (2007-2011) to .823 during the 2011-2015 baseline period.
- Although the five year moving average decreased during the 2011-2015 baseline period, preliminary 2016 data show the fatality total of 311 and the five year moving average of 275 to represent an increase in the five year moving average.
- 2017 data show current fatality trends to keep pace with 2016 for the year to date.
- Although 2016 VMT data was not available at the time of publishing (projected VMT was used in the 2016 figure in this graph),
- Based on the anticipated increase in fatalities in 2016 and 2017, the Fatality rate per 100M VMT trend is expected to increase during the planning period. Collaboration with SHSP targets has led to the choice to maintain the current five year moving average.



Source: FARS final files 2011-2014, Annual Report File 2015, CT Crash Data Repository 2016

To maintain the five year (2011-2015) moving average of 1,571 Serious (A) Injuries during the five year (2014-2018) period.

- While Serious (A) Injuries have fluctuated during the five year reporting period, the five year moving average and trend has continued to decrease for the 2011-2015 baseline period.
- Although the five year moving average decreased during the 2011-2015 baseline period, preliminary 2016 data show the Serious (A) Injury total of 1,692 and the five year moving average of 1,575 to represent an increase in the five year moving average.
- Serious Injury totals have increased for consecutive years, for this reason, the Serious (A) Injury trend is expected to increase during the planning period. Collaboration with SHSP targets has led to the choice to maintain the current five year moving average.



To maintain the five year (2011-2015) moving average of 5.03 Serious (A) Injuries per 100M VMT during the five year (2014-2018) period.

- While Serious (A) Injuries have fluctuated during the five year reporting period, the five year moving average and trend has continued to decrease for the 2011-2015 baseline period.
- Although the five year moving average decreased during the 2011-2015 baseline period, preliminary 2016 data show the Serious (A) Injury per 100M VMT total of 4.83 and the five year moving average of 5.03 to represent an increase in the five year moving average.
- Although 2016 VMT data was not available at the time of publishing projected VMT was used in the 2016 figure in this graph.
- Serious Injury totals have increased for consecutive years, for this reason, the Serious (A) Injury per 100M VMT trend is expected to increase during the planning period. Collaboration with SHSP targets has led to the choice to maintain the current five year moving average.

2017 Connecticut Highway Safety Improvement Program

**Total Number of Non-Motorized
Fatalities and Serious Injuries** 280

Describe the basis for established target, including how it supports SHSP goals.

•Although Pedestrian and Bicyclist Fatalities and Serious Injuries have maintained a fairly steady level over the reporting period, there has been an increase in this measure during the last two years. Preliminary 2016 and 2017 data show this increase to be maintained during the current year. •Though 2016 VMT data was not available at the time of goal setting for the 2018 planning period, this trend is expected to continue and possibly increase. For this reason, the fatality and serious injury trends are expected to increase during the planning period and maintaining the current number of pedestrian bicyclists killed and seriously injured was chosen. After reviewing the 2017-2021 SHSP goals and emphasis area strategies, CTDOT chose to maintain the current number of pedestrian and bicyclists killed and seriously injured.

DRAFT

To: Transportation Committee
Transportation Subcommittee

From: Jennifer Carrier, Director of Transportation Planning
Rob Aloise, Principal Transportation Engineer

Date: June 6, 2018; REVISED June 15, 2018

Subject: Performance Measures and Target Setting – Bridge Conditions

REVISED

Revisions to:

- Text in RED
- Figure 3

Per Federal requirements, on May 20, 2018 CTDOT set 2-year and 4-year Transportation Performance Measures targets for ten (10) FHWA performance measures covering 5 general areas, summarized below. CRCOG now has until November 16, 2018 to either adopt/support each CTDOT target, or set our own.

- Bridge Conditions
- Pavement Conditions
- Performance of the National Highway System (NHS)
- Performance of Freight
- CMAQ Program – On-Road Mobile Source Emissions

This memorandum presents and reviews the current Bridge Conditions and CTDOT Performance Measure Targets, and offers potential CRCOG Target recommendations for review and discussion at the upcoming June Subcommittee meeting.

FHWA Bridge Conditions Performance Measure

The two FHWA Bridge Condition performance measures include:

- Percentage of NHS Bridges classified as in Good condition (by deck area)
- Percentage of NHS Bridges classified as in Poor condition (by deck area)

To understand these measures, it is important to have the following background:

- Federal guidance focuses the bridge performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.
- Per federal guidelines, structures with lengths exceeding 20 feet (sum of its spans) are considered bridges. CTDOT regularly inspects all Connecticut bridges (regardless of ownership), and assigns each a condition rating (Good, Fair, Poor) also per federal guidelines.
- CTDOT uses dTIMs, developed by Deighton Associates, as their asset management system. The program encompasses strategic planning components with maintenance, operations and capital investment decision-making aspects.
- CTDOT's Bridge Management System starts with the current status of the bridge, accounts for programmed work and adjusts for predicted decay. Major bridges are analyzed individually by engineers and spreadsheets and all other structures are analyzed by dTIMS. Bridge input to dTIMS include current bridge condition data, deterioration curves, scheduled projects, treatments and costs, budgets, time spans, inflation and discount rates.

Current NHS Bridge Conditions

The below graphics represent NHS bridge conditions within our region, compared to other regions.

MPO	NHS-NBI Bridges (Deck Area - ft ²)	Locally Owned NHS-NBI Bridges	FAST Act National Performance Management Measures	
			% Good (by deck area)	% Poor or % Structurally Deficient (by deck area)
1 - South Western	2,183,450	0	3.3%	19.1%
2 - Housatonic Valley	920,157	2	22.0%	7.4%
3 - Northwest Hills (RPO)	273,510	0	22.7%	10.0%
5 - Central Naugatuck Valley	1,917,348	1	9.7%	34.2%
7 - Greater Bridgeport Valley	3,765,462	0	24.8%	6.3%
8 - South Central Region	4,014,609	4	42.8%	6.0%
10 - Capitol Region	8,567,699	5	13.6%	15.7%
11 - Lower CT River Valley	1,418,300	2	11.0%	16.2%
13 - Southeastern CT	2,832,830	0	7.4%	23.0%
15 - Northeastern CT (RPO)	377,273	0	15.3%	12.6%
TOTAL	26,270,638	14	18.1%	14.9%

Currently, 15.0% of NHS Bridges statewide (by deck area) are categorized in Poor condition, with bridges within CRCOG experiencing a similar percentage of 15.7%. A map showing the region’s NHS Bridges currently in Poor condition appears in Figure 2.

Bridge Condition Measures

- % of NHS Bridges in “Good” and “Poor” condition
- **Max % poor: 10 (MAP-21)**

Assets (unit of measure)	Current Condition (NBI submittal 3/2017)		2-year targets (2020)		4-year targets (2022)	
	Good %	Poor %	Good %	Poor %	Good %	Poor %
NHS Bridge (deck area)	18.1	15.0	22.1	7.9	26.9	5.7
			Better	Better	Better	Better

CTDOT’s statewide bridge performance targets are summarized above.

Staff Review of CTDOT NHS Bridge Condition Targets

Federal regulations require that State DOT’s maintain bridges so the percentage of bridge deck area classified as poor does not exceed 10%. If, for 3 consecutive years, this condition is not met, States are required to obligate and set aside National Highway Performance Program (NHPP) funds for eligible bridge projects on the NHS.

To determine the future 2-year and 4-year statewide targets, CTDOT relied on projections from its bridge asset management program, and utilized an assumption that, 2017 funding levels would be maintained. Under this scenario, CTDOT sees the condition of NHS Bridges improving, with both the percentage of bridges in Good condition increasing, and the percentage of bridges in Poor condition decreasing. The anticipated percent of NHS Bridges in Poor condition, is anticipated to decrease to 7.9% and 5.7% in 2 and 4 years, respectively.

Non-NHS Bridge Conditions

As previously noted, the FHWA bridge performance measures only apply to bridges located on the NHS. However, there are almost as many bridges within the region that are not located on the NHS (516 vs. 528). Currently, 39 of the region's Non-NHS bridges (representing 7.6% of Non-NHS bridge deck area) are in Poor condition. All regional non-NHS bridges are mapped in Figure 3.

An item worth noting, we understand there are 5 locally owned bridges on the NHS. These bridges are generally summarized below:

Condition	Town	Facility Carried	Features Intersected
Poor	West Hartford	North Main St.	West Branch Trout Brook
Good	West Hartford	Farmington Ave.	Trout Brook
Fair	Hartford	I-84 AMTRAK CTFA	North Branch of Park River
Fair	Hartford	I-84 RAMPS and Locals Streets	Park River Conduit
Fair	Hartford	SR 598 + Local Streets	Park River Conduit

As we consider bridge conditions and investments, we may want to consider prioritizing improvements to these 5 bridges, when conditions merit, given they are locally owned and appear to be regionally significant. CRCOG will further discuss these structures with the towns of West Hartford and Hartford.

Current TIP Bridge Funding

CRCOG reviewed the Transportation Improvement Program (TIP) and the TIP Bridge Report (April 2018) to assess financials associated with bridge improvements within the Capital Region. In general, we found that approximately \$793 million is programmed in the TIP for bridge projects (including inspection, design, repair and construction) between FFY2018 and 2021.

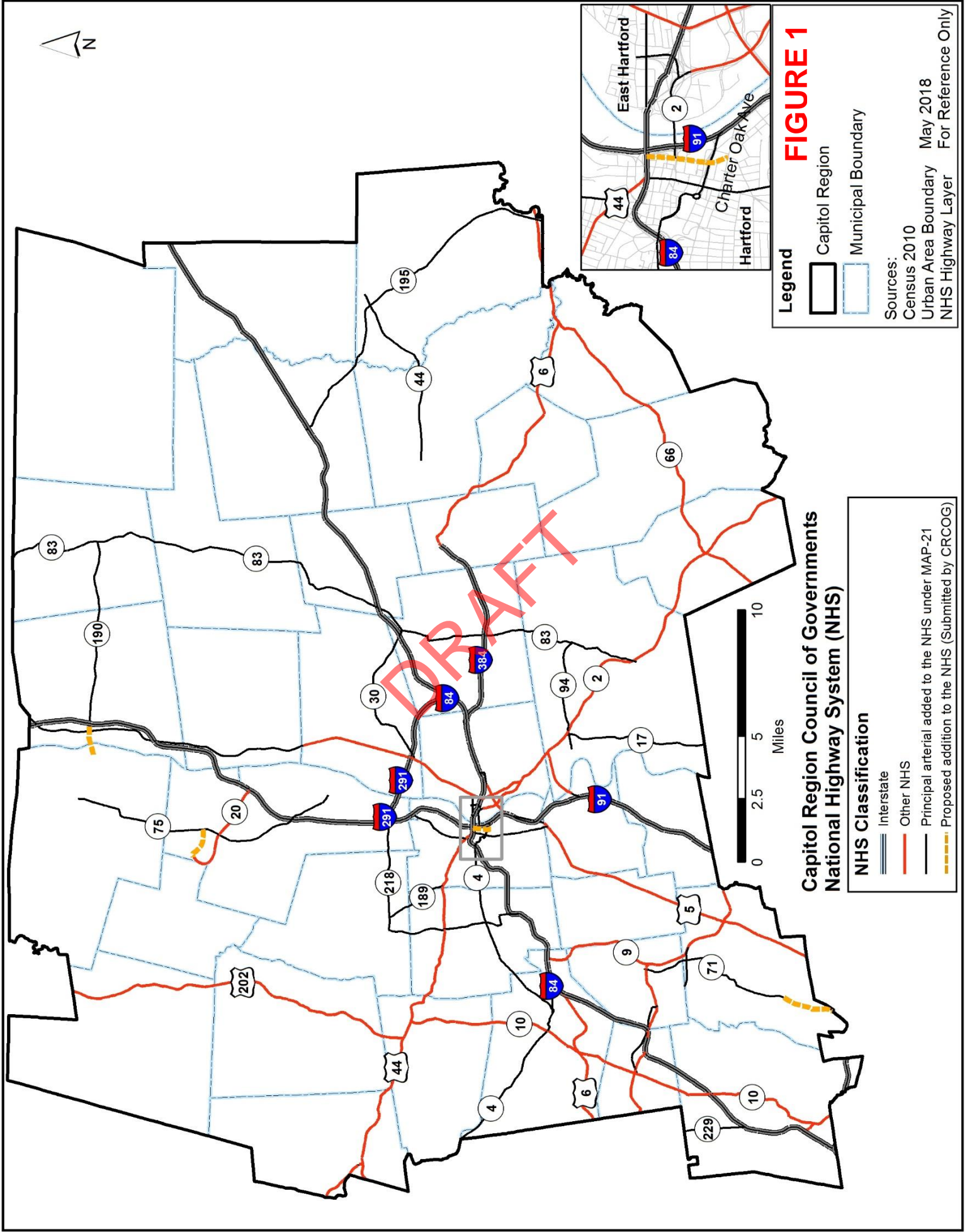
Staff Recommendations

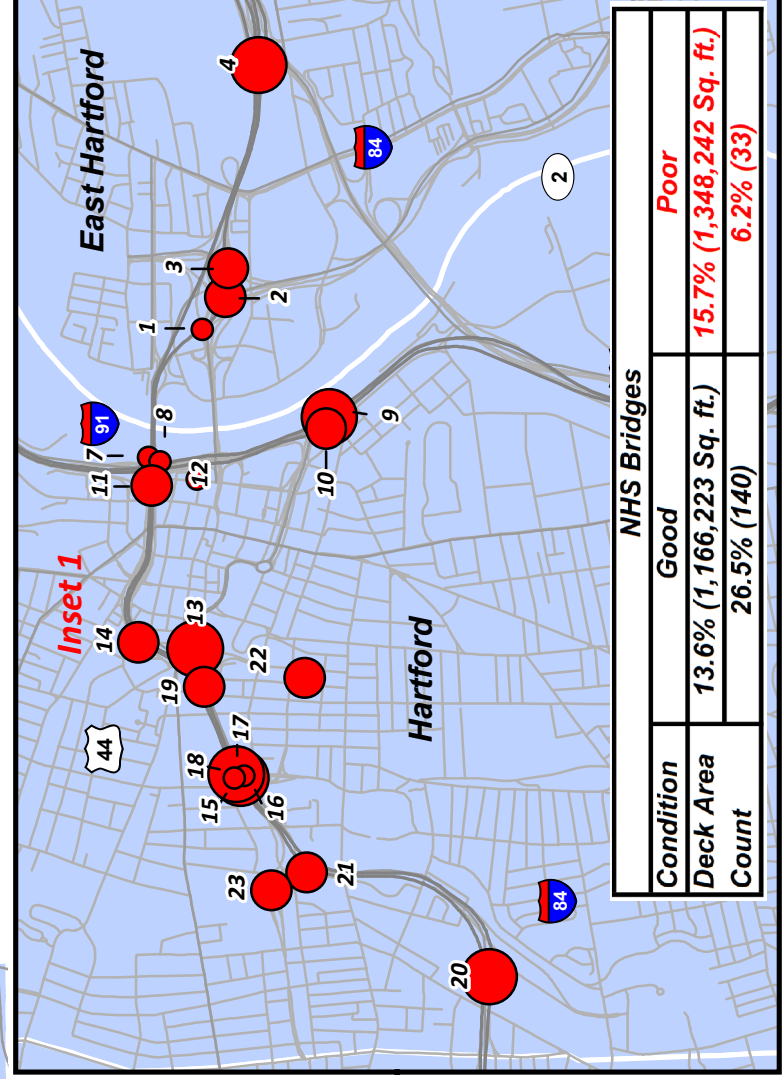
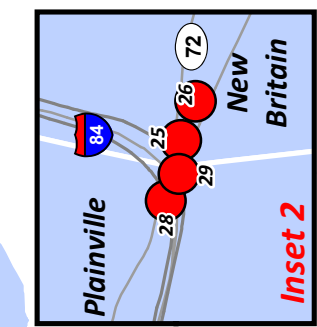
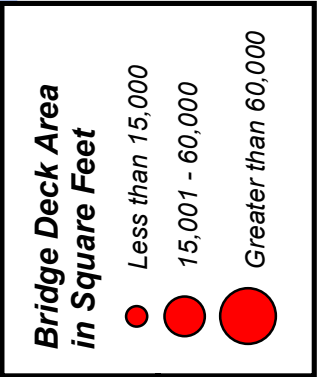
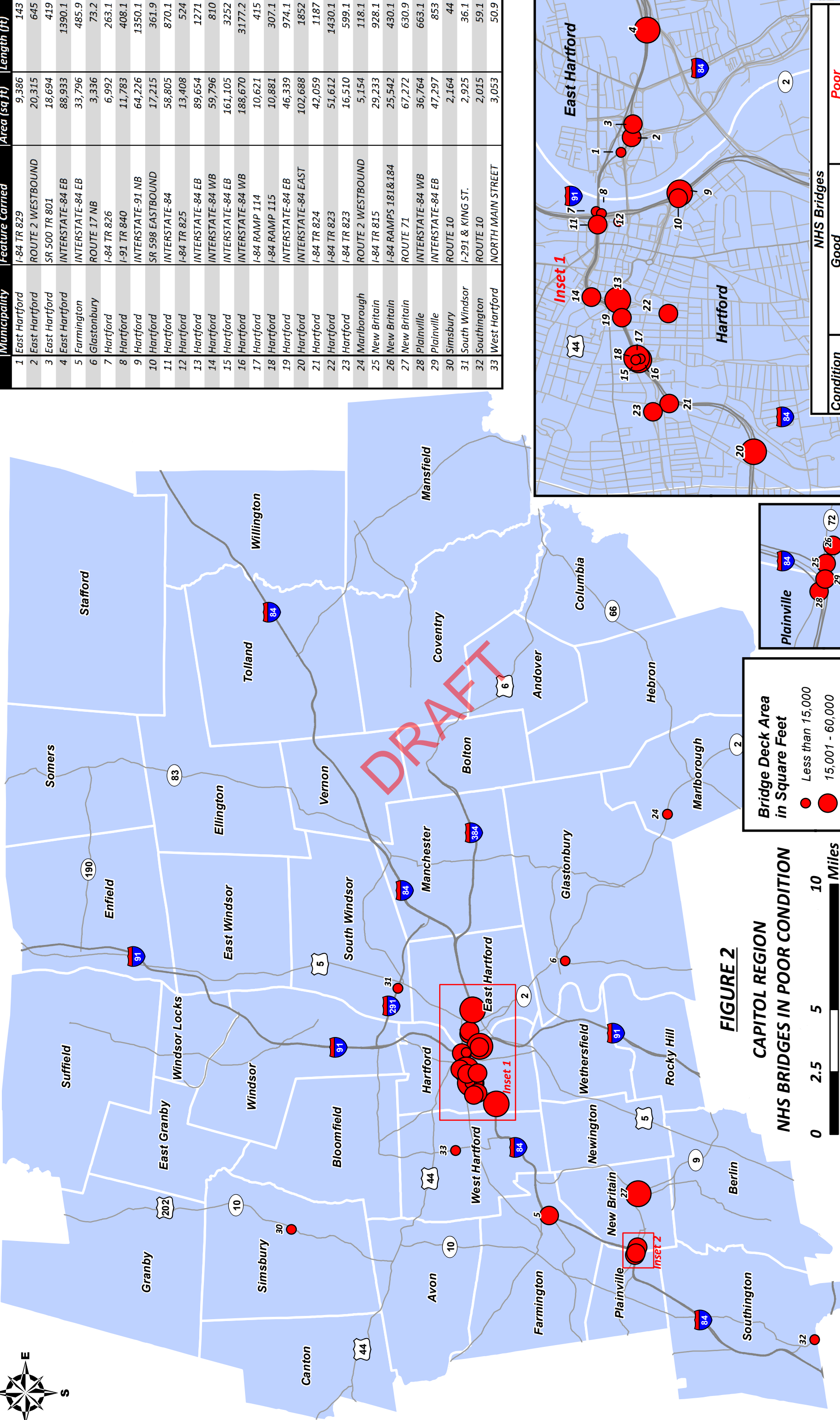
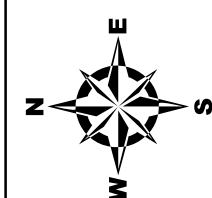
The CTDOT 2020 and 2022 targets work to address the Poor condition of bridges on the NHS and meet federal guidelines. CRCOG feels developing our own regional targets for NHS roads is outside of what we can reasonably do given limited access to DOT's asset management system and regional data. CRCOG recommends supporting DOT's 2 and 4-year targets for the NHS bridge conditions.

However, CRCOG staff feels that we should also aim to improve the non-NHS bridges in our region, with the goal of **not exceeding a maximum of 10% in poor condition in 2020 and 2022.** We suggest that this goal would be an administrative one and something to monitor and work with CTDOT and municipalities on to ensure projects not on the NHS are being addressed. Many of these non-NHS bridges are municipally owned and therefore of prime importance to us.

CRCOG staff also recommends that we work on the following initiatives:

- Monitor the 5 locally owned bridges on the NHS (identified above) and ensure improvements are prioritized for structures in 'Poor' conditions
- Coordinate with CTDOT to understand the dTIMS asset management system and assess regional use
- Incorporate the Non-NHS Bridges in poor condition data and map into CRCOG's Long Range Transportation Plan
- Update bridge condition mapping on a year basis to monitor progress and bridge conditions
- Coordinate with CTDOT as it relates to bridge investments within our region
- Ensure improvements to Interstate 84 in Hartford advance, especially reconstruction of the Interstate 84 Viaduct project
- Monitor bridge performance best practices in other states and Regional Planning Organizations





NHS Bridges	
Condition	Good
Deck Area	13.6% (1,166,223 Sq. ft.)
Count	26.5% (140)
	15.7% (1,348,242 Sq. ft.)
	6.2% (33)

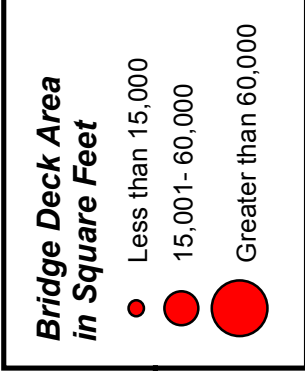
FIGURE 2
CAPITOL REGION
NHS BRIDGES IN POOR CONDITION



Date: June 2018
 Datascource: 2017 National Bridge Inventory
 For Reference Purposes Only

Municipality	Feature Carried	Area (sq ft)	Length (ft)
1 East Hartford	I-84 TR 829	9,386	143
2 East Hartford	ROUTE 2 WESTBOUND	20,315	645
3 East Hartford	SR 500 TR 801	18,694	419
4 East Hartford	INTERSTATE-84 EB	88,933	1390.1
5 Farmington	INTERSTATE-84 EB	33,796	485.9
6 Glastonbury	ROUTE 17 NB	3,336	73.2
7 Hartford	I-84 TR 826	6,992	263.1
8 Hartford	I-91 TR 840	11,783	408.1
9 Hartford	INTERSTATE-91 NB	64,226	1350.1
10 Hartford	SR 598 EASTBOUND	17,215	361.9
11 Hartford	INTERSTATE-84	58,805	870.1
12 Hartford	I-84 TR 825	13,408	524
13 Hartford	INTERSTATE-84 EB	89,654	1271
14 Hartford	INTERSTATE-84 WB	59,796	810
15 Hartford	INTERSTATE-84 EB	161,105	3252
16 Hartford	INTERSTATE-84 WB	188,670	3177.2
17 Hartford	I-84 RAMP 114	10,621	415
18 Hartford	I-84 RAMP 115	10,881	307.1
19 Hartford	INTERSTATE-84 EB	46,339	974.1
20 Hartford	INTERSTATE-84 EAST	102,688	1852
21 Hartford	I-84 TR 824	42,059	1187
22 Hartford	I-84 TR 823	51,612	1430.1
23 Hartford	I-84 TR 823	16,510	599.1
24 Marlborough	ROUTE 2 WESTBOUND	5,154	118.1
25 New Britain	I-84 TR 815	29,233	928.1
26 New Britain	I-84 RAMPS 181&184	25,542	430.1
27 New Britain	ROUTE 71	67,272	630.9
28 Plainville	INTERSTATE-84 WB	36,764	663.1
29 Plainville	INTERSTATE-84 EB	47,297	853
30 Simsbury	ROUTE 10	2,164	44
31 South Windsor	I-291 & KING ST.	2,925	36.1
32 Southington	ROUTE 10	2,015	59.1
33 West Hartford	NORTH MAIN STREET	3,053	50.9

Municipality	Non NHS Bridges in Poor Condition
Andover	3
Avon	1
Berlin	2
Bloomfield	0
Bolton	1
Canton	1
Columbia	0
Coventry	1
East Granby	1
East Hartford	0
East Windsor	0
Ellington	1
Enfield	1
Farmington	1
Glastonbury	2
Granby	2
Hartford	2
Hebron	0
Manchester	1
Mansfield	0
Marlborough	1
New Britain	1
Newington	1
Plainville	1
Rocky Hill	3
Simsbury	0
Somers	0
South Windsor	1
Southington	4
Stafford	0
Suffield	0
Tolland	0
Vernon	2
West Hartford	1
Wethersfield	1
Willington	3
Windsor	0
Windsor Locks	0
CRCOG Total	39



Non-NHS Bridges	
Good	21.4% (630,359 Sq. ft.)
Poor	6.8% (198,925 Sq. ft.)
Deck Area Count	37.2% (192)

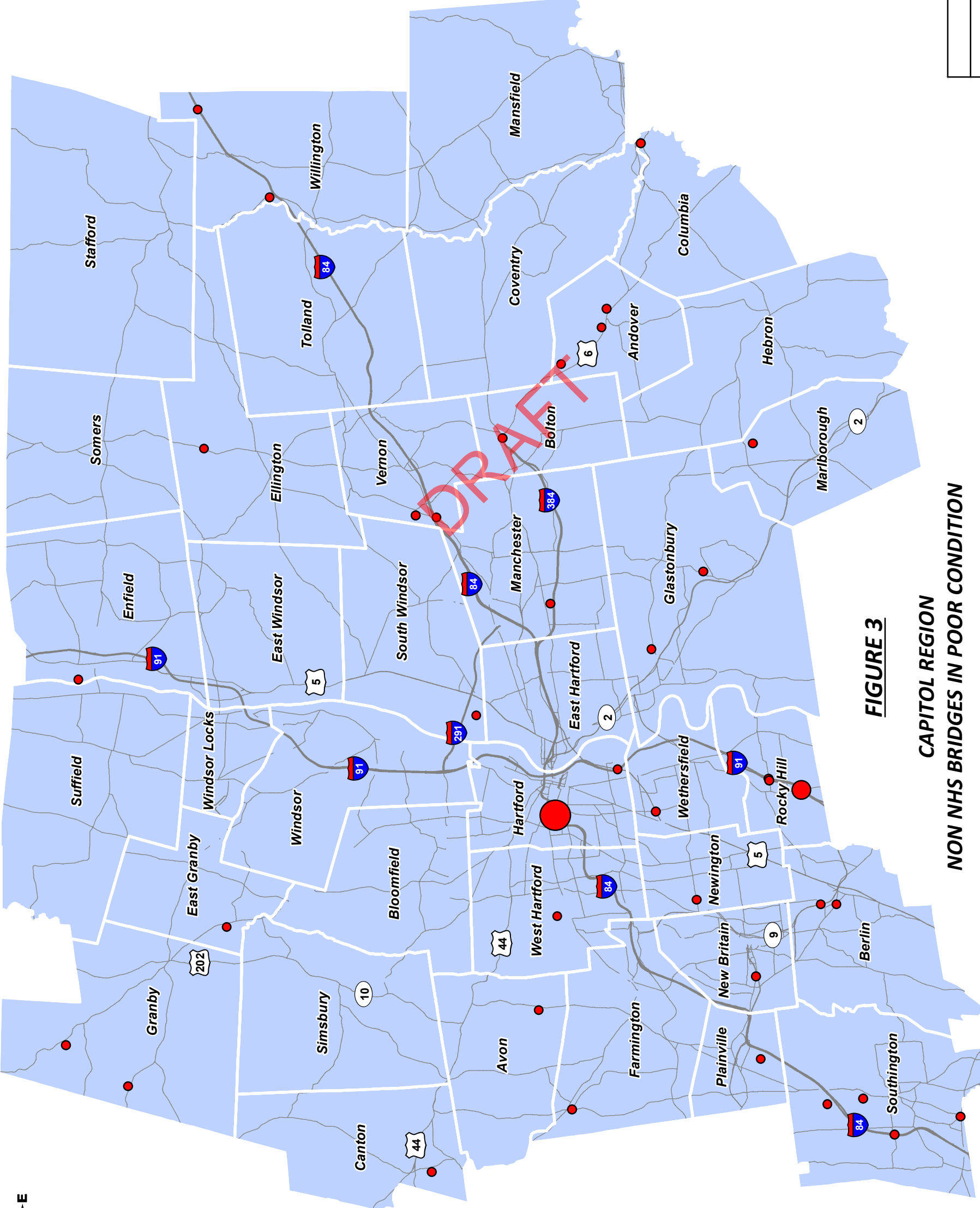
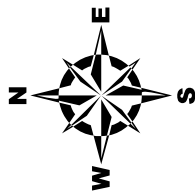


FIGURE 3

**CAPITOL REGION
NON NHS BRIDGES IN POOR CONDITION**



Date: Revised June 15, 2018
 Datasource: 2017 National Bridge Inventory
 For Reference Purposes Only

To: Transportation Committee
From: Jennifer Carrier, Director of Transportation Planning
 Rob Aloise, Principal Transportation Engineer
Date: June 12, 2018
Subject: Performance Measures and Target Setting – Pavement Conditions

This memorandum presents and reviews the current Pavement Conditions and CTDOT Performance Measure Targets, and offers potential CRCOG Target recommendations for review and discussion at the June Subcommittee meeting. CRCOG has until November 16, 2018 to either adopt CTDOT’s targets or set our own.

FHWA Pavement Condition Performance Measures

The four performance measures include:

- Percentage of Pavements on the Interstate System in Good condition
- Percentage of Pavements on the Interstate System in Poor condition
- Percentage of Pavements on the non-Interstate NHS in Good condition
- Percentage of Pavements on the non-Interstate NHS in Poor condition

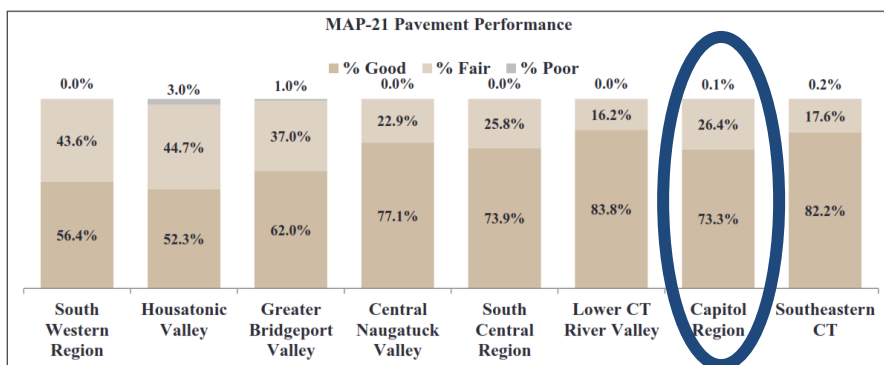
To understand these measures it is important to have the following background:

- Federal guidance focuses the pavement performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.
- CTDOT uses dTIMS, developed by Deighton Associates, as their asset management system. The program encompasses strategic planning components with maintenance, operations and capital investment decision-making aspects.
- CTDOT’s Pavement Management System, consists of three major components: a system to regularly collect highway condition data; a computer database (ROADWARE Vision) to process, sort, and store the collected data, and dTIMS to evaluate repair or preservation strategies and suggest cost-effective projects to maintain highway conditions.

Current NHS Pavement Conditions

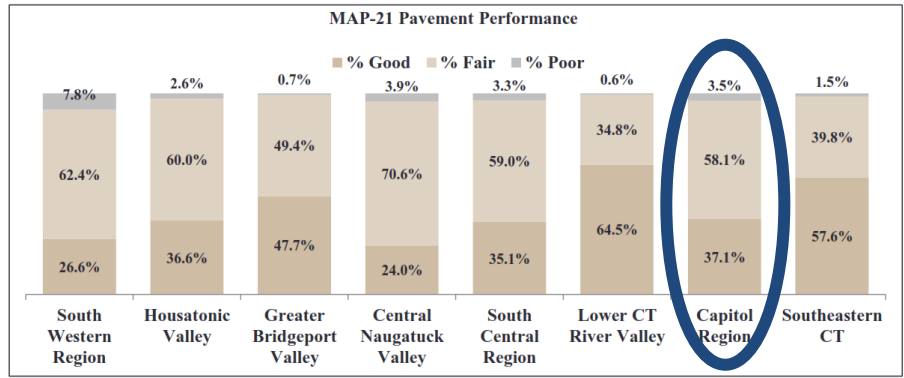
The following graphics represent pavement conditions within our region, compared to other regions.

Percentage of Pavements on the Interstate NHS in Good/Poor Condition



Percentage of Pavements on the non-Interstate NHS in Good/Poor Condition

As illustrated in these graphics, the region’s Interstate NHS pavements and non-Interstate NHS pavements are rated 0.1% and 3.5% poor, respectively.



Statewide, 2.2% of the Interstate NHS pavements and 8.6% of the non-interstate NHS pavements are in poor condition.

CTDOT’s pavement condition performance targets for 2020 and 2022 are shown to the right.

Pavement Condition Measures	Asset (unit of measure)	Current Condition (HPMS submittal 6/2017)		2-year targets (2020)		4-year targets (2022)	
		Good %	Poor %	Good %	Poor %	Good %	Poor %
<ul style="list-style-type: none"> % of Interstate system in “Good” and “Poor” condition <ul style="list-style-type: none"> MAX % Poor (Interstates): 5% % of National Highway System in “Good” and “Poor” condition 	Interstate Pavement (lane miles)	66.2	2.2	65.5	2.0	64.4	2.6
	Non-Interstate NHS Pavement (lane miles)	37.9	8.6	36.0	6.8	31.9	7.6

Staff Review of CTDOT NHS Pavement Condition Targets

Federal regulations require that State DOT’s maintain pavements so the percentage of Interstate pavement classified as poor does not exceed 5% (there is no threshold for non-Interstate pavement). If this condition is not met States are required to set aside and obligate a specified percentage of its NHPP funds and STP funds to correct the Interstate pavement conditions until the 5% minimum threshold is met.

To determine the future 2-year and 4-year statewide targets, CTDOT relied on projections from its pavement asset management program, utilizing the assumption that 2017 funding levels would be maintained. Under this scenario, CTDOT sees the condition of NHS pavements improving slightly in the 2-year projection, then receding slightly back to approximately current conditions in the 4-year timeframe. It should be noted that in both timeframes the percent of Interstate Pavement in Poor condition remains below the 3%, which is below the 5% federal threshold.

Within CRCOG, NHS Pavement Conditions are significantly better than the statewide averages, with only 0.1% of Interstate and 3.5% of Non-Interstate pavement in Poor condition. Both of these measures are within the 5% maximum threshold that FHWA applies to Interstates. A map showing locations where the region’s NHS roadway’s pavements are in Poor condition appears in Figure 2. As shown on the map, there is very little in Interstate pavement that is in Poor condition, and Poor pavement conditions on NHS Non-Interstate roadways are primarily limited to the following three areas:

- Route 71 in Berlin
- Route 30 in South Windsor
- Route 83 in Ellington and in southern Somers

Staff Recommendations

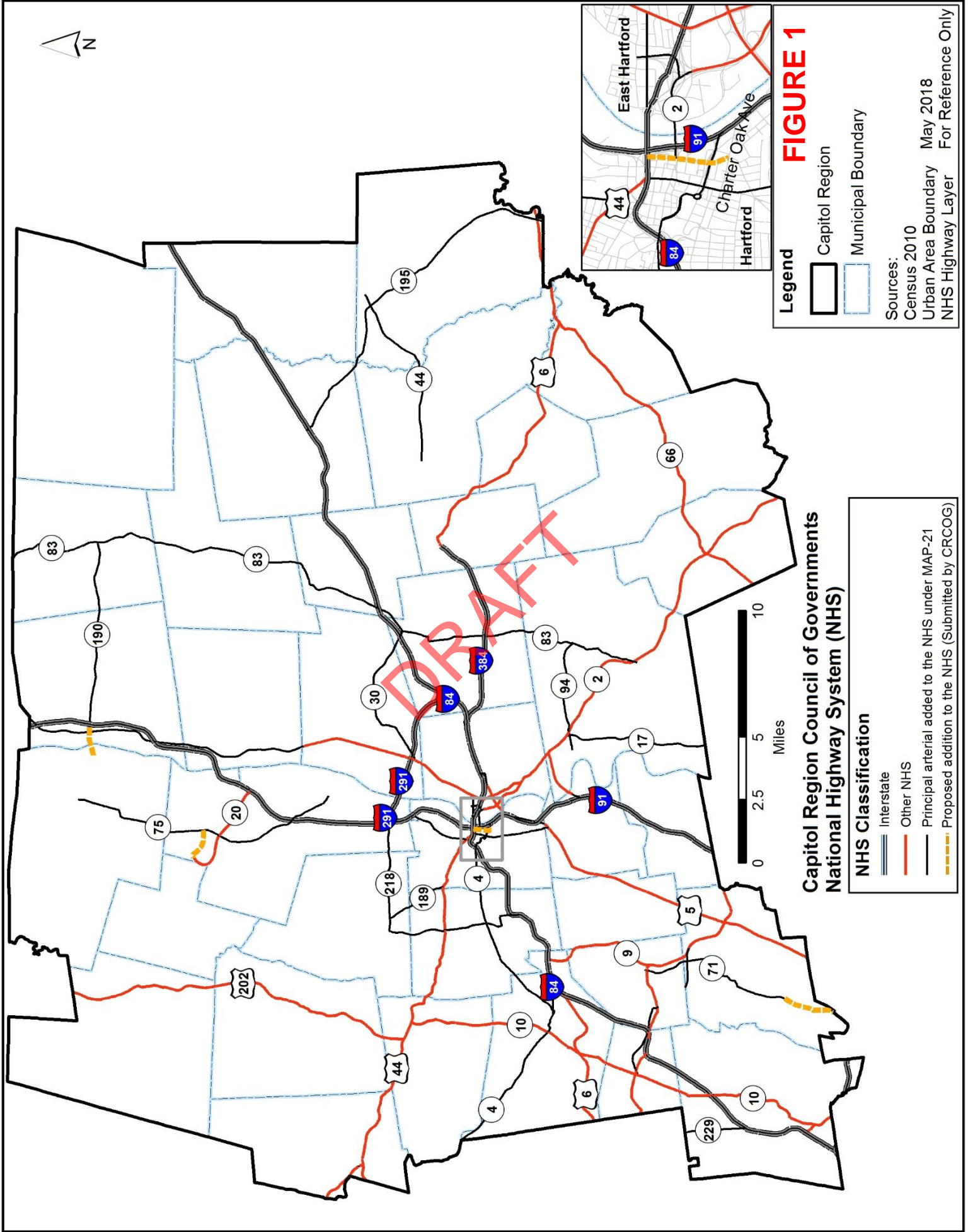
The CTDOT 2020 targets work to address the Poor condition of pavement on the NHS Interstate and NHS non-interstate system; the 2022 targets show a deterioration of the 2020 targets. It should be noted that the 2022 targets still meet federal requirements as it relates to NHS Interstate poor pavement conditions being below 5%.

CRCOG staff feels developing our own regional targets for NHS Interstate and NHS non-Interstate pavements is currently outside of what we can reasonably do given limited access to DOT's asset management system and regional data. CRCOG staff feels the NHS Interstate targets represent pavement improvements in the next 2 years. CRCOG also feels the NHS non-interstate poor pavement conditions targets represent an improvement over current conditions. Understanding this, CRCOG staff recommends supporting DOT's 2 and 4-year targets for the pavement conditions.

However, understanding the FHWA pavement performance measures only apply to NHS roadways, and that over 95% of lane miles (20,427 of 21,390) of Connecticut's public roadways are not located on the NHS, we feel CRCOG should also aim to improve the non-NHS pavements within the region. Currently almost 85% of these non-NHS lane miles (17,287 of 20,427) are municipally owned, with pavement conditions either unknown, or documented within the respective municipality. There is no comprehensive source of aggregated data available, and therefore Non-NHS pavement conditions are mostly unquantifiable on a regional basis.

Therefore, CRCOG staff also recommends that we work on the following initiatives:

- Support improvements that address these three stretches of non-Interstate NHS roadways with poor conditions generally identified above and in the attached (e.g. Route 71 in Berlin; Route 30 in South Windsor; Route 83 in Ellington and a portion of Somers)
- Coordinate with CTDOT to understand the dTIMS asset management system and assess regional use
- Incorporate the NHS Pavement Condition data and map into CRCOG's Long Range Transportation Plan
- Update pavement condition mapping on a regular basis to monitor progress and pavement conditions
- Coordinate with CTDOT as it relates to pavement investments within our region
- Monitor pavement performance best practices in other states and Regional Planning Organizations
- Evaluate if the establishment of a comprehensive regional pavement management system, that focuses on non-NHS roadways, has merit and if so evaluate the pros, cons, options, and feasibility of beginning to establish one.





Municipality	Total Lane Miles in Poor Condition
South Windsor	6.60
Berlin	5.31
East Hartford	3.68
Ellington	3.12
Avon	2.21
Enfield	1.57
Southington	1.50
Mansfield	1.43
Somers	1.40
Bloomfield	0.83
Simsbury	0.80
Farmington	0.70
Windsor	0.45
Glastonbury	0.44
Marlborough	0.40
Wethersfield	0.40
New Britain	0.20
Plainville	0.20
West Hartford	0.12
Capitol Region	31.37

Interstates Pavement Condition	
Good Condition	Poor Condition
Lane Miles	459.5 (73.3%)
Lane Miles	0.7 (0.1%)
Non-Interstate Pavement Condition	
Good Condition	Poor Condition
Lane Miles	322.3 (37.1%)
Lane Miles	30.7 (3.5%)

NHS Pavement Condition

- █ Interstate Poor Pavement Condition
- █ Non-Interstate Poor Pavement Condition

(Locations are approximate and for illustration purposes only)

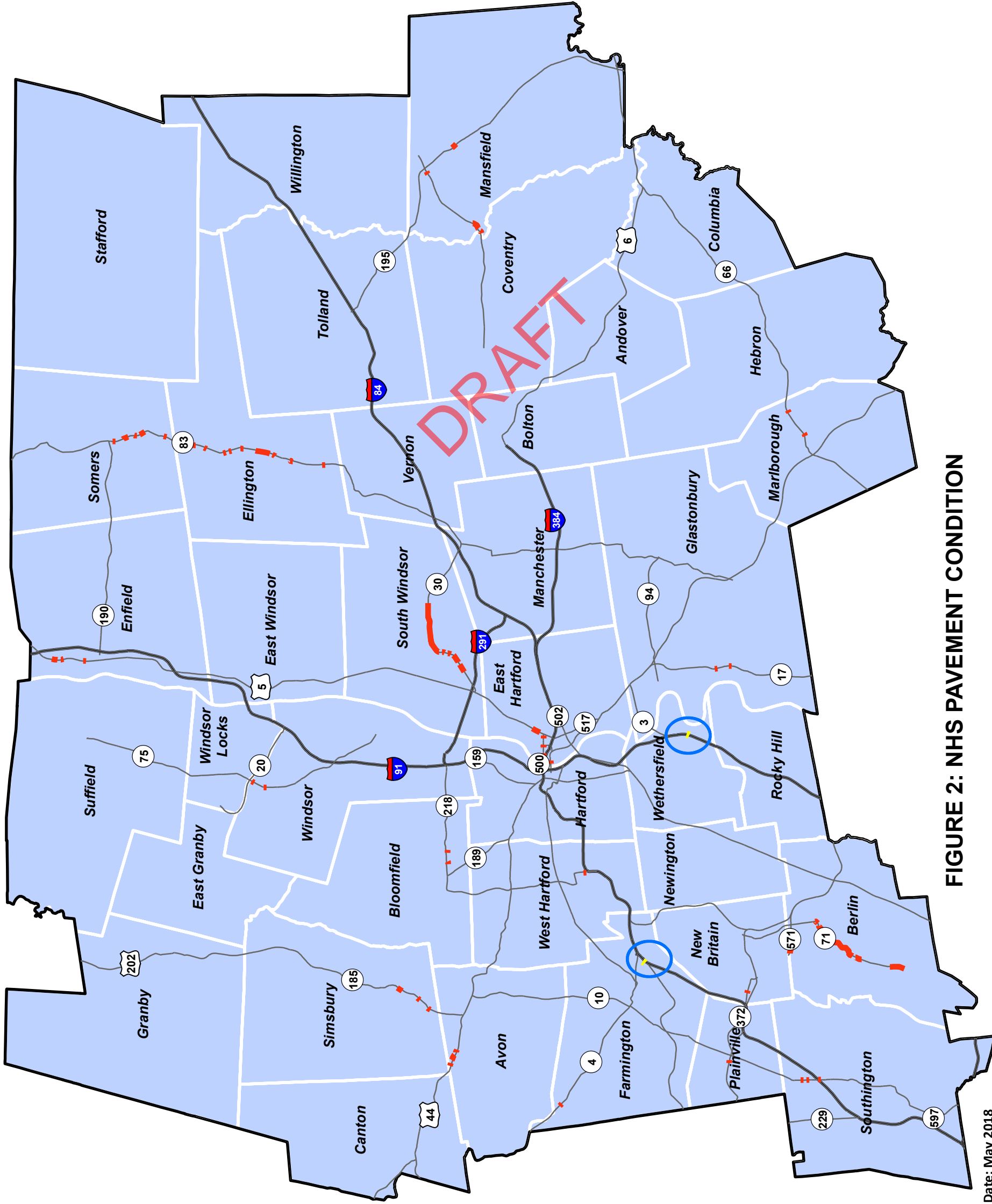


FIGURE 2: NHS PAVEMENT CONDITION

Date: May 2018
 Datasource: CTDOT Pavement Data
 For Reference Purposes Only.

To: Transportation Committee
Cost Review and Schedule Subcommittee

From: Jennifer Carrier, Director of Transportation Planning
Rob Aloise, Principal Transportation Engineer

Date: July 13, 2018 (Revised 8/24/18: See Changes in Red)

Subject: Performance Measures and Target Setting – Performance of the National Highway System (NHS)

This memorandum presents and reviews the current performance of the National Highway System (NHS) and associated CTDOT Performance Measure Targets, and offers potential CRCOG recommendations for review and discussion at the July Subcommittee and Transportation Committee meetings. CRCOG has until November 16, 2018 to either adopt CTDOT's targets or set our own.

Performance of the NHS Measures

The **four** performance measures include:

- Percent of person-miles traveled on the Interstate System that are reliable
- Percent of person-miles traveled on the Non-Interstate NHS that are reliable
- Annual hours of peak-hour excessive delay (PHED) per capita (CTDOT will establish in 2022; CRCOG is not required to set this target until 2022 given our region is less than 1 million in population)
- **Percentage of Non-Single Occupancy Vehicle (SOV) Travel (CTDOT will establish in 2022; CRCOG is not required to set this target until 2022 given our region is less than 1 million in population)**

To understand these measures, it is important to have the following background:

- Federal guidance focuses these performance measures on the National Highway System (NHS) which consists of a network of strategic highways, including interstates and other roads that serve major airports, rail or truck terminals, and other strategic transport facilities. The specific NHS roadways within our region are illustrated in Figure 1.
- The Performance of the NHS measures strive to assess travel time reliability. The measurement of travel time reliability is an emerging practice that compares days with high delay to days with average delay. To determine the reliability of a segment, a Level of Travel Time Reliability (LOTR) is calculated as the ratio of the longer travel times (80th percentile) to a “normal” travel time (50th percentile), with reliability defined as an LOTR of less than 1.5.
- Predicting future NHS performance in this manner is new, and therefore CTDOT has a low level of confidence in the accuracy of these predictions and targets. CTDOT has obtained newly provided data and software to determine current conditions, however software and/or systems that can predict future performance based on projects or investments are not readily available. CTDOT arrived at the 2-year and 4-year targets by extrapolating future reliability based the very limited number of available historical reliability data-points (less than five data points).
- Penalties may be assessed if reliability targets are not met, however unlike some of the other performance measures, there are no penalties associated with exceeding a minimum percentage of reliability.

National Highway System (NHS) Performance

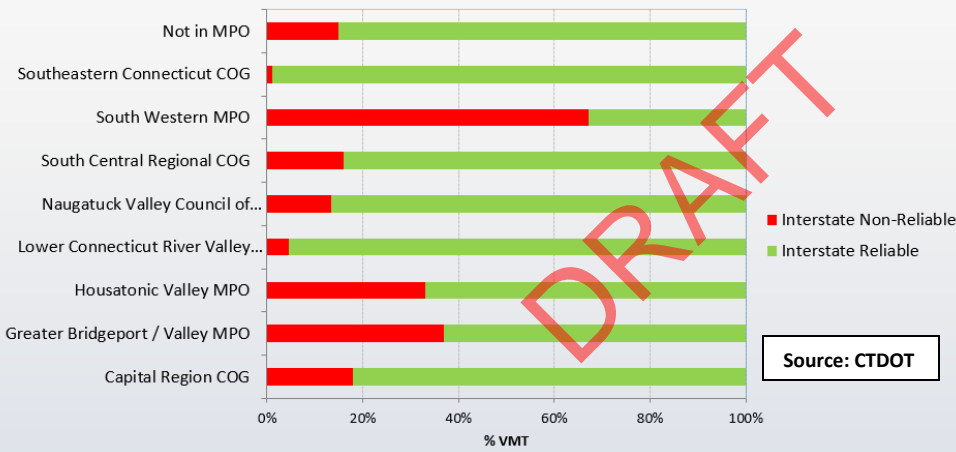
CTDOT's NHS performance targets for the State of Connecticut are illustrated to the right. Of note is that both the 2-year and 4-year targets represent an expected slight decline in travel time reliability on the NHS. These are predicted based on linear extrapolations of limited historical data in various formats, and therefore CTDOT has a low confidence level in their predictive capability.

System Reliability Measures

- % person-miles of Interstate that are "reliable"
- % person-miles of non-Interstate NHS that are "reliable"

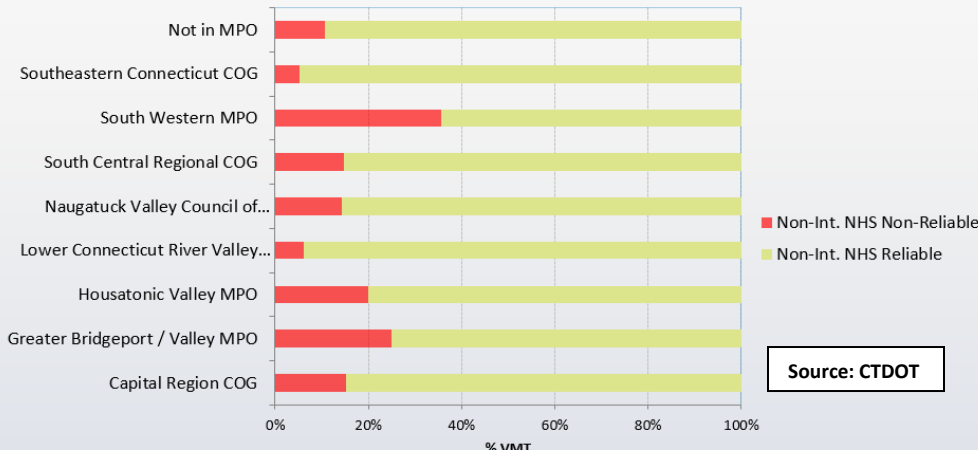
System (unit of measure)	Current Condition	2-year targets (2020)	4-year targets (2022)
	Reliable %	Reliable %	Reliable %
Interstate (person-miles)	78.3	75.2	72.1
Reliability declines in all cases			
Non-Interstate NHS (person-miles)	83.6	80.0	76.4

System Performance Measure (% Reliable), Interstate System Based on Vehicle-Miles Traveled



The graphics to the left illustrate current NHS system reliability within CRCOG as compared to other Connecticut regions. The top graphic shows that CRCOG's Interstates experience reliability of 86.8%, which is more reliable than the 78.3% statewide average. The bottom graphic illustrates that CRCOG's Non-Interstate NHS roadways experience reliability of 84.7%, which is slightly more reliable than the 83.6% statewide average.

System Performance Measure (% Reliable), Non-Int. NHS Based on Vehicle-Miles Traveled



Maps showing locations of the region's reliable and unreliable segments of NHS roadway appear in Figure 2 (for the Interstate System) and Figure 3 (for the Non-Interstate NHS). As shown in Figure 2, the region's unreliable Interstate travel times are mostly contained within the following segments:

- I-84 in West Hartford and Hartford, and portions of I-84 in East Hartford
- Portions of I-91 in Hartford and Wethersfield
- A Portion of I-291 in Windsor and South Windsor

As shown in Figure 3, unreliable segments of the Non-Interstate NHS are distributed throughout CRCOG, with segments contained in most municipalities.

Staff Review of CTDOT's Targets for Performance of the NHS

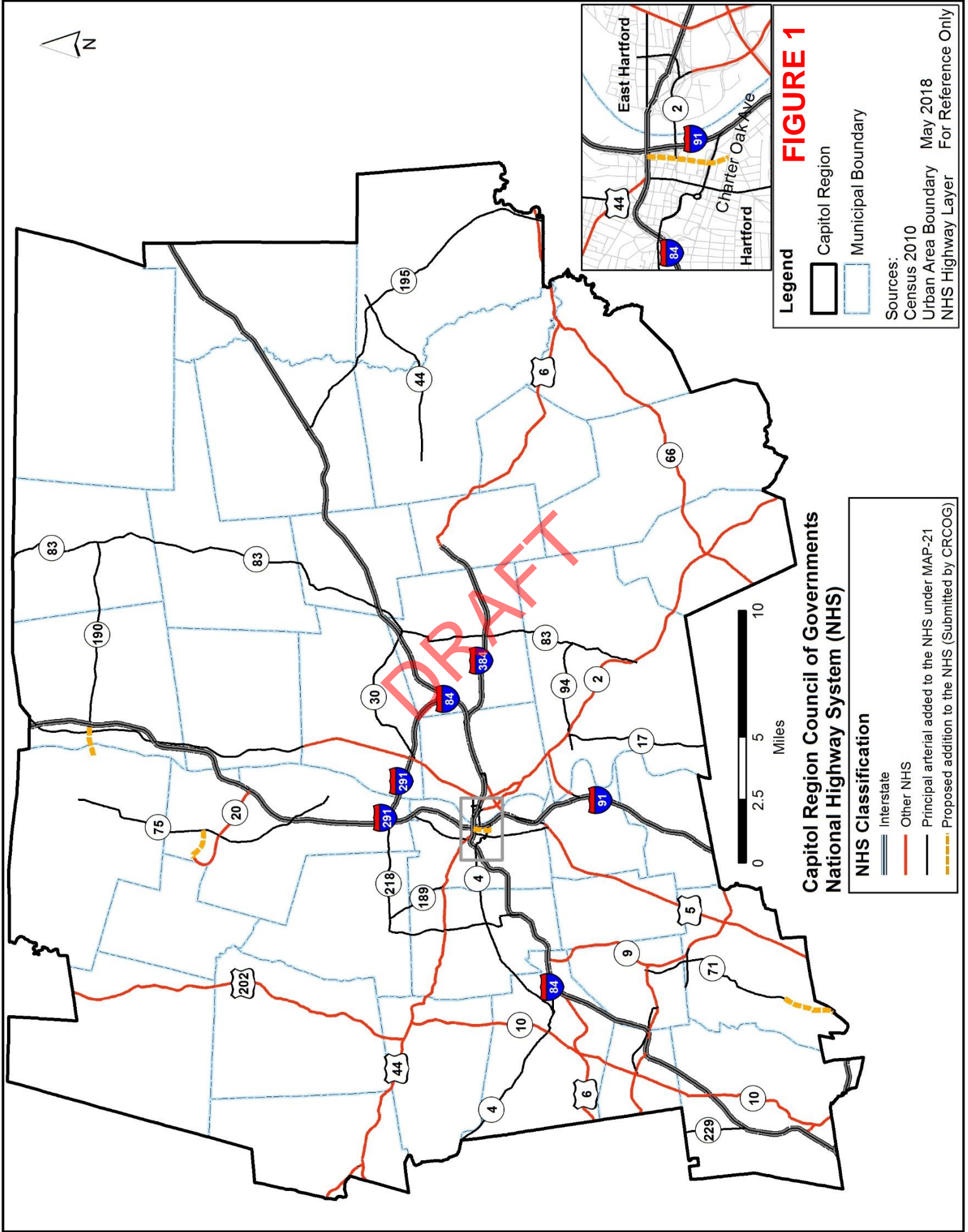
As mentioned, CTDOT arrived at the 2-year and 4-year targets by extrapolating future reliability based a very limited number of annual historical data-points (less than five). Of note is that these targets represent an expected slight decline in travel time reliability on the NHS statewide. Because the measurement of travel time reliability is an emerging practice, and due to the limited availability of historical data and analysis tools, CTDOT has a low confidence level in the accuracy of these predictions and the resulting targets. Similarly, CRCOG's analysis efforts have focused on determination of existing travel time reliability and have not employed sophisticated future prediction methodologies. Given that the development and use of travel time reliability measures and predictive tools are emerging practices, at this time staff concurs with CTDOT's extrapolation method of target setting.

Staff Recommendations

Given that travel time reliability is an emerging practice, and the lack of tools currently available for predicting targets, CRCOG staff concurs with CTDOT's extrapolation method of targets setting and feels it is premature to employ a separate method on a regional basis. Understanding this, CRCOG staff recommends supporting CTDOT's 2 and 4-year targets for travel time reliability.

However, to further understand and develop this performance measure and associated future target setting, CRCOG staff also recommends that we work on the following initiatives:

- Update CRCOG's Congestion Management Process methodologies to align with travel time reliability performance measure methodologies, and include relevant performance measure/target setting information
- Work towards reviewing and assuring adequate ITS infrastructure is provided in high volume areas (Interstates, etc.) with travel times categorized as unreliable
- Work collaboratively with CTDOT and FHWA to research and implement travel time reliability methodologies and predictive capabilities.
- Incorporate the Travel Time Reliability data and maps into CRCOG's Long Range Transportation Plan
- Monitor Travel Time Reliability best practices in other states and Regional Planning Organizations



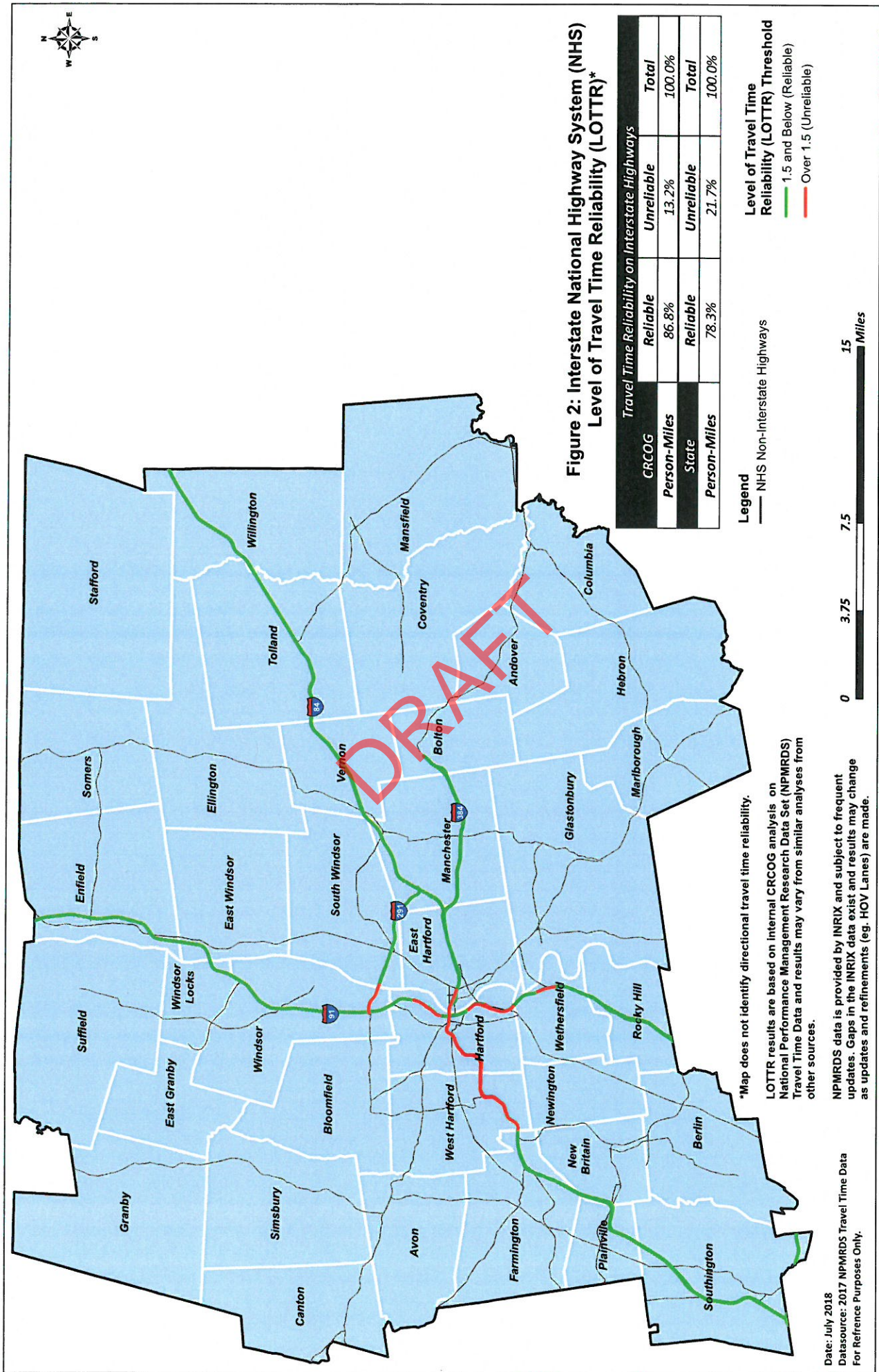
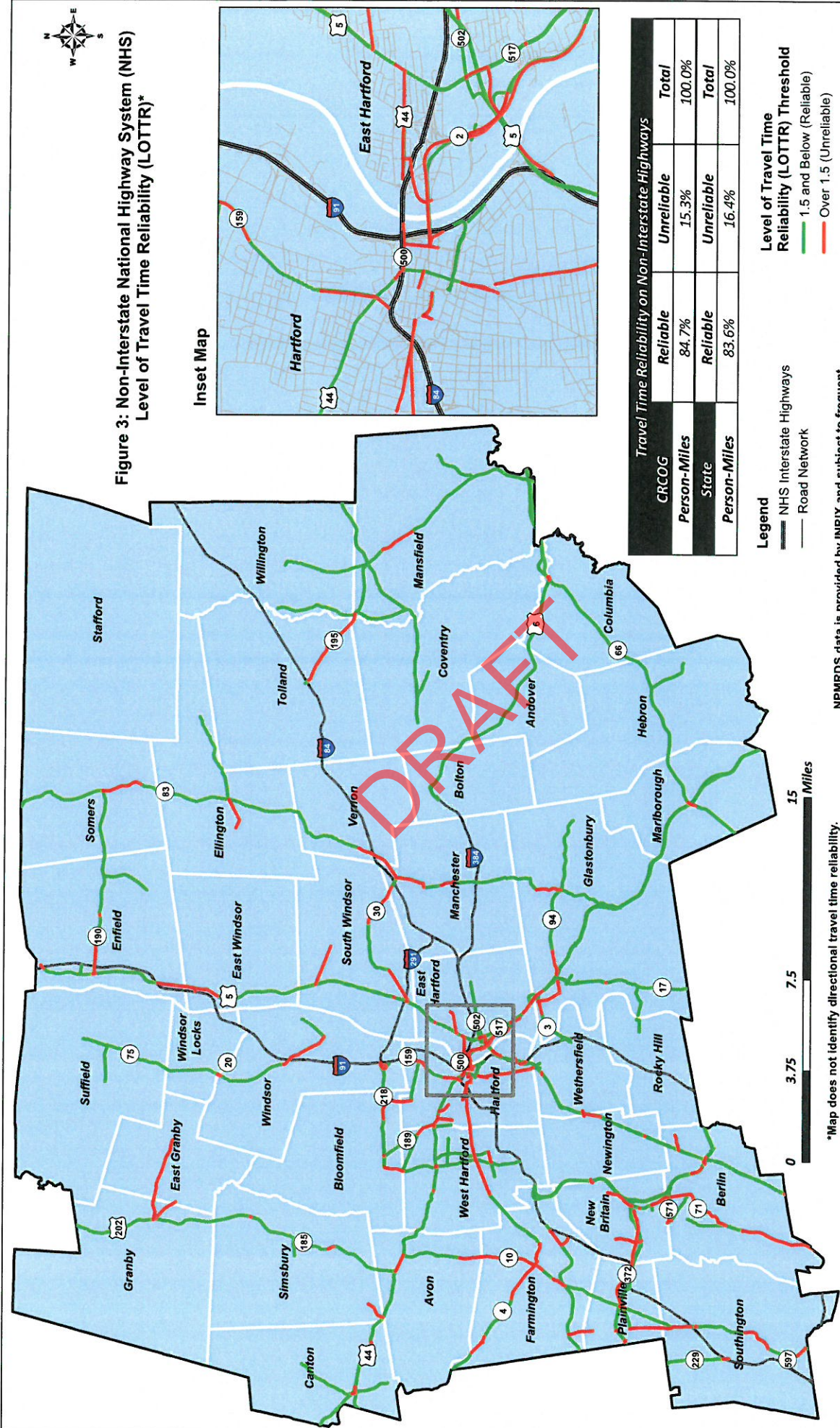


Figure 3: Non-Interstate National Highway System (NHS) Level of Travel Time Reliability (LOTR)*



NPMRDS data is provided by INRIX and subject to frequent updates. Gaps in the INRIX data exist and results may change as updates and refinements (eg. HOV Lanes) are made.

Additional non-interstate roadway segments with NPMRDS travel time data has been added to the map for informational purposes.

*Map does not identify directional travel time reliability.

LOTR results are based on internal CRCOG analysis on National Performance Management Research Data Set (NPMRDS) Travel Time Data and results may vary from similar analyses from other sources.

Date: July 2018
 Dataverse: 2017 NPMRDS Travel Time Data
 For Reference Purposes Only.

To: Transportation Committee
Cost Review and Schedule Subcommittee

From: Devon Lechtenberg, Transportation Planner
Rob Aloise, Interim Director of Transportation Planning

Date: August 24, 2018

Subject: Performance Measures and Target Setting – Freight Performance

This memorandum presents and reviews the current freight performance measure on the Interstate Highway system in CRCOG and associated CTDOT Performance Measure Targets, and offers potential CRCOG recommendations for review and discussion at the September Subcommittee and Transportation Committee meetings. CRCOG has until November 16, 2018 to either adopt CTDOT's targets or set our own.

Freight Performance Measure

The freight performance measure is:

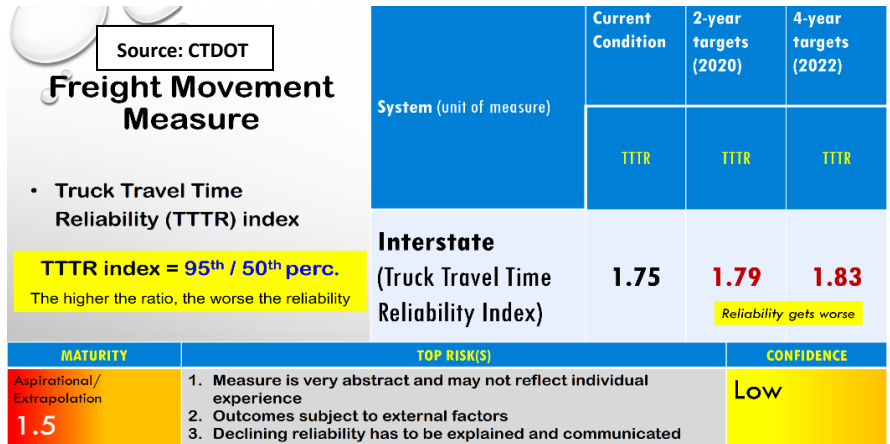
- Truck Travel Time Reliability (TTTR) Index

To understand this measure, it is important to have the following background:

- The freight performance measure focuses on Interstate highways. Interstate Highways and other major roadways within the Capitol Region are illustrated in Figure 1.
- The freight performance measure strives to assess the reliability of travel time for trucks on the Interstate system. This is an emerging practice that compares days with extremely high delay to days with average delay. To determine the reliability of a segment, a Truck Travel Time Reliability (TTTR) measure is calculated as the ratio of the longer travel times (95th percentile) to a "normal" travel time (50th percentile). The TTTR's of interstate segments are then used to create the TTTR Index for the entire Interstate system using a weighted aggregate calculation for the worst performing times of each segment.
- Predicting future freight performance in this manner is new, and therefore CTDOT has a low level of confidence in the accuracy of these predictions and targets. CTDOT has obtained newly provided data and software to determine current conditions, however software and/or systems that can predict future performance based on projects or investments are not readily available. CTDOT arrived at the 2-year and 4-year targets by extrapolating future reliability based the limited historical data.
- Penalties may be assessed if reliability targets are not met, however unlike some of the other performance measures, there are no penalties associated with not achieving a specific level of reliability.

Freight Performance on the Interstate System

CTDOT’s freight performance targets for the State of Connecticut are illustrated to the right. Of note is that both the 2-year and 4-year targets represent an expected slight decline in travel time reliability on the Interstate System. These are predicted based on linear extrapolations of limited historical data in various formats, and therefore CTDOT has a low confidence level in their predictive capability.



Mapping of Truck Travel Time Reliability (TTR)

A map depicting reliable and unreliable (defined here by the 1.5 threshold) TTR scores for each roadway segment on the Interstates in CRCOG can be found in Figure 2. As shown, the region’s Interstate TTR of 1.83 is slightly higher than the state average. CRCOG Interstate segments with higher truck travel times are mostly contained within the following areas:

- I-84 from New Britain town line to Vernon town line
- I-91 from southern CRCOG border in Rocky Hill to Windsor Locks
- Most of I-291 in Windsor and South Windsor
- A small portion of I-384 in Manchester

It should be noted that independent of these measures, the *Connecticut Statewide Freight Plan* identified two truck freight “bottlenecks” within CRCOG, which include the I-84 Viaduct in Hartford and I-91 from CT 3 to Charter Oak Bridge.

Staff Recommendations

There is no feasible way for CRCOG to address bottlenecks on the Interstates independently of CTDOT, and therefore setting our own targets *and* assuming responsibility for meeting them is not currently within our organizational and financial capacity. Given that travel time reliability is an emerging practice, as well as the lack of tools currently available for predicting targets, CRCOG staff concurs with CTDOT’s extrapolation method of targets setting and feels it is premature to employ a separate method on a regional basis. Understanding this, CRCOG staff recommends supporting CTDOT’s 2 and 4-year targets for truck travel time reliability.

However, to further understand and develop this performance measure and associated future target setting, CRCOG staff also recommends that we work on the following initiatives:

- Update CRCOG’s Congestion Management Process methodologies to align with travel time reliability performance measure methodologies, and include relevant performance target setting information
- Work towards reviewing and assuring adequate ITS infrastructure is provided on Interstates with truck travel times categorized as unreliable
- Work collaboratively with CTDOT and FHWA to research and implement truck travel time reliability methodologies and predictive capabilities
- Incorporate the Travel Time Reliability data and maps into CRCOG’s Long Range Transportation Plan
- Monitor Travel Time Reliability best practices in other states and Regional Planning Organizations

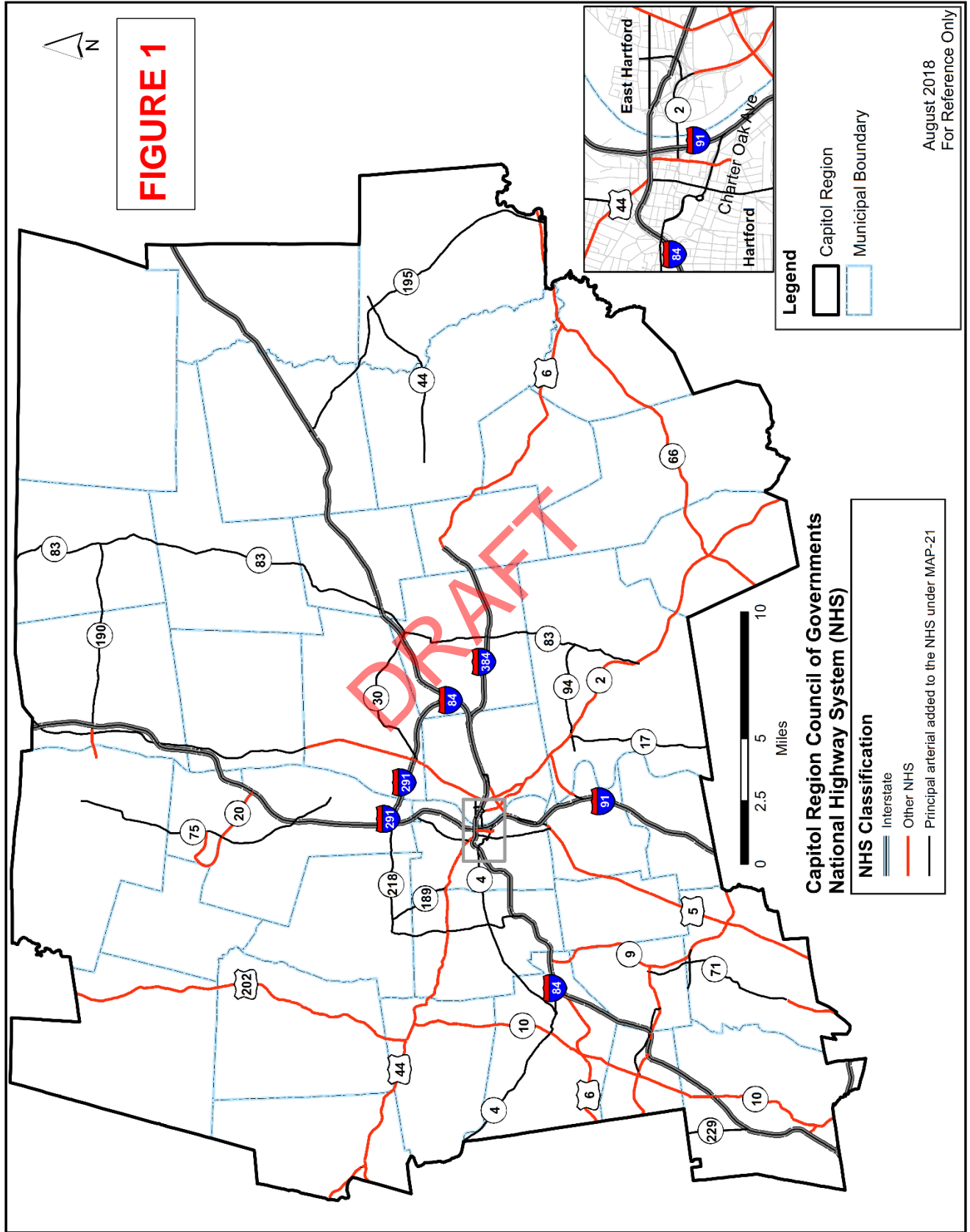


FIGURE 2

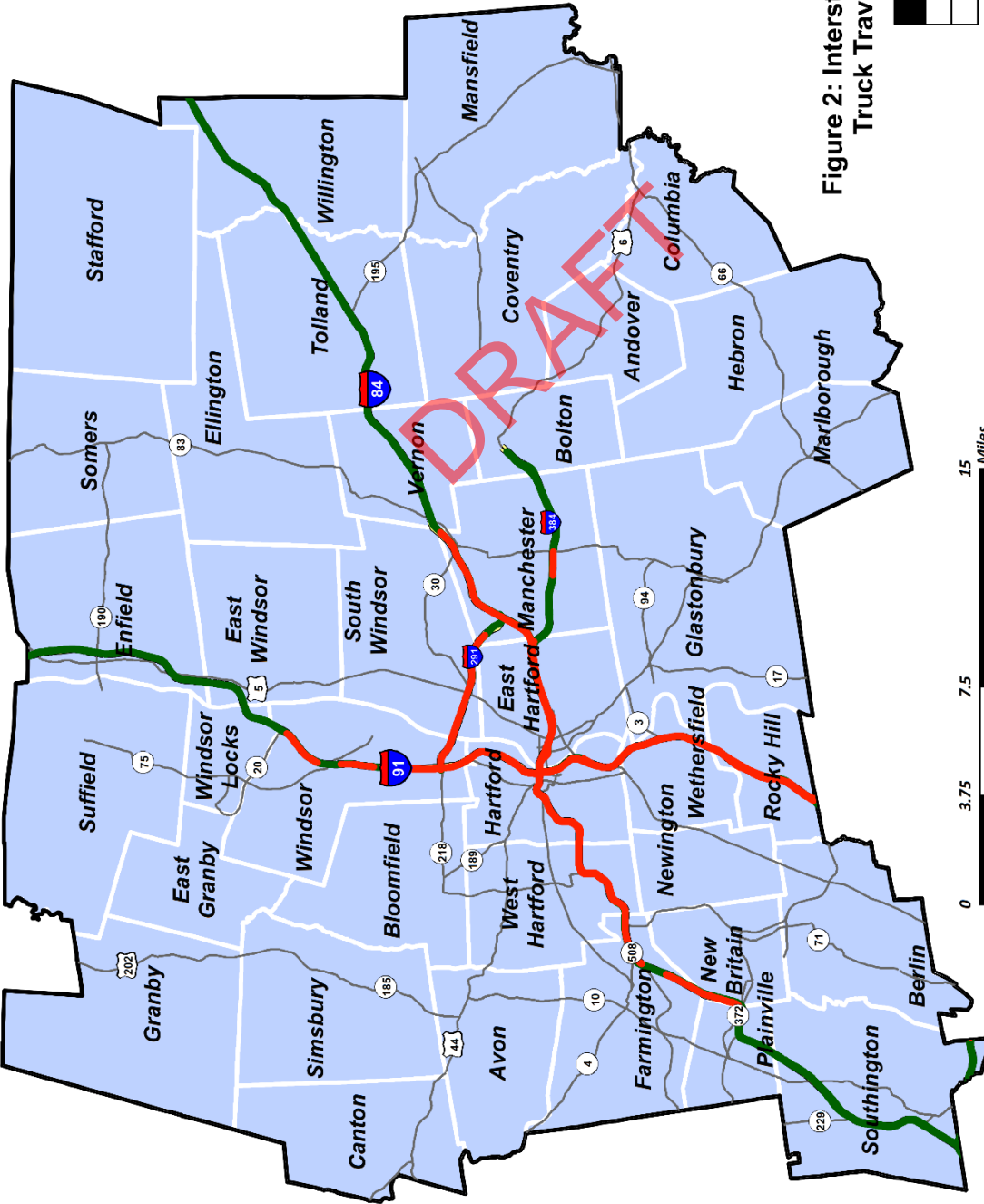


Figure 2: Interstate National Highway System (NHS) Truck Travel Time Reliability (TTTR)* Index

TTTR Index	
CRCOG	1.83
State	1.75

Legend

- NHS Non-Interstate Highways
- Level of Truck Travel Time Reliability (TTTR) Index Threshold
 - 1.5 and Below
 - Over 1.5



*Map does not identify directional travel time reliability.

TTTR results are based on internal CRCOG analysis on National Performance Management Research Data Set (NPMRDS) Freight Travel Time Data and results may vary from similar analyses from other sources.

NPMRDS data is provided by INRIX and subject to frequent updates. Gaps in the INRIX data exist and results may change as updates and refinements are made.

Date: August 2018
Datasource: 2017 NPMRDS Travel Time Data
For Reference Purposes Only.

To: Transportation Committee
Cost Review and Schedule Subcommittee

From: Devon Lechtenberg, Transportation Planner
Rob Aloise, Interim Director of Transportation Planning

Date: August 24, 2018

Subject: Performance Measures and Target Setting – On-Road Mobile Source Emissions

This memorandum presents and reviews the On-Road Mobile Source Emissions Measure and the associated CTDOT Performance Measure Target, and offers potential CRCOG recommendations for review and discussion at the July Subcommittee and Transportation Committee meetings. CRCOG has until November 16, 2018 to either adopt CTDOT's target or set our own.

On-Road Mobile Source Emissions Measures

The performance measure:

- Total Emissions Reduction


To understand this measure, it is important to have the following background:

- The measure consists of the cumulative 2-year and 4-year Emissions Reductions (kg/day) for CMAQ-funded projects for nonattainment and maintenance areas.
- Covers the *criteria pollutants*: **Nitrogen Oxide (NO_x)**, **Carbon Monoxide (CO)**, **Particulate Matter (PM₁₀ & PM_{2.5})**, and **Ozone (O₃)**, as well as *applicable precursors*: **NO_x**, **CO**, **PM₁₀** & **PM_{2.5}**, and **Volatile Organic Compounds (VOCs)** for nonattainment and maintenance areas.
- The contribution of a given project toward emissions reduction are counted in its launch year, not subsequently.
- The emission reduction measure does not measure the actual level of pollutants in the environment. Instead, a rate of reduction (kg/day) is being measured. This rate must be at least maintained in order to continue to make progress under the rule.
- No penalty has been formulated for failure to meet an emissions reduction performance target. However, MPO's could potentially expect to receive more scrutiny in the future if targets are not met.

Staff Review of CTDOT's Target for On-Road Mobile Source Emissions

Congestion Mitigation and Air Quality (CMAQ) supported transportation projects are subject to this performance measure requirement. The Capitol Region, along with the rest of Connecticut, is classified as a non-attainment area and is therefore eligible for Federal funds for transportation projects that will help it attain the National Ambient Air Quality Standards (NAAQS). Air quality does not conform to political borders and thus pollution in one region can greatly affect the air quality in another and vice versa. The measure is calculated as the sum of the reduction of each individual criteria pollutant in kilograms per day over both a cumulative 2-year period, and a cumulative 4-year period. The analysis process is very complex, requiring access to specialized data sources and analytical tools that aid in the calculation. CTDOT has been developing these resources as well as needed expertise for some time. The rate of emission reduction improved gradually in 2013 and 2014, then saw drastic improvement in 2015 because of the CT*fastrak* launch. However, additional reductions were not as significant in

2016 and 2017. Future CMAQ projects that contribute to additional emission reductions in the next 2-year (2018 and 2019) and 4-year (2020 and 2021) periods, are not expected to be of the same magnitude created by past projects.

 Air Quality Measure		Current Measurements (CMAQ Public Access as of 2017)		2-year targets (2020)	4-year targets (2022)	
		2-year cumulative kg/day	4-year cumulative kg/day	2-year cumulative kg/day	4-year cumulative kg/day	
<ul style="list-style-type: none"> • Total Emissions Reduction • From projects entered into the CMAQ Public Access system in previous year 		VOC	10.820	263.890	19.320	30.140
		NOx	34.680	462.490	67.690	102.370
		PM2.5	1.040	12.950	1.632	2.674
MATURITY	TOP RISK(S)				CONFIDENCE	
Extrapolation Level 2	1. Qualitative benefits are not captured in measure 2. Given program priorities, quantifiable benefits may appear low with respect to other agencies				Moderate	

Staff Recommendations

Given the complexity and resource demands of developing measures and targets for emissions reduction, considerable expertise and experience needed, CRCOG staff feel it is premature to employ a separate method on a regional basis. Understanding this, CRCOG staff recommends supporting CTDOT’s 2 and 4-year targets for On-Road Mobile Source Emissions.

However, to further understand and develop this performance measure and associated future target setting, CRCOG staff also recommends that we work on the following initiatives:

- Being aware of the environmental benefits in terms of emission reductions that CMAQ transportation projects in our region can produce.
- Developing staff understanding and competency in assessing emission’s data.
- Incorporating consideration of On-Road Mobile Source Emissions Measure and maps into CRCOG’s Long Range Transportation Plan
- Monitoring applicable best practices in other states and Regional Planning Organizations

To: Transportation Committee
Cost Review and Schedule Subcommittee

From: Devon Lechtenberg, Transportation Planner
Rob Aloise, Acting Director of Transportation Planning

Date: October 5, 2018

Subject: Discussion of Performance Targets

At the September 5, 2018 Transportation Committee and Cost Sub-Committee meetings, the committees discussed staff's recommendation to support CTDOT's performance measure targets for NHS performance, Freight performance, and On-Road Mobile Source Emissions. The committee proposed and carried a motion to postpone supporting performance targets set by CTDOT until more information was available regarding the resulting implications.

CRCOG staff contacted representatives from the FHWA and CTDOT shortly after the September 5th committee meetings. A meeting between CRCOG, FHWA, and CTDOT was held on September 24th, 2018 where staff could discuss the consequences of supporting performance targets. The main outcomes were as follows:

- There are no penalties for failing to attain a set target for the NHS performance, Freight performance, and On-Road Mobile Source Emissions Reduction. However, if a target is not met, actions must be developed towards rectifying the gap in performance.
- If an MPO supports a state's target, the state bears the primary responsibility for meeting performance targets. An MPO's support should be reflected in its plans and project selection, where applicable. Far more responsibility is assigned to an MPO if it sets its own targets. However, setting an MPO target triggers significant reporting requirements which CRCOG currently does not have the resources to support.
- If an MPO neither sets its own targets nor adopts the state's, it will be deemed non-compliant by the FHWA in its planning process. This noted deficiency would linger in subsequent evaluations of the MPO's activities, such as an MPO Certification Review. In this initial stage of performance target setting, participating in the performance based-planning process is more important than meeting targets.

In light of the abovementioned discussions, CRCOG staff recommends the committee take action on supporting the state's targets for System Reliability of the NHS, Freight, and On-Road Mobile Source Emissions. Please refer to the attached resolution for Policy Board consideration as well as the associated memorandums previous issued.

RESOLUTION REGARDING TARGETS FOR TEN PERFORMANCE MEASURES ESTABLISHED BY CTDOT

WHEREAS, the Capitol Region Council of Governments (CRCOG) has been designated by the Governor of the State of Connecticut as the Metropolitan Planning Organization responsible, together with the State, for the comprehensive, continuing, and cooperative transportation planning process for the Capitol Region; and

WHEREAS, the National Performance Management Measures final rule (23 CFR Part 490) requires States to set targets for ten performance measures by May 20, 2018, and

WHEREAS, the Connecticut Department of Transportation (CTDOT) has established targets for four pavement performance measures for:

- (1) Percentage of Pavements on the Interstate System in Good condition,
- (2) Percentage of Pavements on the Interstate System in Poor condition,
- (3) Percentage of Pavements on the non-Interstate NHS in Good condition,
- (4) Percentage of Pavements on the non-Interstate NHS in Poor condition,
- (5) Percentage of NHS Bridges classified as in Good Condition (by deck area),
- (6) Percentage of NHS Bridges classified as in Poor Condition (by deck area),
- (7) Percentage of Person-miles traveled on the Interstate System that are reliable,
- (8) Percentage of Person-miles traveled on the non-Interstate System that are reliable,
- (9) Truck Travel Time Reliability Index,
- (10) Total Emissions Reduction,

WHEREAS, the CTDOT generally discussed performance measures with the 8 Metropolitan Planning Organizations (MPOs) in Connecticut at the March 27 and May 8 RPO coordination meetings as well as on other occasions during the course of this new Federal mandate,

WHEREAS, the CTDOT has officially adopted the ten targets in the State Long Range Transportation Plan in March 2018,

WHEREAS, the CRCOG may establish performance targets by agreeing to plan and program projects that contribute toward the accomplishment of the aforementioned State's targets, or establish its own target within 180 days of the State establishing and reporting its performance targets,

NOW THEREFORE, BE IT RESOLVED, that the MPO Policy Board has agreed to support CTDOT's 2018 targets for the ten performance targets as previously discussed and endorsed, and

BE IT FURTHER RESOLVED, that the MPO Policy Board will plan and program projects that contribute to the accomplishment of said targets.

CERTIFICATE: The undersigned duly qualified CRCOG Board Member certifies that the foregoing is a true and correct copy of a resolution adopted by the voting members of the CRCOG on September 5, 2018.

Lori L. Spielman, Secretary
Capitol Region Council of Governments

Date

Part 4:
FTA Performance Measures
and Targets

DRAFT

DRAFT

TAM Performance Measures

Background

In 2012, MAP-21 mandated FTA to develop a rule establishing a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their entire life cycle. The TAM Final Rule 49 USC 625 became effective Oct. 1, 2016 and established four performance measures. The performance management requirements outlined in 49 USC 625 Subpart D are a minimum standard for transit operators. Providers with more data and sophisticated analysis expertise are allowed to add performance measures and utilize those advanced techniques in addition to the required national performance measures.

Performance Measures

Rolling Stock: The percentage of revenue vehicles (by type) that exceed the useful life benchmark (ULB).

Equipment: The percentage of non-revenue service vehicles (by type) that exceed the ULB.

Facilities: The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale.

Infrastructure: The percentage of track segments (by mode) that have performance restrictions. Track segments are measured to the nearest 0.01 of a mile.



TRANSIT ASSET MANAGEMENT

Data To Be Reported - Optional Report Year 2017, Mandatory Report Year 2018

Rolling Stock: The National Transit Database (NTD) lists 23 types of rolling stock, including bus and rail modes. Targets are set for each mode an agency, or Group Plan Sponsor, has in its inventory.

FTA default ULB or Agency customized ULB: Default ULBs represent maximum useful life based on the TERM model. Agencies can choose to customize based on analysis of their data OR they can use the FTA provided default ULBs.

Equipment: Only 3 classes of non-revenue service vehicles are

collected and used for target setting: 1) automobiles, 2) other rubber tire vehicles, and 3) other steel wheel vehicles.

Facilities: Four types of facilities are reported to NTD. Only 2 groups are used for target setting 1) Administrative and Maintenance and 2) Passenger and Parking.

Infrastructure: The NTD lists 9 types of rail modes; the NTD collects data by mode for track and other infrastructure assets.

BRT and Ferry are NTD fixed guideway modes but are not included in TAM targets.

TAM Performance Metrics: The NTD collects current year performance data. The NTD will collect additional Asset Inventory Module (AIM) data but targets forecast performance measures in the next fiscal year.

TAM Narrative Report: The TAM Rule requires agencies to submit this report to the NTD annually. The report describes conditions in the prior year that led to target attainment status.

www.transit.dot.gov/TAM/ULBcheatsheet

TERM Scale: Facility condition assessments reported to the NTD have one overall TERM rating per facility. Agencies are not required to use TERM model for conducting condition assessment but must report the facility condition assessment as a TERM rating score.

What You Need to Know About Establishing Targets

Include:

- Only those assets for which you have direct capital responsibility.
- Only asset types specifically referenced in performance measure.

Group Plans:

- Only one unified target per performance measure type.
- Sponsors may choose to develop more than one Group Plan.

MPOs:

- MPOs must establish targets specific to the MPO planning area for the same performance measures for all public transit providers in the MPO planning area within 180 days of when the transit provider establishes its targets.
- Opportunity to collaborate with transit providers.

Example Target Calculations

Rolling Stock and Equipment: Each target is based on the agency's fleet and age. Agencies set only one target per mode/class/asset type. If an agency has multiple fleets in one asset type (see example BU and CU) of different service age, it must combine those fleets to calculate the performance metric percentage of asset type that exceeds ULB and to set the following fiscal year's target. The performance metric calculation does not include emergency contingency vehicles.

Asset Category	Vehicle Class/Type	Fleet Size	Vehicle age	default ULB	FY 16 Performance Metric (% Exceeding ULB)	FY17 Target
Rolling Stock	Over the road bus (BU)	10	5	14 years	0%	60%
		15	13	14 years		
	Cutaway bus (CU)	19	8	10 years	21%	21%
		5	12	10 years		
	Mini Van (MV)	5	5	8 years	0%	0%
	Van (VN)	1	10	8 years	67%	67%
2		5	8 years			
Equipment	Auto (AO)	5	4	8 years	0%	0%

This example assumes no new vehicle purchases in the calculation of targets for FY17, therefore the FY17 target for over the road bus (BU) increases due to the second fleet vehicles aging another year and exceeding the default ULB. If an agency is more conservative, then it might set higher value targets. If an agency is more ambitious or expects funding to purchase new vehicles, then it might set lower value targets.

There is no penalty for missing a target and there is no reward for attaining a target. Targets are reported to the NTD annually on the A-90 form. The fleet information entered in the inventory forms will automatically populate the A-90 form with the range of types, classes, and modes associated with the modes reported.

TERM Rating	Condition	Description
Excellent	4.8–5.0	No visible defects, near-new condition.
Good	4.0–4.7	Some slightly defective or deteriorated components.
Adequate	3.0–3.9	Moderately defective or deteriorated components.
Marginal	2.0–2.9	Defective or deteriorated components in need of replacement.
Poor	1.0–1.9	Seriously damaged components in need of immediate repair.

To: CRCOG Transportation Committee, acting as CRCOG Policy Board
From: Cara Radzins, Principal Transit Planner
C: CRCOG Policy Board
 Jennifer Carrier, Director of Transportation
Date: June 16, 2017
Subject: FTA State of Good Repair Performance Targets – Resolution of Support

In 2012, MAP-21 mandated that the Federal Transit Administration (FTA) develop a rule establishing a strategic and systematic approach to Transit Asset Management (TAM). The purpose of TAM is to “monitor and manage public transportation capital assets to enhance safety, reduce maintenance costs, increase reliability, and improve performance.” The TAM Final Rule (49 CFR 625) became effective October 1, 2016 and requires that transit providers develop a TAM Plan by October 1, 2018. Tier I transit providers must each develop an individual TAM Plan, whereas Tier II providers may participate in a group plan facilitated by the State. Provider tiers are defined as follows:

- **Tier I:** A provider that owns, operates, or manages either (a) 101 or more vehicles in revenue service during peak regular service across all fixed route modes or in any one non-fixed route mode, or (b) rail transit
- **Tier II:** A provider that owns, operates, or manages (a) 100 or fewer vehicles in revenue service during peak regular service across all non-rail fixed route modes or in any one non-fixed route mode, (b) a subrecipient under the 5311 Rural Area Formula Program, or (c) any American Indian tribe

The Connecticut Department of Transportation (CTDOT) will be preparing a Tier I TAM Plan for the rail, bus, and ferry transit it provides. Within the CRCOG Region, this includes *CTtransit* Hartford Division (HNS Management) and the Rocky Hill/Glastonbury Ferry. CTDOT will also develop a group Tier II TAM Plan, which will include the Windham Regional Transit District. The Greater Hartford Transit District (GHTD) is classified as a Tier I provider and will therefore be responsible for preparing an individual TAM Plan.

As a first step towards developing these TAM Plans, transit providers must establish State of Good Repair targets for the following four performance measures:

- **Rolling Stock:** The percentage of revenue vehicles (by type) that exceed the useful life benchmark (ULB)
- **Equipment:** The percentage of non-revenue service vehicles (by type) that exceed the ULB
- **Facilities:** The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale
- **Infrastructure:** The percentage of track segments (rail fixed-guideway only) that have performance restrictions

To this end, CTDOT has developed State of Good Repair Performance Targets for both Tier I and Tier II providers. The current performance (December 2016), anticipated performance by the end of FY2017¹, and the performance target for each of the above performance measures is summarized in the tables on pages 3 and 4 of this memorandum. Additional supporting documentation is attached to this memo. Although GHTD will not be included in CTDOT's TAM Plans, GHTD assisted CTDOT with the target setting process. As such, GHTD targets, which are included on page 5 of this memo, match the Tier I targets being used by CTDOT.

Transit providers will be required to report the above performance measures to the National Transit Database (NTD) each state fiscal year, beginning with FY2018. For providers in Connecticut, this means an initial reporting deadline of October 1, 2018 for the period of July 1, 2017 to June 30, 2018, with October 1st reporting deadlines thereafter for the preceding fiscal year. Performance targets must also be reassessed each fiscal year. It is the expectation that transit providers use the performance measure data to inform their capital planning and to improve their decision making, but it is important to note that **there is neither a reward for target attainment nor a penalty for target non-attainment**. Because of this, FTA encourages transit providers to be aggressive when setting targets, both to support making the case for additional funds to meet state of good repair goals and to encourage finding innovative ways to use existing funding levels to meet state of good repair goals.

The TAM Rule further requires that Metropolitan Planning Organizations (MPOs) establish regional performance targets relating to State of Good Repair no later than July 1, 2017. Such targets should, at a minimum, be complementary to those of the transit operators, and MPOs can opt to endorse providers' targets as those for the region.

Staff Recommendation:

It is the recommendation of CRCOG Staff that the CRCOG Transportation Committee, on behalf of the CRCOG Policy Board, pass a resolution of support endorsing CTDOT's State of Good Repair Performance Targets as the regional performance targets for the MPO. To ensure that the MPO stays informed and is given opportunities for input on future matters relating to Transit Asset Management within the Region, we further recommend that our transit representatives from CTDOT and GHTD keep the Policy Board updated on development of their TAM Plans, progress towards their performance targets, and annual reassessment of these targets.

Attachments:

- Draft Resolution of Support
- CTDOT State of Good Repair Performance Measures Target Summary: Tier I
- CTDOT State of Good Repair Performance Measures Target Summary: Tier II

¹ The forecasted performance for the end of FY2017 assumes a continuation of current business practices and funding levels.

Target Summary: Metro North, Shore Line East, CT Transit (HNS), Nason, Collins, Northeast Transportation, New Britain Transportation, Dattco

Revenue Vehicle Classes Total Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Articulated Bus	ULB	51 Vehicles	0%	0%	14%
Bus	ULB	477 Vehicles	46%	18%	14%
Cutaway Bus	ULB	43 Vehicles	2%	2%	17%
BR Over-The-road bus	ULB	48 Vehicles	15%	0%	14%
Commuter Rail Locomotive	ULB	30 Vehicles	40%	40%	0%
Commuter Rail Passenger Coach	ULB	84 Vehicles	0%	0%	0%
Commuter Rail Self Propelled Passenger Car	ULB	310 Vehicles	12%	12%	0%
Ferry Boats	ULB	3 Vehicles	100%	100%	0%

Service Vehicle Classes Total Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	48 Vehicles	29%	29%	7%
Automobiles	ULB	11 Vehicles	46%	0%	20%
Sport Utility Vehicle	ULB	26 Vehicles	62%	0%	20%
Steel Wheel Vehicles	ULB	40 Vehicles	100%	100%	0%

Guideway Infrastructure Total Goal: Maintain All Transit Guideway Assets in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Commuter Rail Guideway	% Restricted	~240 Track Miles	6%	5%	2%

Facilities Classes Total Goal: Maintain all Facilities in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	46 Facilities	2%	0%	0%
Admin and Maintenance	TERM (1-5)	25 Facilities	4%	4%	0%

12/15/2016

Performance Measures Target Summary

CTDOT - TIER II

Target Summary:	Greater Bridgeport, Middletown, Millford, Southeast, Northwestern, Northeastern, Greater New Haven, Windham, Estuary, Valley, Norwalk, Housatonic Area Transit
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Revenue Vehicle Classes Total

Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Trolley	ULB	1 Vehicle	0%	0%	7%
Bus	ULB	184 Vehicles	43%	15%	14%
Cutaway Bus	ULB	286 Vehicles	41%	16%	17%
Minivan	ULB	5 Vehicles	0%	0%	17%

Service Vehicle Classes Total

Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	23 Vehicles	26%	26%	7%
Automobiles	ULB	9 Vehicles	56%	56%	20%
Van	ULB	3 Vehicles	67%	67%	17%
Minivan	ULB	2 Vehicles	0%	0%	17%
Sport Utility Vehicle	ULB	15 Vehicles	87%	60%	20%

Facilities Classes Total

Goal: Maintain all Facilities in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	4 Facilities	0%	0%	0%
Admin and Maintenance	TERM (1-5)	11 Facilities	0%	0%	0%

Target Summary: **Greater Hartford Transit District**

Revenue Vehicle Classes Total *Goal: Maintain the vehicle class of rolling stock in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Cutaway Bus	ULB	157	24%	2%	17%

Service Vehicle Classes Total *Goal: Maintain the vehicle class of rolling stock in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	5	40%	40%	7%
Automobiles	ULB	3	67%	67%	20%
Sport Utility Vehicle	ULB	4	25%	25%	20%

Facilities Classes Total *Goal: Maintain all Facilities in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	2	0%	0%	0%
Admin and Maintenance	TERM (1-5)	2	0%	0%	0%

AUTHORIZING RESOLUTION

FOR ENDORSEMENT OF THE STATE OF GOOD REPAIR PERFORMANCE TARGETS SET BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION

WHEREAS, the Federal Transit Administration (FTA) and FTA regulations governing federal transportation assistance prescribe new requirements for Metropolitan Planning Organizations (MPOs) to coordinate with transit providers, set performance targets, and integrate those performance targets and performance plans into their planning documents. As per 23 CFR 450.324 and 23 CFR 450.326, MPOs are required to reference performance targets and performance-based planning into their Transportation Improvement Programs (TIPs) and Metropolitan Transportation Plans by October 2018; and

WHEREAS, FTA established four State of Good Repair (SGR) Performance Measures in asset categories of Rolling Stock, Equipment, Facilities, and Infrastructure. The SGR Performance Targets for these measures were set by the Connecticut Department of Transportation (CTDOT) in coordination with the transit providers, including Metro-North Railroad, CTtransit, and all the rural and urban Transit Districts to comply with a January 1, 2017 deadline; and

WHEREAS, each MPO is required to establish SGR performance targets for each FTA Performance Measure and for each asset class offered within the metropolitan planning area, as per 23 CFR 450.306 (d)(3), 180 days after the transit providers have set their respective performance targets, or by July 1, 2017; and

WHEREAS, the SGR Performance Measure Targets set by CTDOT have been reviewed by the Policy Board of the Capitol Region Council of Governments and align with regional goals for transit asset management;

NOW THEREFORE BE IT RESOLVED THAT, the Capitol Region Council of Governments does hereby endorse the State of Good Repair Performance Measure Targets established by the Connecticut Department of Transportation as the regional performance targets for the MPO.

CERTIFICATE

I certify the above is a true copy of a resolution adopted by the Transportation Committee, acting on behalf of the Policy Board, at its meeting held on June 26, 2017.

BY: _____

Lisa Heavner, CRCOG Secretary

DATE: _____

FTA State of Good Repair Performance Measures

Target Summary

Tier I

Commuter Rail, CT Transit, Ferry

Bureau of Public Transportation
Asset Management Unit

12/22/2016

TIER I

Rail

Metro North - New Haven Line
Amtrak - Shore Line East

Bus

HNS - CT Transit (*Hartford, New Haven, Stamford*)
Nason - CT Transit (*Torrington*)
Collins - CT Transit (*Hartford*)
Northeast Transportation - CT Transit (*Waterbury, Meriden, Wallingford*)
New Britain Transportation - CT Transit (*New Britain*)
Dattco - CT Transit (*Bristol*)

Ferry

CTDOT - Rocky Hill/Glastonbury
CTDOT - Chester/Hadlyme

Asset Categories

Revenue Vehicles	Page No.
Service Vehicles	3
Guideway Infrastructure	11
Facilities	15
	16

Asset Category: Revenue Vehicles - Tier I

Asset Class: Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 46%

Useful Life Benchmark: 12 years

Forecast for End of SFY 17: 18%

Business Practice / Target: **14%**

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

477

Average Fleet Age

9.49

Total # Past ULB

218

Comments:

- 1 Replace vehicles at the 12 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 12 year bus replacement program.

Total # Scheduled to be Replaced

130

Asset Category: Revenue Vehicles - Tier I

Asset Class: Articulated Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 0%

Useful Life Benchmark: 12 years

Forecast for End of SFY 17: 0%

Business Practice / Target: **14%**

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

51

Average Fleet Age

4.55

Total # Past ULB

0

Comments:

- 1 Replace vehicles at the 12 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 12 year bus replacement program.

Total # Scheduled to be Replaced

0

Asset Category: Revenue Vehicles - Tier I

Asset Class: Cutaway Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 2%

Useful Life Benchmark: 5 Years

Forecast for End of SFY 17: 2%

Business Practice / Target: 17%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

43

Average Fleet Age

4.2

Total # Past ULB

1

Comments:

- 1 Replace vehicles at the 5 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 5 year bus replacement program.

Total # Scheduled to be Replaced

0

Asset Category: Revenue Vehicles - Tier I

Asset Class: BR Over the Road Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 15%

Useful Life Benchmark: 12 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: **14%**

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

48

Average Fleet Age

6.19

Total # Past ULB

7

Comments:

- 1 Replace vehicles at the 12 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 12 year bus replacement program.

Total # Scheduled to be Replaced

7

Asset Category: Revenue Vehicles - Tier I

Asset Class: Commuter Rail Locomotive (Diesel)

Mode: Rail

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 40%

Useful Life Benchmark: 39 Years

Forecast for End of SFY 17: 40%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Metro North Capital Plan does not anticipate replacement of Locomotives until 2020 at earliest
- 2 Consistency of federal funds
- 3 Available state funding

Number of Vehicles

30

Consistency of federal funds

Average Fleet Age

35

Available state funding

Total # Past ULB

12

Comments:

- 1 Work on programming replacement of locomotives to CTDOT Capital Plan
- 2 Combination of Metro North and Shore Line East locomotives
- 3 This ULB needs to be revisited to determine if it has met CTDOT Practices

Total # Scheduled to be Replaced

0

Asset Category: Revenue Vehicles - Tier I

Asset Class: Commuter Rail Passenger Coaches (Push/Pull Coaches) Mode: Rail

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 0%

Useful Life Benchmark: 39 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Asset Condition may cause vehicles to need replacement prior to ULB of 39 years, as they have exceeded the 25 year minimum for Grant Application per FTA
- 2 Consistency of federal funds
- 3 Available state funding

Number of Vehicles

84

Average Fleet Age

24

Total # Past ULB

0

Comments:

- 1 Passenger Coaches are all within FTA's Recommended ULB. This ULB needs to be revisited to determine if it has met CTDOT Practices
- 2 Continue to evaluate the asset performance, to determine need for replacement
- 3 Combination of Metro North and Shore Line East Passenger Coaches

Total # Scheduled to be Replaced

0

Asset Category: Revenue Vehicles - Tier I

Asset Class: Commuter Rail Self Propelled Passenger Cars (EMU) Mode: Rail

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 12%

Useful Life Benchmark: 39 Years

Forecast for End of SFY 17: 12%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 M2's will not be removed by end of State FY 17, and are expected to be used daily in that time frame
- 2 Consistency of federal funds
- 3 Available state funding

Number of Vehicles

310

Average Fleet Age

8

Total # Past ULB

36

Comments:

- 1 New Haven Line Vehicles are comprised mostly of new M8 fleet put in service within the last 5 years
- 2 M4's and M6's have been taken fully of out of service, but are kept as part of Tax Advantage Leasing. Does not need to be reflected in inventory
- 3 M2's will be taken out of service after full installation of Positive Train Control, expected to be complete in 2018

Total # Scheduled to be Replaced

0

Asset Category: Revenue Vehicles - Tier I

Asset Class: Ferry Boat

Mode: Ferry

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 100%

Useful Life Benchmark: 42 years

Forecast for End of SFY 17: 100%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funds
- 3 Other public transit modes supercede ferry investment

Number of Vehicles

3

Average Fleet Age

62.3

Total # Past ULB

3

Comments:

- 1 Assess the replacement needs to align more with the FTA recommended ULB
- 2 CTDOT Ferry modes are used mainly for tourism purposes
- 3 Ferry boats are inspected by US Coast Guard to ensure its operating in a State of Good Repair

Total # Scheduled to be Replaced

0

Asset Category: Service Vehicles - Tier I

Asset Class: Trucks and Rubber Tire Vehicles **Mode:** Bus, Rail, and Ferry

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 30%

Useful Life Benchmark: 14 Years

Forecast for End of SFY 17: 30%

Business Practice / Target: 7%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No immediate plans to replace service vehicles way beyond the ULB

Number of Vehicles

46

Average Fleet Age

9.23

Total # Past ULB

14

Comments:

- 1 Assess the replacement needs to align more with the ULB
- 2 2 of the 46 Vehicles are used for New Haven Line
- 3 There is an open grant application to replace vehicles of this asset class at CTDOT's discretion

Total # Scheduled to be Replaced

0

Asset Category: Service Vehicles - Tier I

Asset Class: Automobiles

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 46%

Useful Life Benchmark: 4 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: 20%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

1 Consistency of federal funds

2 Available state funding

Number of Vehicles

11

Average Fleet Age

4.45

Total # Past ULB

5

Comments:

1 Replace vehicles at the 4 year custom Useful Life Benchmark

2 Utilize a business practice to align all Connecticut Transit Providers on a 4 year service vehicle replacement program.

Total # Scheduled to be Replaced

5

Asset Category: Service Vehicles - Tier I

Asset Class: Sport Utility Vehicle

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 62%

Useful Life Benchmark: 4 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: 20%

**SFY 17 - State of Connecticut Fiscal Year 2017*

DRAFT

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding

Number of Vehicles

26

Average Fleet Age

3.62

Total # Past ULB

16

Comments:

- 1 Replace vehicles at the 4 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 4 year service vehicle replacement program.

Total # Scheduled to be Replaced

16

Asset Category: Service Vehicles - Tier I

Asset Class: Steel Wheel Vehicles

Mode: Rail

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 100%

Useful Life Benchmark: 25 Years

Forecast for End of SFY 17: 100%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Uncertainty as to where MNR's plan impacts CTDOT owned Steel Wheel Vehicles
- 2 Low priority replacements
- 3 Vehicles are operated in both Connecticut and New York which would require collaboration on investment decisions with Metro North

Number of Vehicles

40

Comments:

Average Fleet Age

38.7

Total # Past ULB

40

Comments:

Total # obligated for Year

0

1 Metro North has mentioned a Steel Wheel Vehicle Replacement Program

2 Coordinate between Capital Office and Office of Rail the replacement needs of these vehicles

3 Determine what funds can be used to replace these vehicles

Asset Category: Guideway Infrastructure - Tier I

Asset Class: Commuter Rail Guideway

Mode: Rail

CTDOT GOAL: Maintain All Transit Guideway Assets in a State of Good Repair

KPI: Percentage of Asset Class that is under a Performance Restriction

Current Percentage: 6%

Forecast for End of SFY 17: 5%

Business Practice / Target: 2%

Performance Restriction: # of Slow Zone Miles

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Some slow zones are long term (will keep percentage static)
- 2 Need to account for temporary slow zones related to preventative maintenance, inspection, and construction
- 3 Percentage would be a function of the budget for track replacement/repairs

Number of Track Miles

~240

Slow Zone Miles

13.88

Performance Restriction %

5.73

Comments:

- 1 Further analyze projected slow zones
- 2 Analyze data to calibrate next years target
- 3 Need an expansion of C program to address mud spots, tie replacements, and drainage concerns to alleviate need for slow zones

Asset Category: Facilities - Tier I

Asset Class: Passenger and Parking Facilities

Mode: Bus and Rail

CTDOT GOAL: Maintain all Facilities in a State of Good Repair

KPI: Percentage of Asset Class that is below a 3 on the TERM Scale for SGR Condition

Current Percentage: 2%

Forecast for End of SFY 17: 0%

Business Practice / Target: 0%

TERM Scale Ratings: 1-5

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No formal condition rating process currently in place to accurately establish condition
- 2 No formal Maintenance Management System in place to respond efficiently to SGR deficiencies
- 3 Target was set only based on institutional knowledge that critical issues are dealt with promptly

Number of Facilities

46

Facilities Ranked Below 3

1

% Ranked Below 3

2

Comments:

- 1 Address the need to perform condition assessments to determine an asset rating to better reflect SGR of our facilities to determine an appropriate target
- 2 Work with property managers to enhance data collection to better address deficiencies
- 3 Inventory is comprised of 45 rail facility assets and 1 bus facility asset

Asset Category: Facilities - Tier I

Asset Class: Administrative and Maintenance Facilities **Mode:** Bus, Rail, and Ferry

CTDOT GOAL: Maintain all Facilities in a State of Good Repair

KPI: Percentage of Asset Class that is below a 3 on the TERM Scale for SGR Condition

Current Percentage: 4%

Forecast for End of SFY 17: 4%

Business Practice / Target: 0%

TERM Scale Ratings: 1-5

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No formal condition rating process currently in place to accurately establish condition
- 2 No formal Maintenance Management System in place to respond efficiently to SGR deficiencies
- 3 Target was set only based on institutional knowledge that critical issues are dealt with promptly

Number of Facilities

25**

Facilities Ranked Below 3

1

% Ranked Below 3

4%

Comments:

- 1 Address the need to perform condition assessments to determine an asset rating to better reflect SGR of our facilities to determine an appropriate target
- 2 Need to finalize inventory to determine if certain buildings should be considered facilities
- 3 Work with property managers to enhance data collection to better address deficiencies

***Number was based on treating each separate facility structure in rail yards as an asset as opposed to each campus being an asset*

Target Summary:	Metro North, Shore Line East, CT Transit (HNS), Nason, Collins, Northeast Transportation, New Britain Transportation, Dattco
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Revenue Vehicle Classes Total*Goal: Maintain the vehicle class of rolling stock in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Articulated Bus	ULB	51 Vehicles	0%	0%	14%
Bus	ULB	477 Vehicles	46%	18%	14%
Cutaway Bus	ULB	43 Vehicles	2%	2%	17%
BR Over-The-road bus	ULB	48 Vehicles	15%	0%	14%
Commuter Rail Locomotive	ULB	30 Vehicles	40%	40%	0%
Commuter Rail Passenger Coach	ULB	84 Vehicles	0%	0%	0%
Commuter Rail Self Propelled Passenger Car	ULB	310 Vehicles	12%	12%	0%
Ferry Boats	ULB	3 Vehicles	100%	100%	0%

Service Vehicle Classes Total*Goal: Maintain the vehicle class of rolling stock in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	48 Vehicles	29%	29%	7%
Automobiles	ULB	11 Vehicles	46%	0%	20%
Sport Utility Vehicle	ULB	26 Vehicles	62%	0%	20%
Steel Wheel Vehicles	ULB	40 Vehicles	100%	100%	0%

Guideway Infrastructure Total*Goal: Maintain All Transit Guideway Assets in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Commuter Rail Guideway	% Restricted	~240 Track Miles	6%	5%	2%

Facilities Classes Total*Goal: Maintain all Facilities in a State of Good Repair*

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	46 Facilities	2%	0%	0%
Admin and Maintenance	TERM (1-5)	25 Facilities	4%	4%	0%

FTA State of Good Repair Performance Measures

Target Summary

DRAFT

Tier II

Transit Providers

Bureau of Public Transportation

Asset Management Unit

12/15/2016

TIER II

Urban Transit Providers

- Greater Bridgeport Transit (GBT)
- Middletown Area Transit (MAT)
- Milford (MTD)
- Southeast Area Transit (SEAT)
- Estuary Transit District (ETD)
- Valley Transit District (VTD)
- Norwalk Transit District (NTD)
- Housatonic Area Transit (HART)
- Greater New Haven Transit District (GNHTD)

Rural Transit Providers

- Northwestern Transit District (NWCTD)
- Northeastern Transit District (NECTD)
- Windham Transit District (WRTD)

Asset Categories

- Revenue Vehicles
- Service Vehicles
- Facilities

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- 8
- 13

Asset Category: Revenue Vehicles - Tier II

Asset Class: Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 43%

Useful Life Benchmark: 12 years

Forecast for End of SFY 17: 15%

Business Practice / Target: 14%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers

- 1 Consistency of federal funds
- 2 Available state funds
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

184

Average Fleet Age

8.85

Total # Past ULB

79

Comments:

- 1 Replace vehicles at the 12 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers

Total # Scheduled to be Replaced

51



Asset Category: Revenue Vehicles - Tier II

Asset Class: Minivans

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 0%

Forecast for End of SFY 17: 0%

Useful Life Benchmark: 5 Years

Business Practice / Target: 17%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funds
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

5

Average Fleet Age

0

Total # Past ULB

0

Comments:

- 1 Replace vehicles at the 5 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 5 year bus replacement program.

Total # Scheduled to be Replaced

0



Asset Category: Revenue Vehicles - Tier II

Asset Class: Cutaway Bus

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 41%

Forecast for End of SFY 17: 16%

Business Practice / Target: 17%

Useful Life Benchmark: 5 Years

**SFY 17 - State of Connecticut Fiscal Year 2017*

DRAFT

Barriers:

- 1 Consistency of federal funds
- 2 Available state funds
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

286

Average Fleet Age

4.23

Total # Past ULB

118

Comments:

Total # Scheduled to be Replaced

71

- 1 Replace vehicles at the 5 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 5 year bus replacement program.

Asset Category: Revenue Vehicles - Tier II

Asset Class: Trolley

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 0%

Useful Life Benchmark: 13 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: 7%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding
- 3 Waiting period for the availability of bus procurement contracts varies

Number of Vehicles

1

Average Fleet Age

2

Total # Past ULB

0

Comments:

- 1 Replace vehicles at the 13 year Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 13 year bus replacement program.

Total # Scheduled to be Replaced

0

Asset Category: Service Vehicles - Tier II

Mode: Bus

Asset Class: Trucks and Rubber Vehicles

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 26%

Forecast for End of SFY 17: 26%

Business Practice / Target: 7%

Useful Life Benchmark: 14 Years

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No immediate plans to replace service vehicles way beyond the Useful Life Benchmark

Number of Vehicles

23

Average Fleet Age

8

Total # Past ULB

6

Comments:

- 1 Assess the replacement needs to align more with the Useful Life Benchmark

Total # Scheduled to be Replaced

0

Asset Category: Service Vehicles - Tier II

Asset Class: Automobiles

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 56%

Useful Life Benchmark: 4 Years

Forecast for End of SFY 17: 56%

Business Practice / Target: 20%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding

Number of Vehicles

9

Average Fleet Age

4.78

Total # Past ULB

5

Comments:

- 1 Replace vehicles at the 4 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 4 year service vehicle replacement program.

Total # Scheduled to be Replaced

0

Asset Category: Service Vehicles - Tier II

Asset Class: Sport Utility Vehicles

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 87%
Forecast for End of SFY 17: 60%

Useful Life Benchmark: 4 Years

Business Practice / Target: 20%

**SFY 17 - State of Connecticut Fiscal Year 2017*

DRAFT

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding

Number of Vehicles
15

Average Fleet Age
6.47

Total # Past ULB
13

Total # Scheduled to be Replaced
4

Comments:

- 1 Replace vehicles at the 4 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 4 year service vehicle replacement program.

Asset Category: Service Vehicles - Tier II

Asset Class: Minivan

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 0%

Useful Life Benchmark: 5 Years

Forecast for End of SFY 17: 0%

Business Practice / Target: 17%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding

Number of Vehicles

2

Comments:

Average Fleet Age

0

Total # Past ULB

0

Number of Vehicles Scheduled to be Replaced

Total # Scheduled to be Replaced

0

- 1 Replace vehicles at the 5 year custom Useful Life Benchmark
- 2 Utilize a business practice to align all Connecticut Transit Providers on a 5 year bus replacement program.

DRAFT

Asset Category: Service Vehicles - Tier II

Asset Class: Van

Mode: Bus

CTDOT GOAL: Maintain the vehicle class of rolling stock in a State of Good Repair

KPI: Percentage of Asset Class that have met or exceeded their Useful Life Benchmark (ULB)

Current Percentage: 67%

Useful Life Benchmark: 5 Years

Forecast for End of SFY 17: 67%

Business Practice / Target: 17%

**SFY 17 - State of Connecticut Fiscal Year 2017*

DRAFT

Barriers:

- 1 Consistency of federal funds
- 2 Available state funding

Number of Vehicles

3

Average Fleet Age

9.33

Total # Past ULB

2

Comments:

1 Replace vehicles at the 5 year custom Useful Life Benchmark

2 Utilize a business practice to align all Connecticut Transit Providers on a 5 year service vehicle replacement program.

Total # Scheduled to be Replaced

0

Asset Category: Facilities - Tier II

Mode: Bus

Asset Class: Passenger and Parking Facilities

CTDOT GOAL: Maintain all Facilities in a State of Good Repair

KPI: Percentage of Asset Class that is below a 3 on the TERM Scale for SGR Condition

TERM Scale Ratings: 1-5

Current Percentage: 0%

Forecast for End of SFY 17: 0%

Business Practice / Target: **0%**

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No formal condition rating process currently to accurately project condition **Number of Facilities**
4
- 2 No formal Maintenance Management System in place to respond efficiently to SGR deficiencies **Facilities Ranked Below 3**
0
- 3 Target was set only based on institutional knowledge that critical issues are dealt with promptly **% Ranked Below 3**
0

Comments:

- 1 Address the need to perform condition assessments to determine an asset rating to better reflect SGR of our facilities to determine an appropriate target
- 2 Work with property managers to enhance data collection to better address deficiencies

Asset Category: Facilities - Tier II

Asset Class: Administrative and Maintenance Facilities Mode: Bus

CTDOT GOAL: Maintain all Facilities in a State of Good Repair

KPI: Percentage of Asset Class that is below a 3 on the TERM Scale for SGR Condition

Current Percentage: 0% **TERM Scale Ratings: 1-5**

Forecast for End of SFY 17: 0%

Business Practice / Target: 0%

**SFY 17 - State of Connecticut Fiscal Year 2017*

Barriers:

- 1 No formal or unified condition rating process currently to accurately project condition amongst providers
- 2 No formal Maintenance Management System in Place to respond efficiently to SGR deficiencies
- 3 Target was set only based on institutional knowledge of each facility staff member who performed their own condition assessment

Number of Facilities

11

Facilities Ranked Below 3

0

% Ranked Below 3

0

Comments:

- 1 Address need to perform unified condition assessments amongst transit providers to determine an asset rating to reflect SGR of our facilities to determine an appropriate target
- 2 Determine Inventory Size to see if certain buildings need to be included/excluded
- 3 Work with property managers to enhance data collection to better address deficiencies

Target Summary: Greater Bridgeport, Middletown, Milford, Southeast, Northwestern, Northeastern, Greater New Haven, Windham, Estuary, Valley, Norwalk, Housatonic Area Transit

Revenue Vehicle Classes Total

Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Trolley	ULB	1 Vehicle	0%	0%	7%
Bus	ULB	184 Vehicles	43%	15%	14%
Cutaway Bus	ULB	286 Vehicles	41%	16%	17%
Minivan	ULB	5 Vehicles	0%	0%	17%

Service Vehicle Classes Total

Goal: Maintain the vehicle class of rolling stock in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Rubber and Tire Vehicles	ULB	23 Vehicles	26%	26%	7%
Automobiles	ULB	9 Vehicles	56%	56%	20%
Van	ULB	3 Vehicles	67%	67%	17%
Minivan	ULB	2 Vehicles	0%	0%	17%
Sport Utility Vehicle	ULB	15 Vehicles	87%	60%	20%

Facilities Classes Total

Goal: Maintain all Facilities in a State of Good Repair

Asset Class	Performance Metric	Asset Count	Performance Measure	1 Year Forecast	Goal / Target
Passenger and Parking	TERM (1-5)	4 Facilities	0%	0%	0%
Admin and Maintenance	TERM (1-5)	11 Facilities	0%	0%	0%

Appendix 4

DRAFT

AGREEMENT
Regarding
Transportation Planning & Funding
In the Hartford Urbanized Area

Section I. Purpose of Agreement

As required by 23 CFR Sec. 450.314(a), The Metropolitan Planning Organization (MPO), the State, and the providers of public transportation shall cooperatively determine their mutual responsibilities in carrying out the metropolitan planning process, and 23 CFR Sec. 450.314 (e). If more than one MPO has been designated to serve an urbanized area, there shall be a written agreement among the MPOs, the State, and the public transportation operator(s) describing how the metropolitan planning processes will be coordinated. Therefore, an Agreement must be established among the four Councils of Governments (COG) within the Hartford Urbanized Area, as well as the Connecticut Department of Transportation (CTDOT). The urbanized area is defined using the most recent Census blocks and population data. The Hartford Urbanized Area is defined as the towns, cities and suburbs in the region surrounding the City of Hartford. The population of the Hartford Urbanized area is over 200,000 and therefore is considered a Transportation Management Area (TMA). The attached map outlines each TMA in Connecticut. The COGs include the Capitol Region Council of Governments (CRCOG), the Naugatuck Valley Council of Governments (NVCOG), the Lower Connecticut River Valley Council of Governments (RiverCOG), and the Northwest Hills Council of Governments (NHCOG). The purpose of this Agreement is:

1. to define the method for distributing metropolitan planning funds received by the CTDOT from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) for transportation planning within the Hartford Urbanized Area;
2. to define the method for the development of financial plans for the Metropolitan Transportation Plan (MTP), the Transportation Improvement Program (TIP) and the list of obligated projects along with the coordination involved in Air Quality Conformity and Congestion management;
3. to define the method for distributing and administering FHWA Surface Transportation Block Grant Program (STBG) suballocated funds, Transportation Alternatives Set-Aside suballocated funds, FTA Section 5307 funds, and FTA Section 5310 funds earmarked for, or attributable to, the Hartford Urbanized Area; and
4. to define the responsibilities of each COG for carrying out its own transportation planning program and for coordinating with the other COGs in the Hartford Urbanized Area.

Section II. Distribution of Planning (PL) Funds among MPOs

CRCOG, NVCOG, and RiverCOG are the designated MPOs for their respective regions. As such they are entitled to a portion of the Metropolitan planning funds from the FHWA (known as PL funds) and the FTA (known as Section 5303 funds) through a statewide process administered by CTDOT. The funds will continue to be distributed according to a method developed by CTDOT in cooperation with all the MPOs in Connecticut. The method is based primarily on the total population in each urban planning region (not just the urbanized area within the region). Each MPO receives a share of the planning funds generally proportionate to its share of the combined population of all the urban planning regions in the

state. The shares are adjusted to ensure that the smallest urban regions receive a funding level that is at least equal to the minimum needed to carry out a basic urban transportation planning program.

NHCOG, as a rural region, receives a portion of Connecticut's State Planning and Research funds along with a portion of FTA section 5304 funds. Distribution of those funds is outside of the scope of this Agreement.

Section III. MTP, TIP, Obligated projects list, Air Quality Conformity, Congestion Management Process

A financial plan is documentation required to be included with a metropolitan transportation plan and TIP that demonstrates the consistency between reasonably available and projected sources of Federal, State, local, and private revenues and the costs of implementing proposed transportation system improvements.

MTP development – Each MPO shall receive from the CTDOT a financial plan with anticipated funding allocations for the 25 year period along with a list of major projects that are regionally and or statewide significant being funded with FHWA and FTA funds and to be included in the MTP. The formula used to calculate the anticipated funding allocation was developed in coordination with the MPOs throughout the state. Any changes to this formula will also be developed in coordination with the MPOs.

TIP development - Each MPO shall receive from the CTDOT a draft list of proposed projects for the MPOs use in the development of the draft TIP. Coordination between the MPOs and CTDOT on additions or deletions to this list will occur. The MPO will develop their TIP financial plan based on the projects they include in the TIP. Once approved, all MPOs TIPs are sent to the CTDOT for their use in the development of the Statewide Transportation Improvement Program (STIP).

Obligated projects list – Each MPO shall receive from the CTDOT, a listing of all federally funded projects that were obligated or awarded in a given federal fiscal year. The MPOs must publish, or otherwise make available for public review, an annual listing of projects for which federal funds have been obligated in the preceding year by the end of the first quarter of the next fiscal year. This listing must be consistent with the funding categories identified in the TIP.

Air Quality Conformity - The CTDOT, acting on behalf of the MPOs, must demonstrate conformity for all federally funded projects in the MTPs and TIPs located in either nonattainment or maintenance areas. In order to receive federal transportation funds, the CTDOT and the MPOs must cooperatively work to develop and endorse an Air Quality Conformity Determination report, which certifies to the federal government that all TIPs and MTPs within the State of Connecticut collectively conform to the requirements of the Clean Air Act.

Coordination of the Congestion Management Process for the Hartford TMA - As required by 23 CFR 450.320(a), the MPOs agree to develop and implement a Congestion Management Process as an integrated part of the metropolitan transportation planning process. CRCOG, as the largest MPO in the TMA, will take the lead on gathering and analyzing relevant data. Periodically, CRCOG, in consultation with the other MPOs and CTDOT, will develop a CMP report that analyzes the performance of key corridors in the TMA. The MPOs and CTDOT will work cooperatively to develop and implement strategies to address and mitigate congestion. Each MPO will work with CTDOT to develop such strategies into projects for inclusion in their respective Long Range Transportation Plans and Transportation Improvement Programs. Each MPO will also ensure that congestion management strategies are considered in corridor and special studies carried out by the MPO.

Section IV. Distribution of STBG Suballocated Funding for the Hartford UZA

The Surface Transportation Block Grant program (STBG) provides flexible funding that may be used by States and localities for projects to preserve and improve the conditions and performance on any Federal-aid highway, bridge and tunnel projects on any public road, pedestrian and bicycle infrastructure, and transit capital projects, including intercity bus terminals. Urbanized Area Boundaries are established following each decennial census. The boundaries distinguish between urban and rural places for funding and system classification purposes. The census defined boundary is used to set the MPO/TMA threshold and is the basis for funding distribution among urbanized areas. A percentage of the State's STBG apportionment is suballocated to areas of the State based on their relative share of the State's population, and is divided into three categories – urbanized areas with population over 200,000, areas with population of 5,000 or less, and areas of the State with a population of 5,001 to 200,000. This Agreement concerns the over 200,000 Hartford Urbanized Area funding. Suballocation of urbanized area funding is calculated by FHWA and apportioned to the State by urbanized area.

Prior to authorization of the State funded Local Transportation Capital Improvement Program (LOTICIP) in November of 2013, COGs submitted applications to CTDOT for funding on behalf of municipalities and STBG funds attributable to the Hartford Urbanized Area were divided among the four COGs by CTDOT based on population within the Census defined urbanized area. Given the availability of LOTICIP funds for municipal projects of regional significance, projects under the STBG are and will continue to be coordinated and programmed at the Urbanized Area level between CTDOT and the COGs ensuring projects are evaluated based on purpose and need, merit and regional benefit. At a minimum, the coordination will occur during CTDOT's Capital Plan preparation and as needed throughout the Fiscal Year.

In the event that the LOTICIP funds are not authorized for a given year or the program is discontinued, CTDOT will work cooperatively to prioritize the advancement of regional LOTICIP projects using available transportation funds. Should the LOTICIP program be discontinued, CTDOT will work with the COGs on a solution to transition back to the federal STBG program. Funding targets under the STBG would be reflective of populations within the Census defined urbanized area and collaboratively developed with the COGs.

Designated TMAs are allowed to utilize STBG suballocated funds anywhere within the planning region boundaries. CRCOG and RiverCOG have been designated as TMAs, therefore, can utilize the Hartford Urbanized Area funding anywhere within its regional boundaries. One exception, however, exists for RiverCOG due to the merger of the prior planning regions (Midstate and CT River Estuary) and the inclusion of the Midstate towns within the designated Hartford TMA and the CT River Estuary towns within the designated New Haven TMA. The Hartford Urbanized Area funding can be used anywhere within the RiverCOG boundaries that include the prior Midstate towns. If Hartford Urbanized Area funds are to be used within the RiverCOG boundaries of the towns that are part of the New Haven TMA, a formal request through FHWA would be required to transfer the funds to the New Haven Urbanized Area funding source.

NVCOG's primary funding source under the STBG comes from the Waterbury Urbanized Area (referred to as STP Other), which has been designated based on 2010 census results as an area of the State with population of 5,001 to 200,000, therefore, has not reached the threshold for designation as a TMA. NVCOG includes three towns (Plymouth Bristol, and Thomaston) that are located within the Hartford Urbanized Area. Because NVCOG is not a designated Hartford TMA, the Hartford Urbanized Area funding can only be used on eligible projects located within the Hartford urbanized areas within Plymouth, Bristol and Thomaston.

NHCOG is one of two Rural regions located within Connecticut. NHCOG's primary funding source under the STBG comes from the Torrington Urban Cluster (referred to as STP Other), which has been designated based on 2010 census results as an area of the State with population of 5,001 to 200,000. NHCOG also includes towns that reside within the Hartford Urbanized Area – Barkhamsted, Litchfield,

New Hartford, and Burlington. Because NHCOG is a rural region and not designated part of the Hartford TMA, the Hartford Urbanized Area funding can only be used on eligible projects located within the Hartford urbanized areas within the four towns listed above.

Section V. Solicitation of Projects for the Transportation Alternatives (TA) Set-Aside Funds for the Hartford UZA

The TA Set-Aside authorizes funding for programs and projects defined as *transportation alternatives*, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities such as historic preservation and vegetation management, and environmental mitigation related to stormwater and habitat connectivity; recreational trail projects; safe routes to school projects; and projects for planning, designing, or constructing boulevards and other roadways largely in the right-of-way of former divided highways. The four COGs agree to assist CTDOT with soliciting projects for the TA Set-Aside Program. For funds suballocated to urbanized areas with populations of over 200,000, the MPOs representing the urbanized areas are responsible for developing the competitive process and selecting/prioritizing projects in consultation with CTDOT. CRCOG and RiverCOG are the only regions with a population over 200,000, therefore, are responsible for the competitive process to select projects under the Hartford Urbanized Area TA Set-Aside funding source within their respective regional boundaries. NVCOG and NHCOG have towns within the Hartford Urbanized Area and two towns are located within the Hartford TMA boundaries (Plymouth and Bristol). CRCOG and RiverCOG agree to coordinate with NVCOG and NHCOG to consider proposed projects for the TA-Set-Aside program located within eligible areas of NVCOG and NHCOG. NVCOG and/or NHCOG will submit applications to CTDOT for the Hartford Urbanized Area TA Set-Aside funding source should coordination result in agreement between CRCOG, RiverCOG, NVCOG and NHCOG that a portion of funding will be provided to progress a project in NVCOG or NHCOG located within the Hartford Urbanized Area.

Section VI. Distribution of FTA 5307 Funds for the Hartford UZA

The Urbanized Area Formula Funding program (5307) makes Federal resources available to urbanized areas and to the Governors for transit capital and operating assistance and for transportation related planning in urbanized areas. The four COGs and the CTDOT Bureau of Public Transportation agree to distribute Section 5307 funds from the FTA in the manner described below. The FTA Section 5307 funds attributable to the Hartford Urbanized Area will be pooled with all other Section 5307 funds in Connecticut and administered as a statewide program by CTDOT, following procedures specified in FTA Circular 9030.1E (as amended). CTDOT will coordinate as necessary with Transit Operators and the COGs when developing its capital investment priorities for public transportation. The annual 5307 program will be adopted by the MPOs into their respective TIPs.

This continues the procedure previously agreed to by all COGs in the state. It recognizes the inefficiency of trying to program large and infrequent capital purchases when individual regions are limited to small annual appropriations for their respective regions and/or urbanized areas. An example of this is the difficulty of programming funds for replacement of buses when the buses have a minimum 12-year life cycle and appropriated funds are typically available only for 4 years.

Section VII. Coordination and Administration of FTA 5310 Funds for the Hartford UZA

Under the MAP-21 transportation legislation, FTA Section 5317, New Freedom Program, was absorbed into Section 5310 and administration of the program became flexible within a given Urbanized Area. The Section 5310 program provides formula funding to states for the purpose of assisting private nonprofit groups in meeting the transportation needs of older adults and people with disabilities when the transportation service provided is unavailable, insufficient, or inappropriate to meeting these needs. The four COGs agree that the administration of Section 5310 will be the responsibility of CTDOT who will coordinate with the COGs. The COGs and CTDOT will collaborate on the development and periodic update of the required Coordinated Public Transit-Human Services Transportation Plan.

Section VIII. Basic Responsibilities of Each MPO

Each of the three MPOs will conduct each of the following basic transportation planning activities as outlined in the "Statement of Cooperative MPO/State/Transit Operators Planning Roles & Responsibilities"

1. Preparation of an annual Unified Planning Work Program that lists and describes all transportation planning studies and tasks to be completed during the year.
2. Preparation and update of a long range, multi-modal metropolitan transportation plan.
3. Preparation and maintenance of a short-range transportation improvement program (TIP).
4. Financial planning to ensure plan and program are financially constrained and within anticipated funding levels.
5. Conduct of planning studies and system performance monitoring, including highway corridor and intersection studies, transit system studies, application of advanced computer techniques, and transportation data collection and archiving.
6. Public outreach, including survey of affected populations, electronic dissemination of reports and information (website), and consideration of public comments.
7. Ensuring the transportation planning process does not have a significant or disproportionate impact on low income, minority and transit dependent Title VI populations.
8. Ensuring plans, projects and programs are consistent with and conform to air quality goals of reducing transportation-related emissions and attaining National Ambient Air Quality Standards.
9. Adhere to all required Planning Regulations as outlined in 23 CFR part 450 and in 49 CFR part 613.
10. Cooperatively develop and implement a Congestion Management Process for the Hartford Urbanized Area.

As a non-MPO COG, NHCOG is not required to develop the above, but may wish to do so to better coordinate transportation planning activities.

Section IX. Coordination among COGs and CTDOT

It is the goal of the four COGs to conduct their transportation programs in a manner that ensures their plans and programs are mutually supportive of major projects, programs, and policies to improve the transportation system in the Hartford Urbanized Area.

Coordination of Planning Activities. The three MPOs in the Hartford UZA (CRCOG, NVCOG, and RiverCOG) agree to coordinate their regional transportation plans, transportation improvement programs (TIPs), and annual work programs. The coordination efforts will include the exchange and review of annual work programs, regional transportation plans, and TIPs. Staff of the three MPOs will meet at least annually to review each other's planning programs and to identify projects or programs of mutual interest or potential conflict. NHCOG will be included in all correspondence and invited to annual meetings, but it is not critical that they attend annual meetings.

Coordination of the STBG Suballocated Program. Since the establishment of the state funded Local Transportation Capital Improvement Program (LOTICIP) in November 2013, the Department and the COGs have agreed to meet annually to coordinate project selection for the STBG. The intent of these annual meetings is:

- To review projects currently programmed using STBG funds within the COG and to identify any areas of under-programming, with the primary focus on the next federal fiscal year.
- To identify Department projects that appear to be good candidates for STBG funding to address any under-programming concerns in the upcoming fiscal year and to solicit the COG's comments regarding the best candidates from a regional perspective.
- To discuss the status of any projects being scoped by the Department.

Coordination of the Capital Plan/Project Selection Process. CTDOT will send a *draft* of a proposed 5-year Capital Plan (the Plan) to the COGs for review and comment in the summer of each calendar year. The draft may reflect input that the Department received from the COGs during the COG consultation process on the previous year's plan. This consultation process consists of annual meetings with each COG to address comments and concerns and potential selection of projects for the outer years of the Plan.

Moving forward the CTDOT will coordinate with the COGs on developing a project selection process to ensure consideration of fiscal constraint, federal funding restrictions, regional priorities, environmental justice, project readiness and ensuring a state of good repair. The selection process will be transparent and will align with the Department's and COGs mission and vision.

CTDOT is responsible for effectively managing the federal resources entrusted to it and for maximizing the use of these federal resources. Obligating 100% of the obligation limitation (ceiling) provided each fiscal year by Congress is critical to maximizing the use of federal funding. The STBG suballocated program is an important component in the obligation of 100% of ceiling, and CTDOT assumes obligation of 100% of the current fiscal year apportionment in its Capital Plan to accomplish this. Because the TIP/STIP is a critical part of the project funding/implementation process as required by Title 23, the COGs play an important role in the process to ensure maximum use of federal funds. At a minimum, CTDOT will meet annually with each COG. This meeting will be to discuss overall programming within the STBG to enhance coordination, provide project details for new projects determined to be good candidates, and understand regional needs and priorities as outlined in each COGs response to the DRAFT 5-Year Capital Plan. Additional coordination meetings may be needed to ensure that any programming shortfalls that may occur as a result of schedule and cost changes occurring throughout the fiscal year are cooperatively addressed which may result in the need to provide timely approval near fiscal year-end to move a project into the STBG suballocated program or process an Advance Construction (AC) conversion utilizing STBG Hartford Urbanized Area funding. If there are no options for addressing a programming shortfall within the Hartford Urbanized Area within the current fiscal year, funding will carry forward into the next fiscal year and CTDOT will work with the COGs to program these funds.

Coordination of the selection of performance targets for each metropolitan area. According to 23 CFR 450.314(h), The MPOs, Operators of Public Transportation and the CTDOT must mutually agree upon and document the roles and responsibilities for conducting performance-based planning and programming in an Agreement. Therefore, the MPOs, transit operators and CTDOT agree to meet to

discuss setting performance targets, include performance measures and performance targets in the MTP and Transportation Improvement Plans, coordinate reporting of these performance targets to the United States Department of Transportation (USDOT) and develop a separate performance management agreement

Section X. Coordination of Transit and TDM Planning

It is the goal of the parties to this Agreement to conduct their planning activities in a manner that supports multiple modes of transportation throughout the Hartford Urbanized Area.

Coordination of the Locally Coordinated Public Transit – Human Services Transportation Plan (LOCHSTP). In support of the FTA 5310 program, the parties to this Agreement agree to coordinate on developing and maintaining the LOCHSTP for the Hartford Urbanized Area. As the designated recipient of funds under the 5310 program, CTDOT will continue to take the lead role in ensuring that locally coordinated plans throughout the state are developed in a consistent fashion. The four COGS in the Hartford Urbanized Area will work with CTDOT to update and maintain the plan.

Coordination of Transit Planning Activities. The parties agree to participate, as needed, in CT *transit's* Bus Service Review Committee. The parties will assist with demographic data evaluation and municipal coordination. The parties also agree to cooperate on initiatives that seek to maintain and improve security and safety of transit facilities within the Hartford Urbanized Area.

Coordination of Transportation Demand Management (TDM) Strategies. The parties agree to work collaboratively to develop TDM strategies and work toward implementing them. CTDOT will take a lead role in developing and implementing TDM strategies that seek to incentivize, and inform the public of, alternatives to single occupancy vehicles. The COGs and transit operators will assist CTDOT with evaluating such strategies and, where appropriate, implementing them.

Section XI. Amendment

This Agreement may be amended as jointly deemed necessary or in the best interest of all parties, including Federal Transportation agencies.

Nothing contained in this Agreement is intended to or shall limit the authority or responsibilities assigned to signatory organizations under Connecticut law, federal law, local ordinance, or charter.

Section XII. Periodic Review of Agreement

This Agreement will be reviewed periodically so that it remains current in describing the roles and responsibilities of the impacted COGs and CTDOT relative to the Hartford Urbanized Area. The Agreement will be assessed at a minimum in the year following each federal certification review of the TMA regions' planning process to capture any changes in federal transportation authorizations, federal regulations and guidance, changes in State regulations pertaining to transportation, and comments that were part of the certification review.

Marcia Leclerc

Marcia Leclerc, Mayor
CRCOG Chairperson

2/23/18

Date

Mark Lyon

Mark Lyon
NHCOG Chairperson

5/1/18

Date

Neil O'Leary

Neil O'Leary, Mayor
NVCOG Chairperson

4/24/18

Date

Bonnie Reemsnyder

Bonnie Reemsnyder, First Selectwoman
RiverCOG Chairperson

3/28/18

Date

Vicki Shotland

Vicki Shotland
Executive Director, GHTD

5-18-18

Date

Lisa Seymour

Lisa Seymour
Administrator, MAT

3/28/18

Date

Joseph Comerford

Joseph Comerford
Executive Director, Estuary TD

3/28/18

Date

James P. Redeker

James P. Redeker
Commissioner, CTDOT

5/23/18

Date

DRAFT

Memorandum of Understanding / Cooperative Agreement

Capitol Region Council of Governments (CRCOG)

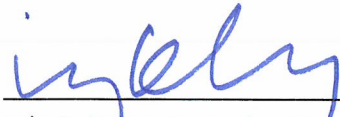
CRCOG is guided by the chief elected officials of 38 Metro Hartford municipalities in the State of Connecticut. The transportation planning program is undertaken at the direction of the CRCOG Transportation Committee, with representatives from each city or town in the Capitol Region. The Transportation Committee reports to the CRCOG Policy Board which acts as the Metropolitan Planning Organization (MPO) for the Capitol Region.

Pioneer Valley Planning Commission (PVPC)

The PVPC is the designated regional planning body for the Pioneer Valley region which encompasses 43 cities and towns in the Hampden and Hampshire county areas. The PVPC transportation planning staff provides support services for the Pioneer Valley Metropolitan Planning Organization (MPO).

The agencies share parts of urbanized areas (designated by the US Bureau of the Census) and metropolitan areas (designated by the Office of Management and Budget) and are each responsible for satisfying the requirements of a Transportation Management Area (TMA as designated by the US Department of Transportation.) The agencies acknowledge a common interest in the interstate region but retain individual responsibility and jurisdiction. It is to the mutual benefit of the agencies to cooperate and provide for the coordination of planning activities for all modes of transportation between their respective planning districts. The agencies agree to the following:

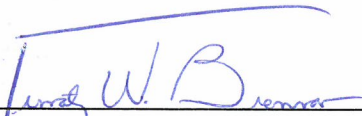
1. Each agency will ensure the mutual exchange of information and expertise, and the transmittal for review of all pertinent documents including, but not limited to, the Unified Planning Work Program, the Transportation Improvement Program, and the Long Range Transportation Plan.
2. Each agency agrees to cooperate in matters pertaining to, but not limited to, the Congestion Management Process, evacuation planning, Intelligent Transportation Systems, bicycle-pedestrian, and transit planning.
3. Each agency agrees to share GIS and regional transportation model data.
4. Each agency will ensure the notification of, and participation in, meetings concerned with matters of mutual interest.
5. Each agency will ensure cooperation and consultation on plans, programs, and projects affecting both parties. In addition, each agency agrees to meet at a minimum annually to discuss cross border transportation planning efforts. If inconsistencies or conflicts arise, the agencies shall meet and employ their best efforts to develop a satisfactory resolution.



Lyle D. Wray, Executive Director
Capitol Region Council of Governments

8-19-2015

Date



Timothy W. Brennan, Executive Director
Pioneer Valley Planning Commission

8-27-2015

Date

Appendix 5

DRAFT

	MPO	Project #	Town	Route/Street Number	Project Description	Added Capacity or N	Y	Bridge #	Funding Source	1 to 4	5 to 10	11 to 27	Total
CTDOT - Transit	CRCOG	TBD	HARTFORD	CT Transit	Bus Maintenance Facility Improvements - Hartford SOGR	N			FTA	75000	175000		250000
	CRCOG	TBD	HARTFORD	CT Transit	Bus Maintenance Facility Improvements - Hartford (New Satellite)	N			FTA		150000		150000
	CRCOG	TBD	HARTFORD	HTFD LINE	Hartford Line - Existing Stations - Hartford	N			FTA			20000	20000
	CRCOG	TBD	STATEWIDE	All Transit Distrcits	Bus Fleet Overhauls & Replacements - All Other Buses	N			FTA	85000	20000	140000	245000
	CRCOG	TBD	STATEWIDE	Statewide Bus	Systemwide Technology Upgrades for Buses	N			FTA	15000	15000	60000	90000
	CRCOG	TBD	STATEWIDE	All Transit Distrcits	Bus Maintenance Facility Improvements - All Other Bus Facilities SOGR	N			FTA	60000	40000	80000	180000
	CRCOG	TBD	STATEWIDE	STATEWIDE	Multimodal Fare Technology Improvements	N			FTA		60000	135000	195000
	CRCOG	TBD	STATEWIDE	CT Transit	CT Transit System wide - Admin Capital / Misc. Support	N			FTA	19000	42000	133000	194000
	CRCOG	TBD	STATEWIDE	CT Transit	Bus Fleet Overhauls & Replacements - CTTransit	N			FTA	18500	166500	434000	619000
	CRCOG	TBD	VARIOUS	CT Transit	New BRT-Like Service - East of Hartford	N			FTA			50000	50000
	CRCOG	TBD	VARIOUS	CTFastrak	Bus Fleet Overhauls & Replacements - CTFastrak	N			FTA	5000	25000	60000	90000
	CRCOG	TBD	VARIOUS	CTFastrak	CTFastrak Stations & Fixed Guideway	N			FTA		40000	80000	120000
	CRCOG	TBD	VARIOUS	Statewide Bus	Bus Fleet Expansion in Urban Areas, Including Real-Time Scheduling and Smart Card Fare Boxes	N			FTA		19800	62700	82500
	CRCOG	0320-0015	WINDSOR	HTFD LINE	Hartford Line - Existing Stations - Windsor	N			FTA		50000	20000	70000
	CRCOG	0320-0016	WINDSOR LOCKS	HTFD LINE	Hartford Line - Existing Stations - Windsor Locks	N			FTA	50000		20000	70000
	CRCOG	0170-2296	BERLIN	HTFD LINE	Hartford Line - Existing Stations - Berlin	N			State			40000	40000
	CRCOG	0320-0017	ENFIELD	HTFD LINE	Hartford Line - Future Stations - Enfield	N			State	50000			50000
	CRCOG	TBD	HARTFORD	HTFD LINE	Hartford Line - Rehabilitation of Connecticut River Railroad Bridge	N			State		60000	90000	150000
	CRCOG	0320-0013	NEWINGTON	HTFD LINE	Hartford Line - Future Stations - Newington	N			State	50000			50000
	CRCOG	TBD	STATEWIDE	Rail Freight	Rail Freight Network Annual Funding Program (SOGR)	N			State	30000	10000		40000
	CRCOG	0320-0008	VARIOUS	HTFD LINE	Hartford Line - Phase 3B (Remaining Double Tracking, without CT River Bridge)	N			State	87500	127000		214500
	CRCOG	TBD	VARIOUS	CTRAIL	Rail Fleet - Coaches	N			State		300000	135000	435000
	CRCOG	TBD	VARIOUS	CTRAIL	Rail Fleet - Locomotives	N			State	225000	1275000	884000	2384000
	CRCOG	TBD	VARIOUS	CTRAIL	Systemwide - New Rail Shop for Diesel / Dual Power Locomotives & Coach Repairs	N			State			87500	87500
CRCOG	0170-2296	VARIOUS	HTFD LINE	Hartford Line - Grade Crossing Elimination Program	N			State	1000	149000		150000	
CRCOG	0320-0014	WEST HARTFORD	HTFD LINE	Hartford Line - Future Stations - West Hartford	N			State	50000			50000	
CTDOT - Highway	CRCOG	0042-0317	EAST HARTFORD	RT 2	Rt. 2 Operational & Safety Improvements Between Exits 3 and 5	N			State		55000		55000
	CRCOG	0053-0192	Glastonbury/Wethersfield	Trail	Trail Connections to the Putnam Bridge Walkway	N			State		10500		10500
	CRCOG	0063-0703	HARTFORD	I-91	I-91 Charter Oak Bridge	N			FHWA		228000		228000
	CRCOG	0063-0716	HARTFORD	I-84	I-84 Hartford Viaduct Replacement	N			FHWA			3490000	3490000
	CRCOG	0063-0719	HARTFORD	Sigourney Street	Rehab/Replace Br 03023 o/ Capitol Ave & Amtrak	N			FHWA		22350		22350
	CRCOG	0118-0170	ROCKY HILL	RT 3, 99 & 411	Replace/Upgrade CTSS Equipment	N			FHWA		10800		10800
	CRCOG	0155-0171	WEST HARTFORD	I-84	I-84 West Hartford Exits 40 & 42	N			State		65000		65000
	CRCOG	0160-0150	WILLINGTON	I-84	Replace Br 02169 over Lower Ruby Brook	N			State		12000		12000
	CRCOG	0171-0425	DISTRICT 1	CT 9/ CT 72	Replace Highway Signs & Supports on CT 9 (Exits 25-31) & CT 72 (Exits 1-9)	N			FHWA		14500		14500
	CRCOG	TBD	FARMINGTON	I-84	I-84 Interchange at Route 4 and Route 6 in Farmington	N			FHWA		130000		130000
	CRCOG	0007-0189	Berlin/Cromwell	Various	Replace Highway Signs & Supports - CT 9 (Exits 18-24), CT 5/15 & SR 571	N			FHWA		14500		14500
	CRCOG	0171-0415	Various	RT 9/72	RT 9/72 CCTV Installation	N			FHWA		12076		12076
	CRCOG	TBD	MERIDEN/SOUTHINGTON	I-691	I-691 RBC Project - Meriden/Southington - MP 1.9 to MP 4.85	N			FHWA		4150		4150
CRCOG Transit	CRCOG	TBD	Southington, Plainville, Bristol	CTtransit	Implement local bus service along Routes 10 and 229	n/a		n/a	unfunded	900			900
	CRCOG	TBD	Hartford, East Hartford	CTtransit	Implement Transit Priority Corridors	n/a		n/a	unfunded		TBD		TBD
CRCOG Highway	CRCOG	TBD	Manchester	I-84	Auxiliary lanes between Exits 62 and 63	Y			FHWA		92000		92000
	CRCOG	TBD	Manchester	I-84	Auxiliary lanes between Exits 63 and 64/65	Y			FHWA		6200		6200
	CRCOG	TBD	Manchester/South Windsor	I-84	Additional WB exit-ramp at Exit 63; other WB ramp improvements	Y			FHWA			94000	94000
	CRCOG	TBD	Manchester/South Windsor	I-84	Buckland HOV Ramps	Y			FHWA			160000	160000
	CRCOG	TBD	Manchester	Buckland Street	Single Point Interchange at Buckland Street/Buckland Hills Drive	Y			FHWA			115000	115000
	CRCOG	TBD	Windsor	I-91	Day Hill Rd Interchange Improvements	Y			FHWA		30000		30000
	CRCOG	TBD	Wethersfield/Glastonbury	Route 2	Putnam Bridge Rehab/Replacement	N			FHWA			520000	520000

CRCOG	TBD	Bolton	I-384 / Rt 6 / Rt 44	Interchange reconfiguration for safety and connectivity improvements	Y		FHWA			50000	50000
CRCOG	0011-0155	BLOOMFIELD	CT 178/Crestview Drive	Extension of RR Track Circuit at Int. #11-252	Y		FHWA	150			150
CRCOG	0042-0319	EAST HARTFORD	Trail	Hockanum River Park Trail - Phase 3	Y		FHWA	475			475
CRCOG	0048-yyyy	ENFIELD	Various	Traffic Study - Vicinity of Routes 190, 220, I-91 & Enfield Square Mall	Y		FHWA	238			238
CRCOG	0053-0189	GLASTONBURY	CT 17	NHS - Rehab Br 00388 CT 17 NB o/ CT 17 SB Ramp 007	Y	Br 00388	State	4,750			4,750
CRCOG	0053-0192	Glastonbury/Wethersfield	Trail	Trail Connections to Putnam Bridge Walkway (RW)	Y		State	185			185
CRCOG	0053-0192	Glastonbury/Wethersfield	Trail	Trail Connections to Putnam Bridge Walkway (FD)	Y		State	500			500
CRCOG	0063-0626	HARTFORD	Van Dyke Ave	Roadway & Streetscape Improvements - Charter Oak Ave to Masseek St	Y		FHWA	3,120			3,120
CRCOG	0063-0626	HARTFORD	Van Dyke Ave	Roadway & Streetscape Improvements - Charter Oak Ave to Masseek St	Y		FHWA	277			277
CRCOG	0063-0678	HARTFORD	Sigourney St	Roundabout at Park, Russ and Sigourney	Y		FHWA	2,292			2,292
CRCOG	0063-0690	HARTFORD	Various	Traffic Signal Upgrades, Various Locations	Y		FHWA	2,675			2,675
CRCOG	0063-0703	HARTFORD	I-91/RT 15	Relocation & Reconfigure Interchange 29 (CN)	Y		State	112,000			112,000
CRCOG	0063-0708	HARTFORD	I-84	NHS - Rehab Bridges 03399A-D, 03400A-C, 03401A-B, 03402A-B; vic. Sisson Ave	Y	, 03400A-C, 03	FHWA	8,096			8,096
CRCOG	0063-0712	HARTFORD	I-84	NHS - Rehab Br 00980B o/CT River, I-84 WB TR 826 to I-91 NB	Y	Br 00980B	FHWA	1,250			1,250
CRCOG	0063-0714	HARTFORD	Weston Street	Intersection Improvements at Jennings Road and Boce Barlow Way	Y		FHWA	1,036			1,036
CRCOG	0063-0716	HARTFORD	I-84	I-84 Viaduct Replacement (PE)	Y		State	30,000			30,000
CRCOG	0063-0717	HARTFORD	Various	ATMS Communications Upgrade	Y		FHWA	532			532
CRCOG	0063-0718	HARTFORD	Various	Traffic Signal Upgrades at Various Locations	Y		FHWA	3,216			3,216
CRCOG	0063-0718	HARTFORD	Various	Traffic Signal Upgrades at Various Locations	Y		FHWA	56			56
CRCOG	0076-0221	MANCHESTER	Buckland Street	Intersection Improvements at Buckland Hills Drive & Pleasant Valley Road	Y		FHWA	813			813
CRCOG	0077-0236	MANSFIELD	SRSI	Ped Safety Improvements, vic. S.E. Elementary School	Y		FHWA	495			495
CRCOG	0077-0240	MANSFIELD	UCONN	SFY 19/20 Technology Transfer Center - LTAP	Y		FHWA	242			242
CRCOG	0078-0093	MARLBOROUGH	South Main Street	Replace Br 05650 over Fawn Brook	Y	Br 05650	FHWA	1,836			1,836
CRCOG	0078-0094	MARLBOROUGH		Tank Replacements	Y		State	1,600			1,600
CRCOG	0088-0194	NEW BRITAIN	Main Street	Intersection Improvements at Lafayette Street	Y		FHWA	610			610
CRCOG	0093-0213	NEWINGTON		CT Safety Research Center (Effective 7/1/16-6/30/21)	Y		FHWA	1,540			1,540
CRCOG	0093-0214	NEWINGTON		Highway Safety Office Tasks Consistent with SHSP (7/1/16-6/30/21)	Y		FHWA	819			819
CRCOG	0093-0228	NEWINGTON	Various	Newington Highway Operations Center (8/1/18-7/30/22)	Y		FHWA	3,880			3,880
CRCOG	0093-0229	NEWINGTON	Various	Newington Highway Operations Procurement (8/1/18-7/30/22)	Y		FHWA	2,830			2,830
CRCOG	0093-xxxx	NEWINGTON		DOT Training Placeholder (CY 2019)	Y		FHWA	1,252			1,252
CRCOG	0109-0165	PLAINVILLE	Tomlinson Ave	Replace Br 04546 o/ Quinnipiac River	Y	Br 04546	FHWA	1,128			1,128
CRCOG	0109-0173	PLAINVILLE	Trail	FCHT - Town Line Rd to Northwest Drive (PE)	Y		State	3,800			3,800
CRCOG	0129-0115	SOMERS	SR 528	Replace Br 05587 o/ Gillettes Brk	Y	Br 05587	State	1,400			1,400
CRCOG	0131-0203	SOUTHINGTON	Trail	Farmington Canal Heritage Trail	Y		FHWA	3,194			3,194
CRCOG	0131-0203	SOUTHINGTON	Trail	Farmington Canal Heritage Trail	Y		FHWA	87			87
CRCOG	0132-0129	SOUTH WINDSOR	Eli Terry	Pedestrian Safety Improvements	Y		FHWA	470			470
CRCOG	0134-0147	STAFFORD	RT 190	Intersection Improvements at Rte 319	Y		FHWA	1,873			1,873
CRCOG	0139-0103	SUFFIELD	Harvey Lane	Modernize Railroad Crossing	Y		FHWA	1,090			1,090
CRCOG	0139-0113	Suffield/Enfield	CT 190	Rehab Br 03295 o/ CT River & Amtrak	Y	Br 03295	FHWA	3,000			3,000
CRCOG	0139-0114	SUFFIELD	Remington Street	Replace Br 04819 over Stony Brook	Y	Br 04819	FHWA	2,800			2,800
CRCOG	0146-0197	VERNON	Skinner Road	Ped Impr vic. Skinner Road Elementary School	Y		FHWA	491			491
CRCOG	0146-0199	VERNON	Main St	Replace Br 04575 o/ Tankerhoosen River	Y	Br 04575	FHWA	1,600			1,600
CRCOG	0155-0171	WEST HARTFORD	I-84	Construct Operational Lanes EB & WB (CN)	Y		State	78,000			78,000
CRCOG	0155-0173	WEST HARTFORD	I-84	Replace Hwy Signs & Supports, Exit 40-56	Y		State	10,500			10,500
CRCOG	0159-0191	Wethersfield/Hartford	I-91	Resurfacing, Bridge & Safety Improvements on I-91, M.P. 33.45-36.58	Y		FHWA	24,300			24,300
CRCOG	0160-0147	WILLINGTON	CT 32	Replace Br 02259 o/S. Branch Roaring Brook	Y	Br 02259	FHWA	2,000			2,000
CRCOG	0170-3054	STATEWIDE	Various	Design of Pavement Preservation Projects	Y		State	750			750
CRCOG	0170-3360	STATEWIDE	Various	CT Safety Analysis Methods (thru 9/30/20)	Y		FHWA	2,002			2,002
CRCOG	0170-3377	STATEWIDE	Various	Statewide Scoping Activities	Y		State	1,000			1,000
CRCOG	0170-3382	STATEWIDE	Various	Load Ratings for Bridges - NHS Roads (1/1/16-12/31/20)	Y		FHWA	2,000			2,000
CRCOG	0170-3383	STATEWIDE	Various	Load Ratings for Bridges - Non-NHS Roads (1/1/16-12/31/20)	Y		FHWA	1,000			1,000
CRCOG	0170-3384	STATEWIDE	Various	Innovative Bridge Program Development (IBP)	Y		State	1,500			1,500
CRCOG	0170-3411	STATEWIDE	Various	SF Bridge Insp - NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	2,440			2,440
CRCOG	0170-3412	STATEWIDE	Various	SF Bridge Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	2,795			2,795
CRCOG	0170-3413	STATEWIDE	Various	CE Bridge Insp - NHS Roads, NBI Bridges Only (9/1/16 - 8/31/21)	Y		FHWA	16,968			16,968
CRCOG	0170-3414	STATEWIDE	Various	CE Bridge Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	8,130			8,130
CRCOG	0170-3415	STATEWIDE	Various	CE Sign Support Insp - NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	1,893			1,893
CRCOG	0170-3416	STATEWIDE	Various	CE Sign Support Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	276			276
CRCOG	0170-3422	STATEWIDE	Local Br Program	Local Bridge Program CLE Services (CJM/BL)	Y		FHWA	360			360
CRCOG	0170-3425	STATEWIDE	Various	Install ADA Curb Ramps and Sidewalks	Y		State	6,000			6,000
CRCOG	0170-3426	STATEWIDE		Fed Local Bridge Program PL (thru 9/30/21)	Y		FHWA	432			432
CRCOG	0170-3431	STATEWIDE		Surface Transportation Workforce Development (thru 9/30/19)	Y		FHWA	100			100
CRCOG	0170-3434	STATEWIDE	Various	Rapid Response Bridge Repairs by State Forces (thru 12/31/20)	Y		FHWA	75			75
CRCOG	0170-3439	STATEWIDE		TA Program - Project Development/Scoping (Fed Eligible) thru 3/31/22	Y		FHWA	528			528

CRCOG	0170-3441	STATEWIDE		Traffic Signal System Circuit Rider Program (4/1/17 - 3/31/20)	Y		FHWA	308		308
CRCOG	0170-3444	STATEWIDE		Pavement Management Analysis (4/1/17 - 3/31/20)	Y		FHWA	443		443
CRCOG	0170-3455	STATEWIDE	Various	CHAMP Safety Service Patrol (7/1/17-6/30/20)	Y		FHWA	4,083		4,083
CRCOG	0170-3491	STATEWIDE	Various	Epoxy Resin Pavement Markings (1 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3492	STATEWIDE	Various	Epoxy Resin Pavement Markings (2 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3493	STATEWIDE	Various	Epoxy Resin Pavement Markings (3 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3494	STATEWIDE	Various	Epoxy Resin Pavement Markings (4 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3499	STATEWIDE		Asset Management Group (7/1/18 thru 6/30/20)	Y		FHWA	1,155		1,155
CRCOG	0170-3500	STATEWIDE		Bridge Management Group (7/1/18 thru 6/30/20)	Y		FHWA	880		880
CRCOG	0170-5002	Rural Towns		HRRR Work Zone Safety Program	Y		FHWA	265		265
CRCOG	0170-PTxx	STATEWIDE	Various	Public Trans Annual Program	Y		FHWA	6,489		6,489
CRCOG	0170-xBRU	STATEWIDE	Various	SFY20 BRU Bridge Preservation Repairs	Y		State	20,000		20,000
CRCOG	0170-xCCP	STATEWIDE	Various - CC	Placeholder - Community Connectivity Program	Y		State	11,073		11,073
CRCOG	0170-xxMP	STATEWIDE		MP Placeholder	Y		FHWA	6,750		6,750
CRCOG	0718-9996	STATEWIDE		SFY 18 & 19 MP Urban Program (7/1/17 - 6/30/19)	Y		FHWA	6,325		6,325
CRCOG	0719-9991	STATEWIDE		SFY 19/20 SPR Program Planning-Coordination, Modeling & Crash Data Office	Y		FHWA	2,585		2,585
CRCOG	0719-9992	STATEWIDE		SFY 19/20 SPR Program Planning-Environmental Planning	Y		FHWA	2,455		2,455
CRCOG	0719-9993	STATEWIDE		SFY 19/20 SPR Program Planning-Strategic Planning & Projects	Y		FHWA	4,280		4,280
CRCOG	0719-9997	STATEWIDE		SFY 19/20 SPR Research Program	Y		FHWA	3,565		3,565
CRCOG	0719-9998	STATEWIDE		SFY 19/20 SPR Program Planning-Roadway Inventory System Office	Y		FHWA	7,468		7,468
CRCOG	170B-RJTS	STATEWIDE	Various	SFY20 Bridge Joints following 2019 VIP	Y		State	5,000		5,000
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvt Mgt List)	Y		State	25,000		25,000
CRCOG	170S-COUR	STATEWIDE	Various	Bridge Scour Monitoring (Placeholder; Effective 1/1/19, Yr 1)	Y		FHWA	100		100
CRCOG	170T-RAIL	STATEWIDE	Various - Trail	Placeholder - Expanded Trail/Alternative Mobility Program	Y		State	5,947		5,947
CRCOG	170U-Wnhs	STATEWIDE	Various	CE Bridge Insp - Uwater - NHS Roads (Placeholder; Effective 9/1/19, Yr 1)	Y		FHWA	920		920
CRCOG	170U-Wnon	STATEWIDE	Various	CE Bridge Insp - Uwater - Non-NHS Roads (Placeholder; Effective 9/1/19, Yr 1)	Y		FHWA	1,272		1,272
CRCOG	BRDG-CLEx	STATEWIDE		DOT & CLE Services for Bridge Program Oversight	Y		State	4,000		4,000
CRCOG	CRSH-STDY	STATEWIDE		Statewide Studies of High Frequency Accident Locations (start date 2/1/19)	Y		FHWA	500		500
CRCOG	GUID-RAIL	STATEWIDE	Various	Guiderail Replacement Program	Y		State	5,000		5,000
CRCOG	RESU-RFAC	STATEWIDE	Various	Vendor in Place Pavement Program	Y		State	69,000		69,000
CRCOG	SAFE-CIRC	STATEWIDE	Various	Placeholder for Continuation of Safety Circuit Rider Program	Y		FHWA	1,240		1,240
CRCOG	SIGN-SPRT	STATEWIDE		Sign Support Replacements Placeholder	Y		State	4,000		4,000
CRCOG	Toll-Stdy	STATEWIDE	Ltd Access Hwys	Study of Electronic Tolling System	Y		State	10,000		10,000
CRCOG	TRAN-SCOM			Transfer to NJ for 2019 TRANSCOM Work Program	Y		FHWA	338		338
CRCOG	0172-0450	DISTRICT 2	Various	Signal Replacements for APS Upgrade	Y		FHWA	4,940		4,940
CRCOG	0171-0417	DISTRICT 1	Various	OSTA Traffic Signals in District 1	Y		FHWA	3,350		3,350
CRCOG	0007-0190	BERLIN	Various	Preservation of Bridge Nos. 04476, 05224, 06122 and 06123	Y	476, 05224, 06	FHWA	1,350		1,350
CRCOG	0042-0318	EAST HARTFORD	Brewer Street	Reconstruction of Brewer St	Y		FHWA	4,091		4,091
CRCOG	0046-SIGN	E. Windsor/Enfield	I-91	Replace Highway Signs - Exit 44 to MA State Line	Y		State	12,750		12,750
CRCOG	0047-0119	ELLINGTON	CT 140	Replace Br 02668 o/ Charters Brook	Y	Br 02668	FHWA	2,000		2,000
CRCOG	0048-0190	ENFIELD		Construct high-speed rail crossing to bike & ped trails along the CT River	Y		FHWA	2,600		2,600
CRCOG	0051-0272	FARMINGTON	CT 177	Rehab Br 01487 over Farmington River	Y	Br 01487	State	2,500		2,500
CRCOG	0053-0192	Glastonbury/Wethersfield	Trail	Trail Connections to the Putnam Bridge Walkway (CN)	Y		State	10,500		10,500
CRCOG	0053-0194	GLASTONBURY	Fisher Hill Road	Rehab Br 04514 over Roaring Brook	Y	Br 04514	FHWA	1,836		1,836
CRCOG	0055-0141	GRANBY	CT10/202	Intersection Improvements at East St. & Notch Rd.	Y		FHWA	4,695		4,695
CRCOG	0055-0142	GRANBY	10/202	Major Intersection Impr at CT 20/189	Y		FHWA	7,150		7,150
CRCOG	0063-0654	HARTFORD	I-84 TR825	NHS - Rehab Br 01686B o/US 44 & Columbus Blvd	Y	Br 01686B	FHWA	4,400		4,400
CRCOG	0063-0694	HARTFORD	I-84 TR 823	NHS - Rehab Bridge 03400D o/ Parking Lot	Y	Br 03400D	State	2,510		2,510
CRCOG	0063-0716	HARTFORD	I-84	I-84 Viaduct Replacement (PE)	Y		State	30,000		30,000
CRCOG	0063-0720	HARTFORD	Asylum Avenue	Intersection Improvements at Sigourney Street	Y		FHWA	830		830
CRCOG	0063-0721	HARTFORD	Riverwalk	Ped/Bike Trail Extension, from the Boathouse to Weston Street	Y		FHWA	2,000		2,000
CRCOG	0076-0220	MANCHESTER	CT 83 & Oakland St	Two Roundabouts - 83 @ Oakland; Oakland @ Local Rds	Y		FHWA	5,500		5,500
CRCOG	0078-0092	MARLBOROUGH	CT 2	NHS - Rehab Br 01708 & 03374 o/ West Rd	Y	r 01708 & 0337	FHWA	2,400		2,400
CRCOG	0078-0095	MARLBOROUGH	Jones Hollow Road	Replace Br 04450 over Blackledge River	Y	Br 04450	FHWA	2,160		2,160
CRCOG	0088-0195	NEW BRITAIN	Trail	Construction of a Ped/Bike Trail Loop in Stanley Quarter Park	Y		FHWA	1,288		1,288
CRCOG	0093-0213	NEWINGTON		CT Safety Research Center (Effective 7/1/16-6/30/21)	Y		FHWA	1,540		1,540
CRCOG	0093-0214	NEWINGTON		Highway Safety Office Tasks Consistent with SHSP (7/1/16-6/30/21)	Y		FHWA	860		860
CRCOG	0093-0218	Newington/New Britain	CT 175	Computerized Traffic Signal System	Y		FHWA	6,800		6,800
CRCOG	0093-0228	NEWINGTON	Various	Newington Highway Operations Center (8/1/18-7/30/22)	Y		FHWA	4,470		4,470
CRCOG	0093-0229	NEWINGTON	Various	Newington Highway Operations Procurement (8/1/18-7/30/22)	Y		FHWA	2,220		2,220
CRCOG	0093-xxxx	NEWINGTON		DOT Training Placeholder (CY 2020)	Y		FHWA	1,252		1,252
CRCOG	0109-0173	PLAINVILLE	Trail	FCHT - Town Line Rd to Northwest Drive (RW)	Y		State	300		300
CRCOG	0118-0172	ROCKY HILL	CT 99	Silas Deane Hwy Ped Improvements	Y		FHWA	2,160		2,160
CRCOG	0131-0206	SOUTHINGTON	Spring Street	Replace Br 04562 o/ Quinnipiac River	Y	Br 04562	FHWA	2,392		2,392

CRCOG	0132-0139	SOUTH WINDSOR	I-291 & King St	NHS - Rehab Br 05944 o/ Podunk River	Y	Br 05944	FHWA	2,800		2,800
CRCOG	0134-0147	STAFFORD	RT 190	Intersection Improvements at Rte 319	Y		FHWA	2,492		2,492
CRCOG	0134-0148	STAFFORD	CT 32/CT 190	Modern Roundabout at Routes 32 & 190	Y		FHWA	1,000		1,000
CRCOG	0159-0191	Wethersfield/Hartford	I-91	Resurfacing, Bridge & Safety Improvements on I-91, M.P. 33.45-36.58	Y		FHWA	20,000		20,000
CRCOG	0164-0240	WINDSOR	Day Hill Rd	Upgrade Signals, Various Intersections	Y		FHWA	1,130		1,130
CRCOG	0165-0468	WINDSOR LOCKS	CT20 @ CT75	Realign CT 20 off-ramp to CT 75	Y		FHWA	2,504		2,504
CRCOG	0165-0468	WINDSOR LOCKS	CT20 @ CT75	Realign CT 20 off-ramp to CT 75	Y		FHWA	425		425
CRCOG	0171-0433	DISTRICT 1	VARIOUS	Replace Traffic Signals at 9 Locations	Y		FHWA	3,218		3,218
CRCOG	0170-3054	STATEWIDE	Various	Design of Pavement Preservation Projects	Y		State	750		750
CRCOG	0170-3377	STATEWIDE	Various	Statewide Scoping Activities	Y		State	1,000		1,000
CRCOG	0170-3382	STATEWIDE	Various	Load Ratings for Bridges - NHS Roads (1/1/16-12/31/20)	Y		FHWA	2,000		2,000
CRCOG	0170-3383	STATEWIDE	Various	Load Ratings for Bridges - Non-NHS Roads (1/1/16-12/31/20)	Y		FHWA	1,000		1,000
CRCOG	0170-3384	STATEWIDE	Various	Innovative Bridge Program Development (IBP)	Y		State	1,000		1,000
CRCOG	0170-3411	STATEWIDE	Various	SF Bridge Insp - NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	2,560		2,560
CRCOG	0170-3412	STATEWIDE	Various	SF Bridge Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	2,935		2,935
CRCOG	0170-3413	STATEWIDE	Various	CE Bridge Insp - NHS Roads, NBI Bridges Only (9/1/16 - 8/31/21)	Y		FHWA	17,816		17,816
CRCOG	0170-3414	STATEWIDE	Various	CE Bridge Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	8,537		8,537
CRCOG	0170-3415	STATEWIDE	Various	CE Sign Support Insp - NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	1,988		1,988
CRCOG	0170-3416	STATEWIDE	Various	CE Sign Support Insp - Non-NHS Roads (9/1/16 - 8/31/21)	Y		FHWA	290		290
CRCOG	0170-3425	STATEWIDE	Various	Install ADA Curb Ramps and Sidewalks	Y		State	6,000		6,000
CRCOG	0170-3426	STATEWIDE		Fed Local Bridge Program PL (thru 9/30/21)	Y		FHWA	432		432
CRCOG	0170-3434	STATEWIDE	Various	Rapid Response Bridge Repairs by State Forces (thru 12/31/20)	Y		FHWA	50		50
CRCOG	0170-3439	STATEWIDE		TA Program - Project Development/Scoping (Fed Eligible) thru 3/31/22	Y		FHWA	528		528
CRCOG	0170-3491	STATEWIDE	Various	Epoxy Resin Pavement Markings (1 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3492	STATEWIDE	Various	Epoxy Resin Pavement Markings (2 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3493	STATEWIDE	Various	Epoxy Resin Pavement Markings (3 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-3494	STATEWIDE	Various	Epoxy Resin Pavement Markings (4 of 4) - thru 12/31/20	Y		FHWA	2,000		2,000
CRCOG	0170-AMGx	STATEWIDE		Asset Management Group	Y		FHWA	1,400		1,400
CRCOG	0170-BMGx	STATEWIDE		Bridge Management Group	Y		FHWA	1,250		1,250
CRCOG	0170-PTxx	STATEWIDE	Various	Public Trans Annual Program	Y		FHWA	6,684		6,684
CRCOG	0170-xBRU	STATEWIDE	Various	SFY21 BRU Bridge Preservation Repairs	Y		State	20,000		20,000
CRCOG	0170-xCCP	STATEWIDE	Various - CC	Placeholder - Community Connectivity Program	Y		State	15,000		15,000
CRCOG	0170-xHPR	STATEWIDE		HPR/SPR Placeholder	Y		FHWA	9,500		9,500
CRCOG	0170-xIBP	STATEWIDE	Various	Placeholder - Innovative Bridge Program (IBP) (Delivery and/or Construction Methodology)	Y		State	6,515		6,515
CRCOG	0170-xxMP	STATEWIDE		MP Placeholder	Y		FHWA	6,750		6,750
CRCOG	170B-RJTS	STATEWIDE	Various	SFY21 Bridge Joints following 2020 VIP	Y		State	5,000		5,000
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvmt Mgt List)	Y		State	13,000		13,000
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvmt Mgt List)	Y		State	12,000		12,000
CRCOG	170S-COUR	STATEWIDE	Various	Bridge Scour Monitoring (Placeholder; Effective 1/1/19, Yr 2)	Y		FHWA	100		100
CRCOG	170T-RAIL	STATEWIDE	Various - Trail	Placeholder - Expanded Trail/Alternative Mobility Program	Y		State	700		700
CRCOG	170U-Wnhs	STATEWIDE	Various	CE Bridge Insp - Uwater - NHS Roads (Placeholder; Effective 9/1/19, Yr 2)	Y		FHWA	975		975
CRCOG	170U-Wnon	STATEWIDE	Various	CE Bridge Insp - Uwater - Non-NHS Roads (Placeholder; Effective 9/1/19, Yr 2)	Y		FHWA	1,348		1,348
CRCOG	BRDG-CLEx	STATEWIDE		DOT & CLE Services for Bridge Program Oversight	Y		State	4,000		4,000
CRCOG	CHMP-xxxx	STATEWIDE	Various	CHAMP Safety Service Patrol	Y		FHWA	4,083		4,083
CRCOG	GUID-RAIL	STATEWIDE	Various	Guiderrail Replacement Program	Y		State	5,000		5,000
CRCOG	RESU-RFAC	STATEWIDE	Various	Vendor in Place Pavement Program	Y		State	69,000		69,000
CRCOG	SIGN-SPRT	STATEWIDE		Sign Support Replacements Placeholder	Y		State	4,000		4,000
CRCOG	SIPH-xxxx	STATEWIDE		TBD Safety Projects	Y		FHWA	17,778		17,778
CRCOG	TRAN-SCOM			Transfer to NJ for 2020 TRANSCOM Work Program	Y		FHWA	338		338
CRCOG	xSTP-PRES	STATEWIDE		TBD STP Infrastructure Preservation	Y		FHWA	15,000		15,000
CRCOG	0172-SIGN	DISTRICT 2	CT 2	Replace Highway Signs - Exits 13-29	Y		State	6,500		6,500
CRCOG	0171-0429	DISTRICT 1		Replace Salt Shed Roofs, Vernon, Stafford & Union	Y		State	800		800
CRCOG	0172-0471	DISTRICT 1 & 2	VARIOUS	Replace Traffic Signals at 14 Locations	Y		FHWA	4,550		4,550
CRCOG	0174-0418	DISTRICT 4	VARIOUS	Replace Traffic Signals at 12 Locations	Y		FHWA	3,859		3,859
CRCOG	0011-0156	BLOOMFIELD	CT 178	Replace Br 01489 over Beaman Brook	Y	Br 01489	State	1,325		1,325
CRCOG	0030-0097	Columbia/Coventry	Trail	Hop River State Park Trail (CN)	Y		State	3,634		3,634
CRCOG	0032-0149	COVENTRY	US 44	Rehab/Replace Br 06851 o/ Olson's Brook	Y	Br 06851	State	400		400
CRCOG	0048-0198	ENFIELD	South River St	Replace Br 04506 over Freshwater Brook	Y	Br 04506	FHWA	2,700		2,700
CRCOG	0051-0274	FARMINGTON	I-84/US 6/SR 531	Realign I-84 EB On-Ramp and US 6	Y		FHWA	3,267		3,267
CRCOG	0063-0716	HARTFORD	I-84	I-84 Viaduct Replacement (PE)	Y		State	25,000		25,000
CRCOG	0076-0222	MANCHESTER	I-384	Replace/Reline Br 06650 (culvert) o/ Folly Brook	Y	Br 06650	State	900		900
CRCOG	0076-0223	MANCHESTER	I-384	Replace/Reline Br 06884 & 06885 (culverts) over Porter Brook	Y	06884 & 06885	State	1,200		1,200
CRCOG	0088-0192	NEW BRITAIN	Various	Upgrade Signals, Various Intersections	Y		FHWA	2,670		2,670
CRCOG	0093-0228	NEWINGTON	Various	Newington Highway Operations Center (8/1/18-7/30/22)	Y		FHWA	4,710		4,710

CRCOG	0093-0229	NEWINGTON	Various	Newington Highway Operations Procurement (8/1/18-7/30/22)	Y		FHWA	2,315		2,315
CRCOG	0093-xxxx	NEWINGTON		DOT Training Placeholder (CY 2021)	Y		FHWA	1,252		1,252
CRCOG	0128-0153	SIMSBURY	CT 10	NHS - Replace Br 00653 o/ Hop Brook	Y	Br 00653	State	1,900		1,900
CRCOG	0165-0509	WINDSOR LOCKS	I-91	Rehab Br 00454 o/ River, Amtrak & 159	Y	Br 00454	FHWA	12,180		12,180
CRCOG	0170-3054	STATEWIDE	Various	Design of Pavement Preservation Projects	Y		State	750		750
CRCOG	0170-3377	STATEWIDE	Various	Statewide Scoping Activities	Y		State	1,000		1,000
CRCOG	0170-3425	STATEWIDE	Various	Install ADA Curb Ramps and Sidewalks	Y		State	6,000		6,000
CRCOG	0170-3426	STATEWIDE		Fed Local Bridge Program PL (thru 9/30/21)	Y		FHWA	432		432
CRCOG	0170-3439	STATEWIDE		TA Program - Project Development/Scoping (Fed Eligible) thru 3/31/22	Y		FHWA	528		528
CRCOG	0170-AMGx	STATEWIDE		Asset Management Group	Y		FHWA	1,400		1,400
CRCOG	0170-BMGx	STATEWIDE		Bridge Management Group	Y		FHWA	1,250		1,250
CRCOG	0170-PTxx	STATEWIDE	Various	Public Trans Annual Program	Y		FHWA	6,684		6,684
CRCOG	0170-xBRU	STATEWIDE	Various	SFY22 BRU Bridge Preservation Repairs	Y		State	20,000		20,000
CRCOG	0170-xCCP	STATEWIDE	Various - CC	Placeholder - Community Connectivity Program	Y		State	15,000		15,000
CRCOG	0170-xHPR	STATEWIDE		HPR/SPR Placeholder	Y		FHWA	9,500		9,500
CRCOG	0170-xIBP	STATEWIDE	Various	Placeholder - Innovative Bridge Program (IBP) (Delivery and/or Construction Methodology)	Y		State	20,000		20,000
CRCOG	0170-xxMP	STATEWIDE		MP Placeholder	Y		FHWA	6,750		6,750
CRCOG	170B-RJTS	STATEWIDE	Various	SFY22 Bridge Joints following 2021 VIP	Y		State	5,000		5,000
CRCOG	170C-Enhs	STATEWIDE	Various	CE Bridge Insp - NHS Roads, NBI Bridges Only (Annual Requirement)	Y		FHWA	17,816		17,816
CRCOG	170C-Enon	STATEWIDE	Various	CE Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	8,537		8,537
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvmt Mgt List)	Y		State	25,000		25,000
CRCOG	170S-COUR	STATEWIDE	Various	Bridge Scour Monitoring (Placeholder; Effective 1/1/19, Yr 3)	Y		FHWA	100		100
CRCOG	170S-Fnhs	STATEWIDE	Various	SF Bridge Insp - NHS Roads (Annual Requirement)	Y		FHWA	2,560		2,560
CRCOG	170S-Fnon	STATEWIDE	Various	SF Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	2,935		2,935
CRCOG	170S-Snhs	STATEWIDE	Various	CE Sign Support Insp - NHS Roads (Annual Requirement)	Y		FHWA	1,988		1,988
CRCOG	170S-Snon	STATEWIDE	Various	CE Sign Support Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	750		750
CRCOG	170T-RAIL	STATEWIDE	Various - Trail	Placeholder - Expanded Trail/Alternative Mobility Program	Y		State	11,200		11,200
CRCOG	170T-RAIL	STATEWIDE	Various - Trail	Placeholder - Expanded Trail/Alternative Mobility Program	Y		State	4,920		4,920
CRCOG	170U-Wnhs	STATEWIDE	Various	CE Bridge Insp - Uwater - NHS Roads (Placeholder; Effective 9/1/19, Yr 3)	Y		FHWA	1,034		1,034
CRCOG	170U-Wnon	STATEWIDE	Various	CE Bridge Insp - Uwater - Non-NHS Roads (Placeholder; Effective 9/1/19, Yr 3)	Y		FHWA	1,429		1,429
CRCOG	BRDG-CLEx	STATEWIDE		DOT & CLE Services for Bridge Program Oversight	Y		State	4,000		4,000
CRCOG	BRDG-OFFx	STATEWIDE		TBD Local Bridge Preservation Projects	Y		FHWA	21,250		21,250
CRCOG	BRID-GExx	STATEWIDE		TBD Bridge Preservation Placeholder	Y		State	10,000		10,000
CRCOG	CHMP-xxxx	STATEWIDE	Various	CHAMP Safety Service Patrol	Y		FHWA	4,083		4,083
CRCOG	CMAQ-COGS	STATEWIDE	Various	Future COG Project Awards for CMAQ (Reserve)	Y		FHWA	10,000		10,000
CRCOG	GUID-RAIL	STATEWIDE	Various	Guidrail Replacement Program	Y		State	5,000		5,000
CRCOG	PREV-OVER	STATEWIDE	Various	Overprogrammed Bridge Projects from Current or Previous Years	Y		State	65,000		65,000
CRCOG	PREV-OVER	STATEWIDE	Various	Overprogrammed Roadway Projects from Current or Previous Years	Y		State	250,000		250,000
CRCOG	Pvmt-Mark	STATEWIDE		Line Striping/Pavement Markings Placeholder	Y		FHWA	8,000		8,000
CRCOG	RESU-RFAC	STATEWIDE	Various	Vendor in Place Pavement Program	Y		State	69,000		69,000
CRCOG	SGNL-PRES	STATEWIDE		Signals Preservation Placeholder	Y		FHWA	7,355		7,355
CRCOG	SIGN-PRES	STATEWIDE		Signing Preservation Placeholder	Y		State	30,000		30,000
CRCOG	SIGN-SPRT	STATEWIDE		Sign Support Replacements Placeholder	Y		State	4,000		4,000
CRCOG	SIPH-xxxx	STATEWIDE		TBD Safety Projects	Y		FHWA	19,139		19,139
CRCOG	TRAN-SCOM			Transfer to NJ for 2021 TRANSCOM Work Program	Y		FHWA	338		338
CRCOG	xSTP-PRES	STATEWIDE		TBD STP Infrastructure Preservation	Y		FHWA	32,500		32,500
CRCOG	xTAP-COGS	STATEWIDE		Future COG Project Awards for TAP (Reserve)	Y		FHWA	4,000		4,000
CRCOG	0171-0441	DISTRICT 1	Various	Replace Traffic Control Signals in District 1	Y		FHWA	3,657		3,657
CRCOG	0174-0424	DISTRICT 4	Various	Replace Traffic Control Signals in Various Locations	Y		FHWA	4,949		4,949
CRCOG	0063-0703	HARTFORD	I-91/RT 15	Relocation & Reconfigure Interchange 29	Y		FHWA	5,000		5,000
CRCOG	0063-0716	HARTFORD	I-84	I-84 Viaduct Replacement (PE)	Y		State	25,000		25,000
CRCOG	0093-xHOC	NEWINGTON	Various	Newington Highway Operations Center	Y		FHWA	4,480		4,480
CRCOG	0093-xPRO	NEWINGTON	Various	Newington Highway Operations Procurement	Y		FHWA	2,255		2,255
CRCOG	0093-xxxx	NEWINGTON		DOT Training Placeholder (CY 2022)	Y		FHWA	1,252		1,252
CRCOG	0109-0173	PLAINVILLE	Trail	FCHT - Town Line Rd to Northwest Drive (CN)	Y		State	11,200		11,200
CRCOG	0109-0173	PLAINVILLE	Trail	FCHT - Town Line Rd to Northwest Drive (CN)	Y		State	3,800		3,800
CRCOG	0131-0190	SOUTHINGTON	CT 10	NHS - Remove Br 00518, reconstruct CT10/322 intersection	Y	Br 00518	FHWA	9,200		9,200
CRCOG	0165-0509	WINDSOR LOCKS	I-91	Rehab Br 00454 o/ River, Amtrak & 159	Y	Br 00454	FHWA	19,600		19,600
CRCOG	0170-3054	STATEWIDE	Various	Design of Pavement Preservation Projects	Y		State	750		750
CRCOG	0170-3377	STATEWIDE	Various	Statewide Scoping Activities	Y		State	1,000		1,000
CRCOG	0170-3425	STATEWIDE	Various	Install ADA Curb Ramps and Sidewalks	Y		State	6,000		6,000
CRCOG	0170-AMGx	STATEWIDE		Asset Management Group	Y		FHWA	1,400		1,400
CRCOG	0170-BMGx	STATEWIDE		Bridge Management Group	Y		FHWA	1,250		1,250
CRCOG	0170-PTxx	STATEWIDE	Various	Public Trans Annual Program	Y		FHWA	6,684		6,684

CRCOG	0170-xBRU	STATEWIDE	Various	SFY23 BRU Bridge Preservation Repairs	Y		State	20,000		20,000
CRCOG	0170-xCCP	STATEWIDE	Various - CC	Placeholder - Community Connectivity Program	Y		State	15,000		15,000
CRCOG	0170-xHPR	STATEWIDE		HPR/SPR Placeholder	Y		FHWA	9,500		9,500
CRCOG	0170-xIBP	STATEWIDE	Various	Placeholder - Innovative Bridge Program (IBP) (Delivery and/or Construction Methodology)	Y		State	20,000		20,000
CRCOG	0170-xxMP	STATEWIDE		MP Placeholder	Y		FHWA	6,750		6,750
CRCOG	170B-RJTS	STATEWIDE	Various	SFY23 Bridge Joints following 2022 VIP	Y		State	5,000		5,000
CRCOG	170C-EnhS	STATEWIDE	Various	CE Bridge Insp - NHS Roads, NBI Bridges Only (Annual Requirement)	Y		FHWA	17,816		17,816
CRCOG	170C-Enon	STATEWIDE	Various	CE Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	8,537		8,537
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvmt Mgt List)	Y		State	25,000		25,000
CRCOG	170S-COUR	STATEWIDE	Various	Bridge Scour Monitoring (Placeholder; Effective 1/1/19, Yr 4)	Y		FHWA	100		100
CRCOG	170S-Fnhs	STATEWIDE	Various	SF Bridge Insp - NHS Roads (Annual Requirement)	Y		FHWA	2,560		2,560
CRCOG	170S-Fnon	STATEWIDE	Various	SF Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	2,935		2,935
CRCOG	170S-Snhs	STATEWIDE	Various	CE Sign Support Insp - NHS Roads (Annual Requirement)	Y		FHWA	1,988		1,988
CRCOG	170S-Snon	STATEWIDE	Various	CE Sign Support Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	750		750
CRCOG	170U-Wnhs	STATEWIDE	Various	CE Bridge Insp - Uwater - NHS Roads (Placeholder; Effective 9/1/19, Yr 4)	Y		FHWA	1,096		1,096
CRCOG	170U-Wnon	STATEWIDE	Various	CE Bridge Insp - Uwater - Non-NHS Roads (Placeholder; Effective 9/1/19, Yr 4)	Y		FHWA	1,515		1,515
CRCOG	BRDG-CLEx	STATEWIDE		DOT & CLE Services for Bridge Program Oversight	Y		State	4,000		4,000
CRCOG	BRDG-OFFx	STATEWIDE		TBD Local Bridge Preservation Projects	Y		FHWA	31,250		31,250
CRCOG	BRDG-PNLT	STATEWIDE		TBD NHS Bridge Preservation Projects	Y		FHWA	43,750		43,750
CRCOG	BRID-GExx	STATEWIDE		TBD Bridge Preservation Placeholder	Y		State	4,000		4,000
CRCOG	CHMP-xxxx	STATEWIDE	Various	CHAMP Safety Service Patrol	Y		FHWA	4,083		4,083
CRCOG	CMAQ-COGS	STATEWIDE	Various	Future COG Project Awards for CMAQ (Reserve)	Y		FHWA	10,000		10,000
CRCOG	GUID-RAIL	STATEWIDE	Various	Guiderail Replacement Program	Y		State	5,000		5,000
CRCOG	Pvmt-Mark	STATEWIDE		Line Striping/Pavement Markings Placeholder	Y		FHWA	8,000		8,000
CRCOG	RESU-RFAC	STATEWIDE	Various	Vendor in Place Pavement Program	Y		State	69,000		69,000
CRCOG	SGNL-PRES	STATEWIDE		Signals Preservation Placeholder	Y		FHWA	15,000		15,000
CRCOG	SIGN-PRES	STATEWIDE		Signing Preservation Placeholder	Y		State	30,000		30,000
CRCOG	SIGN-SPRT	STATEWIDE		Sign Support Replacements Placeholder	Y		State	4,000		4,000
CRCOG	SIPH-xxxx	STATEWIDE		TBD Safety Projects	Y		FHWA	26,083		26,083
CRCOG	TRAN-SCOM			Transfer to NJ for 2022 TRANSCOM Work Program	Y		FHWA	338		338
CRCOG	xSTP-PRES	STATEWIDE		TBD STP Infrastructure Preservation	Y		FHWA	71,250		71,250
CRCOG	XTAP-COGS	STATEWIDE		Future COG Project Awards for TAP (Reserve)	Y		FHWA	4,000		4,000
CRCOG	0172-0477	DISTRICT 2	Various	Horizontal Curve Signs & Pavement Markings	Y		FHWA	6,225		6,225
CRCOG	0063-0716	HARTFORD	I-84	I-84 Viaduct Replacement (PE)	Y		State		25,000	25,000
CRCOG	0093-xHOC	NEWINGTON	Various	Newington Highway Operations Center	Y		FHWA		4,480	4,480
CRCOG	0093-xPRO	NEWINGTON	Various	Newington Highway Operations Procurement	Y		FHWA		2,255	2,255
CRCOG	0093-xxxx	NEWINGTON		DOT Training Placeholder (CY 2023)	Y		FHWA		1,252	1,252
CRCOG	0170-3054	STATEWIDE	Various	Design of Pavement Preservation Projects	Y		State		750	750
CRCOG	0170-3425	STATEWIDE	Various	Install ADA Curb Ramps and Sidewalks	Y		State		6,000	6,000
CRCOG	0170-AMGx	STATEWIDE		Asset Management Group	Y		FHWA		1,400	1,400
CRCOG	0170-BMGx	STATEWIDE		Bridge Management Group	Y		FHWA		1,250	1,250
CRCOG	0170-PTxx	STATEWIDE	Various	Public Trans Annual Program	Y		FHWA		6,684	6,684
CRCOG	0170-xBRU	STATEWIDE	Various	SFY24 BRU Bridge Preservation Repairs	Y		State	20,000		20,000
CRCOG	0170-xCCP	STATEWIDE	Various - CC	Placeholder - Community Connectivity Program	Y		State	15,000		15,000
CRCOG	0170-xHPR	STATEWIDE		HPR/SPR Placeholder	Y		FHWA	9,500		9,500
CRCOG	0170-xIBP	STATEWIDE	Various	Placeholder - Innovative Bridge Program (IBP) (Delivery and/or Construction Methodology)	Y		State	20,000		20,000
CRCOG	0170-xxMP	STATEWIDE		MP Placeholder	Y		FHWA	6,750		6,750
CRCOG	170B-RJTS	STATEWIDE	Various	SFY24 Bridge Joints following 2023 VIP	Y		State	5,000		5,000
CRCOG	170C-EnhS	STATEWIDE	Various	CE Bridge Insp - NHS Roads, NBI Bridges Only (Annual Requirement)	Y		FHWA	17,816		17,816
CRCOG	170C-Enon	STATEWIDE	Various	CE Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	8,537		8,537
CRCOG	170P-VMNT	STATEWIDE		TBD Pavement Preservation (Pvmt Mgt List)	Y		State	25,000		25,000
CRCOG	170S-COUR	STATEWIDE	Various	Bridge Scour Monitoring (Placeholder; Effective 1/1/19, Yr 5)	Y		FHWA	100		100
CRCOG	170S-Fnhs	STATEWIDE	Various	SF Bridge Insp - NHS Roads (Annual Requirement)	Y		FHWA	2,560		2,560
CRCOG	170S-Fnon	STATEWIDE	Various	SF Bridge Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	2,935		2,935
CRCOG	170S-Snhs	STATEWIDE	Various	CE Sign Support Insp - NHS Roads (Annual Requirement)	Y		FHWA	1,988		1,988
CRCOG	170S-Snon	STATEWIDE	Various	CE Sign Support Insp - Non-NHS Roads (Annual Requirement)	Y		FHWA	750		750
CRCOG	170T-RAIL	STATEWIDE	Various - Trail	Placeholder - Expanded Trail/Alternative Mobility Program	Y		State	11,200		11,200
CRCOG	170U-Wnhs	STATEWIDE	Various	CE Bridge Insp - Uwater - NHS Roads (Placeholder; Effective 9/1/19, Yr 5)	Y		FHWA	1,162		1,162
CRCOG	170U-Wnon	STATEWIDE	Various	CE Bridge Insp - Uwater - Non-NHS Roads (Placeholder; Effective 9/1/19, Yr 5)	Y		FHWA	1,606		1,606
CRCOG	BRDG-CLEx	STATEWIDE		DOT & CLE Services for Bridge Program Oversight	Y		State	4,000		4,000
CRCOG	BRDG-OFFx	STATEWIDE		TBD Local Bridge Preservation Projects	Y		FHWA	31,250		31,250
CRCOG	CHMP-xxxx	STATEWIDE	Various	CHAMP Safety Service Patrol	Y		FHWA	4,083		4,083
CRCOG	CMAQ-COGS	STATEWIDE	Various	Future COG Project Awards for CMAQ (Reserve)	Y		FHWA	10,000		10,000
CRCOG	GUID-RAIL	STATEWIDE	Various	Guiderail Replacement Program	Y		State	5,000		5,000

CTDOT 5-year
Capitol Plan
(Transit)

CRCOG	Pvmt-Mark	STATEWIDE		Line Striping/Pavement Markings Placeholder	Y		FHWA		8,000		8,000
CRCOG	RESU-RFAC	STATEWIDE	Various	Vendor in Place Pavement Program	Y		State		69,000		69,000
CRCOG	SGNL-PRES	STATEWIDE		Signals Preservation Placeholder	Y		FHWA		15,000		15,000
CRCOG	SIGN-PRES	STATEWIDE		Signing Preservation Placeholder	Y		State		30,000		30,000
CRCOG	SIGN-SPRT	STATEWIDE		Sign Support Replacements Placeholder	Y		State		4,000		4,000
CRCOG	SIPH-xxxx	STATEWIDE		TBD Safety Projects	Y		FHWA		27,778		27,778
CRCOG	TRAN-SCOM	STATEWIDE		Transfer to NJ for 2023 TRANSCOM Work Program	Y		FHWA		338		338
CRCOG	xSTP-PRES	STATEWIDE		TBD STP Infrastructure Preservation	Y		FHWA		71,250		71,250
CRCOG	XTAP-COGS	STATEWIDE		Future COG Project Awards for TAP (Reserve)	Y		FHWA		4,000		4,000
CRCOG	DOT04010012CN	VARIOUS	CT Transit	CT Transit Hartford Facility Improvements/Expansion	Y		FTA	33,750			33,750
CRCOG	DOT04010011CN	VARIOUS	CT Transit	CT Transit Hartford Facility Expansion - Additional	Y		State	150			150
CRCOG	DOT0426	Hartford	GHTD	GHTD Paratransit Vehicles FY 19	Y		FTA	3,250			3,250
CRCOG	DOT0426	Hartford	GHTD	GHTD Union Station FY 19	Y		FTA	625			625
CRCOG	DOT0426	Hartford	GHTD	GHTD Admin Capital/Misc Support FY 19	Y		FTA	500			500
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5310 Program - FFY 2019 (See Program of Projects)	Y		FTA	4,323			4,323
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5311 Program - FFY 2019 (See Program of Projects)	Y		FTA	3,294			3,294
CRCOG	DOT01702384	VARIOUS	NA	Transit Capital Planning	Y		FTA	450			450
CRCOG	DOT01703192CN	VARIOUS	Off-System	Off System Bridge (Housatonic RR) (Additional)	Y		State	4,000			4,000
CRCOG	DOT03000192PE	VARIOUS	ALL	Rail Fleet - Replacement Program Design & Spec Development	Y		State	10,000			10,000
CRCOG	DOT01703502PL	VARIOUS		Bus Operational Integration Study	Y		State	400			400
CRCOG	DOT01703438EQ	VARIOUS	VARIOUS	Transit District Match Requirements	Y		State	3,500			3,500
CRCOG	DOT03200016CN	VARIOUS	Hartford Line	Hartford Line-Windsor Locks (FDP 10/2/2019)	Y		State	55,000			55,000
CRCOG	DOT04010012CN	VARIOUS	CT Transit	CT Transit Hartford Facility Improvements/Expansion	Y		FTA	25,000			25,000
CRCOG	DOT0426	Hartford	GHTD	GHTD Paratransit Vehicles FY 2020	Y		FTA	3,250			3,250
CRCOG	DOT0426	Hartford	GHTD	GHTD Union Station	Y		FTA	1,000			1,000
CRCOG	DOT0426	Hartford	GHTD	GHTD Admin Capital/Misc Support FY 2020	Y		FTA	500			500
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5310 Program - FFY 2020 (See Program of Projects)	Y		FTA	4,397			4,397
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5311 Program - FFY 2020 (See Program of Projects)	Y		FTA	3,350			3,350
CRCOG	DOT01702384	VARIOUS	NA	Transit Capital Planning	Y		FTA	450			450
CRCOG	DOT0300	VARIOUS	ALL	Rail Fleet (111 Coaches @ \$5m/coach)	Y		State	555,000			555,000
CRCOG	VARIOUS	VARIOUS	Hartford Line	Hartford Line	Y		State	50,000			50,000
CRCOG	DOT0400	VARIOUS	CT Transit	Bus Service Expansion Fleet	Y		State	22,000			22,000
CRCOG	DOT01703438EQ	VARIOUS	VARIOUS	Transit District Match Requirements	Y		State	3,500			3,500
CRCOG	DOT0426	Hartford	GHTD	GHTD Paratransit Vehicles FY 2021	Y		FTA	2,500			2,500
CRCOG	DOT0426	Hartford	GHTD	GHTD Union Station	Y		FTA	1,500			1,500
CRCOG	DOT0426	Hartford	GHTD	GHTD Admin Capital/Misc Support FY 2021	Y		FTA	750			750
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5310 Program - FFY 2021 (See Program of Projects)	Y		FTA	4,397			4,397
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5311 Program - FFY 2021 (See Program of Projects)	Y		FTA	3,350			3,350
CRCOG	DOT01702384	VARIOUS	NA	Transit Capital Planning	Y		FTA	450			450
CRCOG	DOT0300	VARIOUS	ALL	Rail Fleet (Locomotive Spec Development)	Y		State	12,000			12,000
CRCOG	VARIOUS	VARIOUS	Hartford Line	Hartford Line	Y		State	50,000			50,000
CRCOG	DOT03200008CN	VARIOUS	Hartford Line	Hartford Line (Phase 3b)	Y		State	122,000			122,000
CRCOG	DOT03200015CN	VARIOUS	Hartford Line	Hartford Line-Windsor Station (FDP 9/16/2020)	Y		State	53,000			53,000
CRCOG	DOT03200012CN	VARIOUS	Hartford Line	Hartford Line-North Haven Station (FDP 7/1/2020)	Y		State	42,000			42,000
CRCOG	DOT01703438EQ	VARIOUS	VARIOUS	Transit District Match Requirements	Y		State	3,500			3,500
CRCOG	DOT0426	Hartford	GHTD	GHTD Paratransit Vehicles FY 2022	Y		FTA	4,375			4,375
CRCOG	DOT0426	Hartford	GHTD	GHTD Union Station	Y		FTA	1,000			1,000
CRCOG	DOT0426	Hartford	GHTD	GHTD Admin Capital/Misc Support	Y		FTA	1,000			1,000
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5310 Program - FFY 2022 (See Program of Projects)	Y		FTA	4,397			4,397
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5311 Program - FFY 2022 (See Program of Projects)	Y		FTA	3,350			3,350
CRCOG	DOT01702384	VARIOUS	NA	Transit Capital Planning	Y		FTA	450			450
CRCOG	DOT03200008CN	VARIOUS	Hartford Line	Hartford Line (Phase 3b)	Y		State	120,000			120,000
CRCOG	DOT03200014CN	VARIOUS	Hartford Line	Hartford Line-West Hartford Station	Y		State	40,000			40,000
CRCOG	DOT0426	Hartford	GHTD	GHTD Paratransit Vehicles FY 2023	Y		FTA		4,375		4,375
CRCOG	DOT0426	Hartford	GHTD	GHTD Union Station	Y		FTA		1,000		1,000
CRCOG	DOT0426	Hartford	GHTD	GHTD Admin Capital/Misc Support	Y		FTA		1,000		1,000
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5310 Program - FFY 2023 (See Program of Projects)	Y		FTA		4,397		4,397
CRCOG	VARIOUS	VARIOUS	VARIOUS	Section 5311 Program - FFY 2023 (See Program of Projects)	Y		FTA		3,350		3,350
CRCOG	DOT01702384	VARIOUS	NA	Transit Capital Planning	Y		FTA		450		450
CRCOG	DOT0300	VARIOUS	ALL	Rail Fleet (24 locomotives @ \$10 m/unit)	Y		State		240,000		240,000
CRCOG	DOT03200017CN	VARIOUS	Hartford Line	Hartford Line-Enfield Station	Y		State		42,000		42,000
CRCOG	DOT03200013CN	VARIOUS	Hartford Line	Hartford Line-Newington Station	Y		State		55,000		55,000
CRCOG	N/A	Avon	See Description	Avon - S-Curve improvement at Farmington town line	Y		FHWA			2100	2100
CRCOG	N/A	Avon	Rt 44	Avon - Rt 44 between Rt 167 and Climax Road	Y		FHWA		16000		16000

CRCOG Highway
(non-Interstate)

CRCOG	N/A	Bloomfield	See Description	Bloomfield - Rt 305 (East Newberry Road)	Y		FHWA			2400	2400
CRCOG	N/A	Buckland	See Description	Buckland: Redstone Rd Extension	Y		FHWA		125000	300000	425000
CRCOG	N/A	Buckland	See Description	Buckland: Realignment of Pleasant Valley Road	Y		FHWA		22200		22200
CRCOG	N/A	Canton	Rt 44	Canton- Rt 44 Improvements (from Dyer Ave to Dowd Ave)	Y		FHWA			4700	4700
CRCOG	N/A	Canton	Rt 44	Canton - Rt 44 improvements (from Dowd Ave to Rt 177)	Y		FHWA			5000	5000
CRCOG	N/A	Canton	Rt 44	Canton - Rt 44 improvements (Rt 177 to Rt 167)	Y		FHWA			8000	8000
CRCOG	N/A	Canton	Rt 44	Canton - Rt 44 improvements (New Hartford TL to Rt 179)	Y		FHWA			2100	2100
CRCOG	N/A	Enfield	Rt 190	Enfield - Rt 190 Improvements between mall and Hazardville	Y		FHWA			3000	3000
CRCOG	N/A	Enfield	Rt 191	Enfield - Rt 190 / Maple Street traffic and safety improvements	Y		FHWA			900	900
CRCOG	N/A	Enfield	Rt 192	Enfield - Rt 190 Int Improv (Taylor/Scitico and Broad Brook Rd)	Y		FHWA			1600	1600
CRCOG	N/A	Farmington	Rt 177	Farmington - Rt 177 (Bridge)	Y		FHWA		4200		4200
CRCOG	N/A	Farmington	Rt 4	Farmington - Rt 4 Bridge Replacement over Roaring Brk (51-258)	Y		FHWA			3300	3300
CRCOG	N/A	Farmington	New Britain Ave	Farmington - New Britain Avenue Reconstruction	Y		FHWA		3500		3500
CRCOG	N/A	Farmington	See Description	Farmington - Post Office Square Driveway	Y		FHWA			1000	1000
CRCOG	N/A	Glastonbury	See Description	Glastonbury - Traffic Signal System (CMAQ)	Y		FHWA		1900		1900
CRCOG	N/A	Granby	Rt 10	Granby - Rt 10 at Meadow Brook Road	Y		FHWA			1000	1000
CRCOG	N/A	Manchester	Rt 83	Manchester - Int Improv at Route 83 (76-199)	Y		FHWA		2000		2000
CRCOG	N/A	Newington	Rt 175	Newington - Rt 175 - Fenn Road / Cedar Street Improvements	Y		FHWA		2000		2000
CRCOG	N/A	Newington	Rt 176	Newington - Rt 175 - Fenn Road / Ella Grasso Blvd Improvements	Y		FHWA		1000		1000
CRCOG	N/A	Newington	Rt 9	Newington - Rt 9 on-ramp at Paul Manafort Drive	Y		FHWA			7500	7500
CRCOG	N/A	Rocky Hill	See Description	Cromwell Ave/West St/France St Intersection Improvements- (Phase 1)	Y		FHWA		250		250
CRCOG	N/A	Rocky Hill	See Description	Cromwell Ave/West St/France St Intersection Improvements- (Phase 2)	Y		FHWA			1300	1300
CRCOG	N/A	Rocky Hill	See Description	Brook St / Henkel Way Intersection Improvements	Y		FHWA		800		800
CRCOG	N/A	Rocky Hill	West Street	West Street / Interstate 91 Interchange Improvements	Y		FHWA		2300		2300
CRCOG	N/A	Rocky Hill	Cromwell Ave	Cromwell Ave Improvements from Elm St to New Britain Ave	Y		FHWA			5300	5300
CRCOG	N/A	Rocky Hill	See Description	Study Area Transit Facility Improvements	N		FHWA		50		50
CRCOG	N/A	Rocky Hill	See Description	Study Area Sidewalk and Pedestrian Facility Improvements	N		FHWA		4400		4400
CRCOG	N/A	Rocky Hill	See Description	Study Area Bicycle Facility Enhancements	N		FHWA		2500		2500
CRCOG	N/A	Rocky Hill	West Street	West St / Main St Intersection Improvements	Y		FHWA		1100		1100
CRCOG	N/A	Rocky Hill	Brook Street	Brook Street Neighborhood Streetscape and Multimodal Improvements	Y		FHWA			2300	2300
CRCOG	N/A	Rocky Hill	Cromwell Ave	Cromwell Avenue / Inwood Road Intersection Improvements	Y		FHWA		500		500
CRCOG	N/A	Rocky Hill	Cromwell Ave	Cromwell Avenue / Brook Street Intersection Improvements	Y		FHWA		1300		1300
CRCOG	N/A	Rocky Hill	Elm Street	Elm Street Connector Roadway	Y		FHWA			3200	3200
CRCOG	N/A	Simsbury	Nod Road	Simsbury - Nod Road Reconstruction	Y		FHWA		3800		3800
CRCOG	N/A	Simsbury	Rt 10	Simsbury - Rt 10 at Rt 185	Y		FHWA			1000	1000
CRCOG	N/A	Simsbury	Rt 10	Simsbury - Rt 10 at Ely Lane and Hoskins Road	Y		FHWA			1300	1300
CRCOG	N/A	Simsbury	Rt 10	Simsbury - Rt 10 between Ely Lane and Wolcott Rd	Y		FHWA			1600	1600
CRCOG	N/A	Somers	Rt 190	Somers - Rt 190 at Maple St / School Street	Y		FHWA			5000	5000
CRCOG	N/A	Somers	Rt 190	Somers - Rt 190 at Route 83	Y		FHWA			2100	2100
CRCOG	N/A	Tolland	Rt 74	Tolland - Rt 74 Repair Deck and Pain Bridge over 84)(142-148)	Y		FHWA		2200		2200
CRCOG	N/A	Vernon	Rt 74	Vernon - Reconstruct Rt 74 (Maple to Harlow) (146-165)	Y		FHWA		2800		2800
CRCOG	N/A	Vernon	Rt 74	Vernon - Reconstruct Rt 74 (Orchard to Elm)(146-184)	Y		FHWA		4500		4500
CRCOG	N/A	West Hartford	North Main	West Hartford Corridor Study - North Main Street Complete Streets Improvements	N		FHWA			2100	2100
CRCOG	N/A	West Hartford	See Description	West Hartford Corridor Study - Bishops Corner Improvements	Y		FHWA			400	400
CRCOG	N/A	West Hartford	North Main	West Hartford Corridor Study - North Main Street off-road Bike Path to Town Center	N		FHWA		130		130
CRCOG	N/A	West Hartford	See Description	West Hartford - Bishops Corner intersection improvements	Y		FHWA			4760	4760
CRCOG	N/A	West Hartford	Rt 44	West Hartford - Rt 44 / Steele Road improvements	Y		FHWA			700	700
CRCOG	N/A	Wethersfield	Rt 15	Wethersfield - Rt 15 / Rt 175 Interchange	Y		FHWA		21000		21000
CRCOG	N/A	Wethersfield	See Description	Wethersfield - Nott St to Arrow Road (Ped improv, access mgmt)	Y		FHWA			1500	1500
CRCOG	N/A	Wethersfield	Rt 175	Wethersfield - Route 175 at Willow Street	Y		FHWA		300		300
CRCOG	N/A	Wethersfield	Rt 175	Wethersfield - Rt 175 at Silas Deane Highway	Y		FHWA		200		200
CRCOG	N/A	Windsor	Rt 305	Windsor - Rt 305 (Interchange 37 to Brookville Rd)	Y		FHWA			2600	2600
CRCOG	N/A	Windsor	Rt 305	Windsor - Rt 305 (Addision Road and Marshall Phelps)	Y		FHWA			2100	2100
CRCOG	N/A	Windsor Locks	Various	Bradley Airport-Improved transit (Study, implementation; bus connection to rail)	N		Unfunded			5000	5000
CRCOG	N/A	Windsor Locks	Bradley Park Road	Bradley Airport-East Granby - Bradley Park Road Improvements	Y		FHWA			2400	2400
CRCOG	N/A	Windsor Locks	Bradley Park Road	Bradley Airport-East Granby - Bradley Park Road Extension	Y		FHWA			3200	3200
CRCOG	N/A	Windsor Locks	Northern Bradley Conn	Bradley Airport-Northern Bradley Connector	Y		FHWA		30000		30000
CRCOG	N/A	Windsor Locks	Rt 75	Bradley Airport-Better Roadway Access (Rt 75 Backage Roads)	Y		FHWA		15000		15000
CRCOG	N/A	Windsor Locks	Rt 75	Bradley Airport-Route 75 Improvements (PE and CON)	Y		FHWA		7500		7500
CRCOG	N/A	Various	See Description	Complete East Coast Greenway through CRCOG	N		FHWA		56000		56000
CRCOG	N/A	Various	See Description	Bicycle and Pedestrian Projects-Advance other trails	N		FHWA		6000	6000	12000
CRCOG	N/A	Various	See Description	Bicycle and Pedestrian Projects-Other bike/ped programs	N		FHWA		3500	3500	7000
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Notch – Interim Safety Improvements at Notch Road	Y		FHWA		200		200
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Notch – Low-speed Boulevard Improvements	N		FHWA			3000	3000

CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Notch – Pedestrian and Bicycle Improvements	N		FHWA		300		300
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Crossroads – Route 6 Speed Mitigation	Y		FHWA		2000		2000
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Crossroads – Phase 1: Route 6-Route 44 Connector	Y		FHWA		3000		3000
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Crossroads – Phase 2: Village Streets West	Y		FHWA			3500	3500
CRCOG	N/A	Bolton	See Description	Route 6 Corridor Study-Bolton Crossroads – Phase 3: Village Streets East	Y		FHWA			3000	3000
CRCOG	N/A	Coventry	See Description	Route 6 Corridor Study-Coventry Ridge – Phase 1: Site Access (Future Reloc. South Street)	N		FHWA		10000		10000
CRCOG	N/A	Coventry	See Description	Route 6 Corridor Study-Coventry Ridge – Phase 2: Relocated South Street	N		FHWA			7000	7000
CRCOG	N/A	Andover	See Description	Route 6 Corridor Study-Historic Andover – Pedestrian and Speed Mitigation Improvements	N		FHWA		2000		2000
CRCOG	N/A	Andover	See Description	Route 6 Corridor Study-Andover – Hop River Trail Access Improvements, Route 6	N		FHWA		5		5
CRCOG	N/A	Andover	See Description	Route 6 Corridor Study-Historic Andover – Phase 1: Village Streets East	Y		FHWA		6000		6000
CRCOG	N/A	Andover	See Description	Route 6 Corridor Study-Historic Andover – Phase 2: Village Streets West	Y		FHWA			3000	3000
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Lighthouse Corners – Phase 1: Roundabout	Y		FHWA		10000		10000
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Lighthouse Corners – Phase 2: Village Streets	Y		FHWA			5000	5000
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Lighthouse Corners – Route 66 East Flooding Mitigation	N		FHWA		750		750
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Columbia – Route 66 East Roadway Improvements	Y		FHWA			4500	4500
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Columbia – Cards Mill Road Intersection Improvements	Y		FHWA		600		600
CRCOG	N/A	Columbia	See Description	Route 6 Corridor Study-Columbia – Hop River Trail Access Improvements, Route 66 East	N		FHWA		30		30
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Gateway Signing (Bolton, Andover, Columbia)	N		FHWA		40		40
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Route 6 Side Road Intersection Improvements	Y		FHWA		100		100
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Program of Bicycle Safety Improvements	N		FHWA		15		15
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Hop River Trail Surface Improvements	N		FHWA		1000		1000
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Program of Hop River Trail Signing Improvements	N		FHWA		30		30
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Park and Ride Lot Improvements	N		FHWA		75		75
CRCOG	N/A	Bolton, Andover, Columbia	See Description	Route 6 Corridor Study-Express Bus Improvements	N		Unfunded		50		50

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**ALLOCATION OF ANTICIPATED FHWA FUNDS TO MPO/RPO
2019-2045**

	SYSTEM IMPROVEMENTS	SYSTEM PRESERVATION		
Distribution	Weights			
Vehicle Miles of Travel	0.25	0.25		
Volume to Capacity	0.75	0		
Lane Miles	0	0.75		
MPO/RPO			MAJOR PROJECTS OF STATEWIDE SIGNIFICANCE	TOTALS
Southwest MPO	1,247,718,585	1,395,377,517	986,400,000	3,629,496,102
Housatonic Valley MPO	795,276,632	1,176,217,827	400,000,000	2,371,494,458
Northwest Hills RPO	193,444,278	1,251,775,570	14,282,400	1,459,502,249
Naugatuck Valley MPO	902,216,700	1,525,205,994	64,360,000	2,491,782,694
GBVMPO	1,581,238,578	1,486,859,506	686,694,808	3,754,792,892
South Central MPO	1,958,758,671	2,197,972,654	502,196,808	4,658,928,134
Capitol MPO	3,435,253,922	4,289,839,748	3,036,580,597	10,761,674,266
Lower Connecticut River MPO	486,918,876	1,227,228,977	96,900,000	1,811,047,853
Southeastern MPO	688,275,436	1,664,487,304	194,666,396	2,547,429,137
Northeastern RPO	196,368,562	1,013,240,263	-	1,209,608,825
Totals	11,485,470,240	17,228,205,360	5,982,081,009	34,695,756,610

Note: System Improvements are projects which enhance safety, improve mobility, increase system productivity or promote economic growth.

System Preservation are projects such as repaving roadways, bridge repair or replacement and any other form of reconstruction in place.

Appendix 6

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Appendix 5 Chapter 11 Innovative Finance

Appendix 5-1: Examples of Regional Transportation Sales Taxes

Metro Region	Description
Salt Lake City	<ul style="list-style-type: none"> In 2000, a breakthrough sales tax measure to fund the TRAX light rail system was successful. Local option sales tax by county has been the principal transit funding source since the 1970s; several rounds were approved through 2006; now represent 64% of Utah Transit Authority operating budget (including debt service).¹ In 2015, legislation authorized a new .25% local option sales tax increment, which passed in some but not all counties. In 2018, legislation reforming UTA renewed the local option in the counties that rejected it in 2015 and allowed Salt Lake County to adopt by Council vote rather than referendum. County has adopted, after receiving resolutions in support from its municipalities. The new revenues will be divided among UTA for regional transit, the cities, and the county—all for transportation projects.²
Denver	<ul style="list-style-type: none"> After a 1997 defeat, a regional sales tax was approved in 2004 to fund the FasTracks regional transit expansion program. This includes several new rail and BRT lines and Union Station. The referendum was conducted in the eight-county RTD District. It raised the sales tax in the RTD District from 0.6% to 1.0%. The 0.4% increase was projected to fund approximately \$4.7 billion in bond issue and pay-as-you-go capital.³ Slower than expected sales tax growth and increased project costs have combined to slow the timetable for completing some corridors. RTD has opted not to return to the ballot for an additional sales tax increase.
Los Angeles	<ul style="list-style-type: none"> LA County is of regional scale and coincides with LA Metro, the regional transit agency. A history of transportation sales tax wins dating back to 1980. Since 1996, sales tax referenda require a 2/3 vote. In 2009, voters approved Measure R—a ½ cent sales tax to sunset in 2039. In 2012, Measure J which would have extended Measure R by 30 years, was defeated. In 2016, voters passed Measure M, the largest regional transportation sales tax measure in US history. It removes the sunset from Measure R and adds another ½ cent with no sunset. Measure M estimated to generate \$120 billion in capital, allocated 35% new transit construction, 17% highway improvements, 20% bus operations, 17% local city projects. A strongly vetted specific project list with some flexibility to adapt.⁴
Seattle	<ul style="list-style-type: none"> A transit-only example. Sound Transit, the regional transit agency, covers three counties (King, Pierce, Snohomish). Referenda require a majority in the three-county district. The first two tax measures to fund Sound Transit were approved by voters in 1996 and 2008.⁵ In 2016, voters approved “ST3”, including the following tax increases: 0.5% sales tax, 0.8% motor vehicle excise tax, and a property tax increase of 0.025% of assessed value.⁶ The referendum raises the total sales tax in King County to 9.5% and Pierce County to 7.9%. The principal example of a referendum including more sources than the sales tax alone. The new taxes are projected to generate \$54 billion in capital, through bonds and pay-as-you-go. ST3 includes light rail (62 new miles), BRT, Rapid Bus, and commuter rail expansion, and improved station access. A detailed, vetted project list.⁷

¹ <https://le.utah.gov/interim/2017/pdf/00004230.pdf>

² http://wfr.org/PublicInvolvement/GovernmentalAffairs/SB136/SLCo_4thQuarter_LocalOptSalesTaxSumm.pdf

³ http://www.rtd-fastracks.com/main_33

⁴ <http://theplan.metro.net/wp-content/uploads/2018/05/report-theplan-lessons-learned-2018.pdf>

⁵ <https://www.soundtransit.org/system-expansion/building-system/system-planning/history>

⁶ https://st32.blob.core.windows.net/media/Default/Document%20Library%20Featured/Sept_2016/Factsheet_ST3_Funding_092816.pdf

Metro Region	Description
Atlanta and GA Statewide	<ul style="list-style-type: none"> • A complex and illustrative history; in the end, successful referenda in metro Atlanta and other regions in Georgia. • In 2010 the Legislature passed the Transportation Improvement Act which enabled regional referenda on a new 10-year 1% “T-SPLOST” (Transportation Special Purpose Local Option Sales Tax) in each of 12 regional planning districts. The law also created Regional Transportation Roundtables (RTRs) of county and city officials to develop official project lists, which were combinations of highways and transit. • In 2012, nine of the 12 regions voted against the 10-year T-SPLOST, including the 10-county Metro Atlanta region. However, three regions approved the sales tax and are collecting and spending sales tax revenues.⁸ • After 2012 a new approach evolved in Metro Atlanta, resulting in legislation in 2015 allowing three referenda: combined highway-transit T-SPLOSTs in both the City of Atlanta and the non-Atlanta balance of Fulton County, and a transit-only referendum in the City of Atlanta to support expansion by MARTA (the regional transit authority) within the city limits. (MARTA operations are funded by a separate voter-approved sales tax in its participating counties.) • In 2016, all three referenda were approved. Atlanta approved the MARTA expansion sales tax at 0.5% and the T-SPLOST tax at 0.4%, raising its total sales tax to 8.9%. The Fulton T-SPLOST was approved at 0.75%, raising the total county rate outside Atlanta to 7.75%.
Tampa	<ul style="list-style-type: none"> • Hillsborough County referenda were defeated in 2010 and 2014; these were transit-only. • In 2018, a 1 cent sales tax increase was approved. it raises the total sales tax in Hillsborough County to 8.5%. It is split and will raise about \$30 billion over its 30-year term. • The new taxes are projected to generate \$30 billion. The split: 45% to Hillsborough Area Rapid Transit, 54% for highway projects.⁹
Northern VA	<ul style="list-style-type: none"> • A different model: a legislatively mandated regional sales tax, rather than voter-approved. • Northern Virginia Transportation Authority created by the General Assembly in 2002. It consists of four counties (Arlington, Fairfax, Loudoun and Prince William) and five independent cities (Authority is made up of nine jurisdictions including: the counties of; as well as the cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park; it is both an MPO and a transportation provider. • In 2013, the General Assembly imposed a 0.7% sale tax increase in the NVTA district, bringing the total state and local sales tax to 6.0%. The regional sales tax is a dedicated source of funding for NVTA, generating about \$250 million in annual dedicated revenues. • NVTA allocates regional sales tax revenues to projects in its district and can finance projects through the issuance of long term bonds. Seventy percent of revenues are allocated to regional projects, 30% to local projects approved by NVTA.¹⁰

⁷ <http://soundtransit3.org/>

⁸ http://www.nashvillempo.org/docs/symposiums/transit/Dave_Williams.pdf

⁹ <http://floridapolitics.com/archives/280117-hillsborough-transportation-tax>

¹⁰ <https://thenovaauthority.org/>

Appendix 5-2: Off-Site Joint Development Projects in the MBTA Rail System

Project	Description ¹¹
Assembly Square	<ul style="list-style-type: none"> • New infill station on Orange Line in Somerville two miles from downtown Boston. • Initiated by developer of adjoining land (Federal Realty Investment Trust), which contributed \$15 million (including all pre-construction costs) and, by agreement with the MBTA, planned, designed, and permitted the station. • Station unlocked a 45-acre, five million square foot mixed-use TOD district. • New \$56 million station with 6,000 daily trips cost the MBTA zero; funded by developer, FTA, MPO Flex Funds, and state Economic Development.
Boston Landing	<ul style="list-style-type: none"> • New \$20 million infill commuter rail station in Brighton neighborhood of Boston, on MBTA Worcester-Framingham-Boston Line. • Entire station funded and built by New Balance and its development partners, to enable a major mixed-use TOD: New Balance corporate HQ, multi-family housing, Celtics' and Bruins' new practice facilities, other office and retail.
Yawkey Station	<ul style="list-style-type: none"> • Commuter rail station next to Fenway Park on MBTA Worcester-Framingham-Boston Line; serves Longwood Medical Area, Kenmore Square, and Red Sox. • MBTA replaced the old platform with a full-service high-platform station in 2014. • Developer of adjacent Fenway Center TOD is funding and building horizontal and vertical connections to the surrounding parcels, incorporating the station into a dense, weather-protected TOD environment and the surrounding street fronts.
Lynn River Works	<ul style="list-style-type: none"> • Existing commuter rail stop on MBTA's North Shore Line; now a bare gravel flag stop with minimal daily use. • A developer has been permitted for 1,250 units of waterfront multi-family housing. He has negotiated with the MBTA to fund and build a new, full service station as part of his project.

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¹¹ For a summary of these projects, see <http://www.abettercity.org/assets/images/Transportation%20Dividend%20-%20FINAL%20-%2020012918.pdf>, p. 46.

Appendix 5-3: Rail Corridor Public-Private Partnerships in the US

Project	Description
Denver Eagle Partnership (Commuter Rail)	<ul style="list-style-type: none"> • In 2010, Denver Regional Transit District (RTD) entered concession agreement with Denver Transit Partners, a special purpose company owned by Fluor Enterprises, Uberior Investments, and Laing Investments. • A single P3 contract to design, build, finance, operate, and maintain three new commuter rail lines (including flagship line from Union Station to Airport) and the Commuter Rail Maintenance Facility; acquire 54 commuter rail cars; and operate the Denver Union Station train shed. Total capital investment: \$2.2 billion.¹² • All three lines are stand-alone facilities. Seamless interface with other RTD services, but they do not share trackage, operations, or staff with the publicly-operated system. This allows the P3 concessionaire to be solely responsible for the segments of the system it controls and not depend on publicly operated services for the performance of its assets.
Maryland Purple Line (Light Rail)	<ul style="list-style-type: none"> • 16-mile, 21-station circumferential light rail line that will connect several communities in Maryland, from Bethesda in Montgomery County to New Carrollton in Prince George’s County. • Intersects four radial Metrorail corridors owned and operated by the Washington Metropolitan Area Transit Authority (WMATA), all three lines of the MARC commuter rail system, and Amtrak’s Northeast Corridor service. Seamless transfers, but physically and operationally separate. • In 2016, Maryland DOT and its subsidiary, Maryland Transit Administration, entered into a P3 agreement with Purple Line Transit Partners, a special purpose company comprised of design, construction, and maintenance firms to design, build, finance, operate, and maintain the asset. Capital cost: \$2.65 billion.¹³
Brightline (Intercity Rail)	<ul style="list-style-type: none"> • A privately financed, built, and operated intercity rail line in Florida. Phase I completed and operating, connecting downtown Miami, Fort Lauderdale, and West Palm. • The entire Phase I project, including three stations and extensive joint development, undertaken by subsidiaries of Florida East Coast Industries (FEI), the Flagler railroad and real estate enterprise that shaped South Florida a century ago and still owned the entire coastal right of way, on which it operates a profitable freight service. Phase I is thus not really a P3, but a private business improving assets it already owned. • Phase II, from West Palm to Orlando, is under construction. FEI did not own this right of way and had to purchase it from a state agency. Phase III, from Orlando to Tampa, involved a recent RFP by the state for right of way alongside I-4; Brightline was the sole bidder. • Brightline is completely separate from the public transit services with which it interfaces.¹⁴ • In late 2018, Virgin Atlantic became a major investor; Brightline renamed Virgin Trains USA.

¹² <https://www.transportation.gov/policy-initiatives/build-america/eagle-p3-project-denver-co>

¹³ <https://www.transportation.gov/tifia/financed-projects/purple-line-project>

¹⁴ Add cite.

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Appendix 6 Chapter 13 Public Involvement

Appendix 6-1: List of Stakeholder Interviewees and Interview Details

The following individual meetings were held with stakeholders from a wide variety of industries to better understand transportation needs for the CROG region:

1. **09/06/18**
Kevin Dillon; Bradley Airport; Executive Director
2. **09/13/18**
Jason Rojas; Trinity College; President's Chief of Staff
3. **09/13/18**
Emil Frankel; Eno Center for Transportation (+ Consultant); President
4. **09/13/18**
Tom Trutter; UConn Health Center; TBD
5. **09/21/18**
David Kooris; DECD; Deputy Commissioner
6. **09/26/18**
Don Shubert; CT Construction Industries; President
7. **09/28/18**
Richard Andreski; CT DOT; Bureau Chief, Public Transportation
8. **10/02/18**
Michael Freimuth; Capital Region Development; Executive Director
9. **10/09/19**
David Griggs; Metro Hartford Alliance; CEO
10. **12/05/18**
Maria Leclerc; East Hartford; Mayor

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Appendix 6 Chapter 13 Public Involvement

Appendix 6-2: List of Focus Group Attendees and Meeting Details

Focus Group Session – Transit

Tuesday, October 30th, 2018

Union Station, 1 Union Place, Hartford, CT 06103

Stephen Gazillo; AECOM

Krystal Oldread; AECOM

Kevin Tedesco; AECOM

Tim Malone; CRCOG

Rob Aloise; CRCOG

Maureen Lawrence; CTDOT

Lisa Rivers; CTDOT

Cole Pouliot; CT Transit; HNS

Josh Rickman; HNS

Mary Tomolonius; CACT

Vicki Shotland; GHTD

Lyle Wray; CRCOG

Marlene Schempp; Way to Go CT

Focus Group Session – Highway System, Congestion and Freight Movement

Wednesday, October 31st, 2018

Union Station, 1 Union Place, Hartford, CT 06103

Stephen Gazillo; AECOM

Kevin Tedesco; AECOM

Rob Aloise; CRCOG

Lyle Wray; CRCOG

Tim Malone; CRCOG

Ed Perzanowski; CT Rides

Russell McDermott; CT Rides

David Hiscox; CT DOT/OW Permits

Thomas Maziarz; CT DOT

Kevin Burnham; CT DOT/Highway Design

Dave Sousa; CDM Smith

Joe Scully; MTAC

Charles Hunter; GWRR Services, Inc.

Molly Parsons; CT Airport Authority

Focus Group Session – Underserved Population Groups

Friday, November 16th, 2018

CRCOG, 241 Main Street, Hartford, CT 06103

Kevin Tedesco; AECOM

Kerrice Reynolds; CT Rides

Ed Perzanowski; CT Rides
Rebecca M. Townsend; UHart
Anne Morris; Anne Morris Association
Jennifer Gorman; Dept. of Rehab Services
Michelle White; Capital Community College
Sam Pudlin; Center for Latino Progress
Gannon Long; Center for Latino Progress
Marlene Schempp; Way to Go CT
Megan Collins; Disabilities Rights CT
Brandy Petrone; Disabilities Rights CT
Kelly Lacluyze
Lyle Wray; CRCOG

Focus Group Session – Innovative Finance

Friday, November 16th, 2018

CRCOG, 241 Main Street, Hartford, CT 06103

Stephen Gazillo; AECOM

Kevin Tedesco; AECOM

Lyle Wray; CRCOG

Tim Malone; CRCOG

Rob Aloise; CRCOG

Al Raine; AECOM

Alfiya Mirzagalyamova; AECOM

Focus Group Session – Complete Streets

Wednesday, October 10th, 2018

600 East Street New Britain, CT 06051 - East Side Community Center

Kevin Tedesco; AECOM (Attended CRCOG Complete Streets Open House Event)

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Appendix 6 Chapter 13 Public Involvement

Appendix 6-3: List of Public Meeting Attendees and Meeting Details

1st Public Meeting

Tuesday, December 4th, 2018

New Britain YMCA, 2nd Floor – Small Gym, 19 Franklin Square, New Britain, CT 06051

Tim Malone; CRCOG
Devon Lechtenberg; CRCOG
Emily Hultquist; CRCOG
Rob Aloise; CRCOG
Stephen Gazillo; AECOM
Caryn DeCrisanti; AECOM
Stacy Schoen; AECOM
Fatima Cecunjanin; AECOM
Ryan Visci; AECOM
Alicia Leite; CT DOT
Grayson Wright; CT DOT
Tom Russell; CCSU
Michael Gaffney; CCSU
Mark Hoffman; Bike New Britain
Bruce Miller; Bike New Britain
Amy Watkins; Watch for Me CT
David McCluskey; West Hartford Resident

2nd Public Meeting

Thursday, December 6th, 2018

Capital Community College, Degan Hall – Room 1126, 950 Main Street, Hartford, CT 06103

Stephen Gazillo; AECOM
Kevin Tedesco; AECOM
Krystal Oldread; AECOM
Caryn DeCrisanti; AECOM
Isaiah Terry; Capital CC/BSU
Mike Ahem; Town of Berlin
Anthony Cherdis; CLP/Transport Hartford
Ricky Sullivan; Transport Hartford
Dave Mourad; Transport Hartford
Chanel Johnson; Transport Hartford
Quishana Gillett; Transport Hartford
Kathleen Maldonado; Transport Hartford
Sam Pudlin; Transport Hartford
Grayson Wright; CT DOT
Randal Davis; CT DOT
Kerrice Reynolds; CT Rides
Cole Pouliot; CT Transit
Bill Young; Bike/Walk CT
Peter R. Demallie; Design Professionals
Rob Dexter; ECG
Nick Addamo; CDM Smith

Francisco Goicoechea; TSKP Studio
Tina Franklin
Josh Appleby
Andy Sean
Anthony Martinelli
Lee-Ashley Dacres
Chris McArdle; Hartford resident
Hakeem Bamon
David Levitz
Alex Rodriguez
Ernest Mundle
Rev. Narciso Texidor, Jr.
Jerome Mahabeer; Hartford Resident
Francesco Bivona
Quashunda Ashley
Arthur Christian
Jamar Bailey
Mark Maxwell
Kelly McFarland
Allen Ambrose
Guilherme Ribeiro; Capital

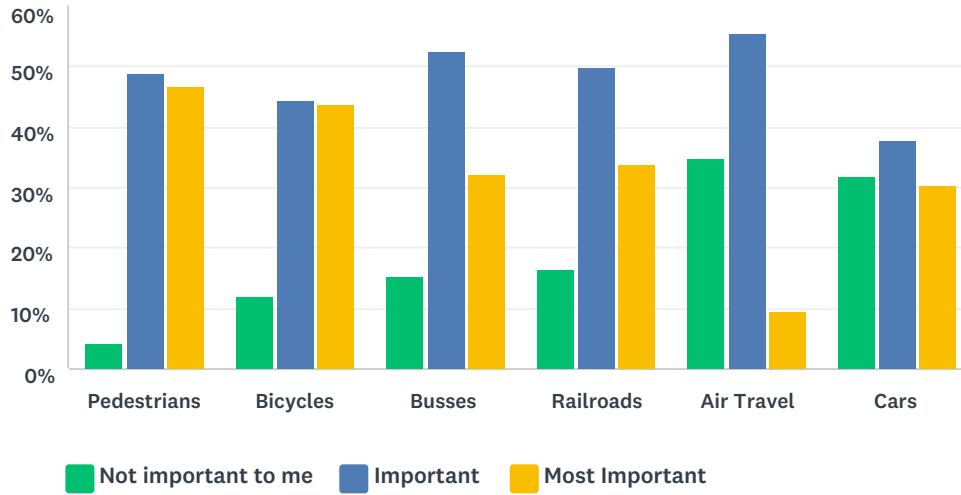
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Appendix 8

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Q1 My key concerns for mobility and access in the CRCOG area are:

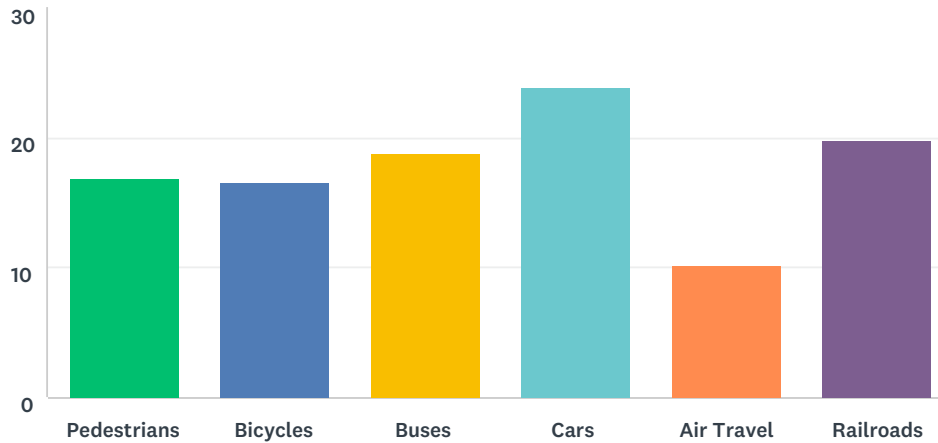
Answered: 330 Skipped: 2



	NOT IMPORTANT TO ME	IMPORTANT	MOST IMPORTANT	TOTAL
Pedestrians	4.33% 14	48.92% 158	46.75% 151	323
Bicycles	12.07% 39	44.27% 143	43.65% 141	323
Busses	15.26% 49	52.65% 169	32.09% 103	321
Railroads	16.36% 53	49.69% 161	33.95% 110	324
Air Travel	34.77% 105	55.63% 168	9.60% 29	302
Cars	31.85% 100	37.90% 119	30.25% 95	314

Q2 What percent of funding would you spend on the following modes in the next 20 years? (Enter only numbers; they must add up to 100 total)

Answered: 320 Skipped: 12

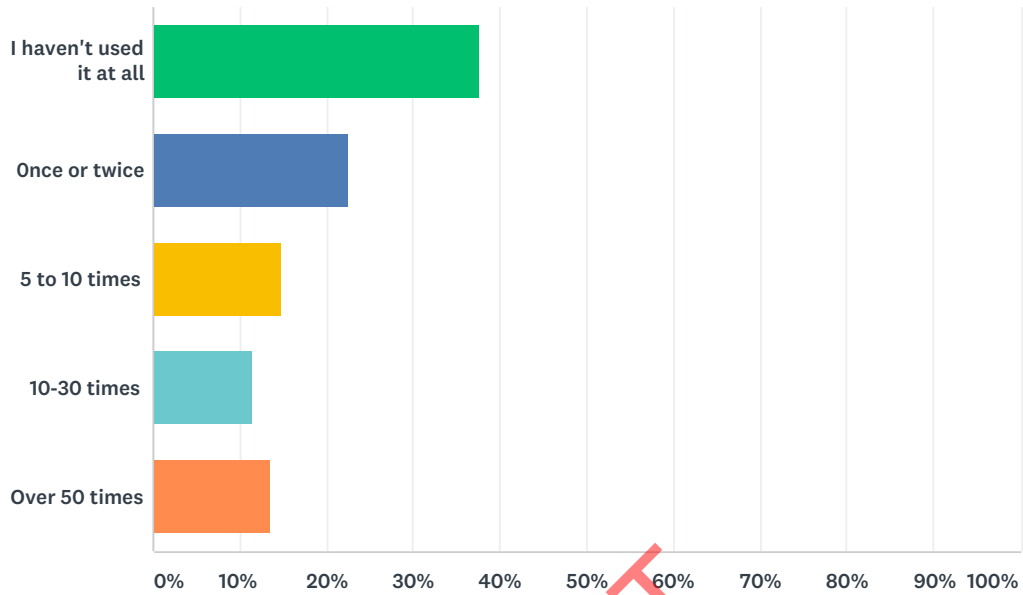


ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
Pedestrians	17	5,231	311
Bicycles	17	5,103	307
Buses	19	5,803	309
Cars	24	7,002	294
Air Travel	10	2,871	280
Railroads	20	5,990	302
Total Respondents: 320			

BASIC STATISTICS						
	MINIMUM	MAXIMUM	MEDIAN	MEAN	STANDARD DEVIATION	
Pedestrians	0.00	75.00	15.00	16.82	11.18	
Bicycles	0.00	100.00	15.00	16.62	11.86	
Buses	0.00	70.00	20.00	18.78	11.94	
Cars	0.00	98.00	20.00	23.82	19.85	
Air Travel	0.00	100.00	10.00	10.25	8.89	
Railroads	0.00	100.00	20.00	19.83	12.74	

Q3 In the past 12 months, how often have you used public transit (rail, bus, paratransit vans) in the Hartford region?

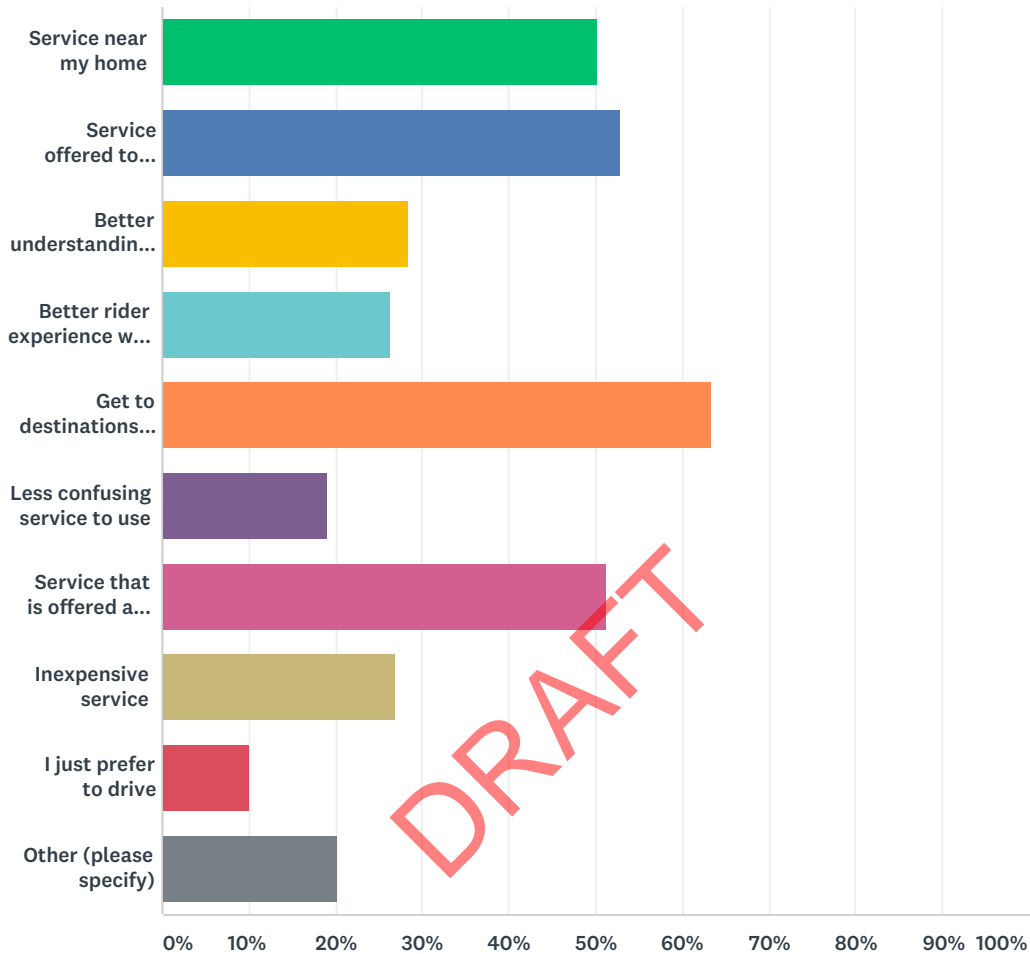
Answered: 332 Skipped: 0



ANSWER CHOICES	RESPONSES	
I haven't used it at all	37.65%	125
Once or twice	22.59%	75
5 to 10 times	14.76%	49
10-30 times	11.45%	38
Over 50 times	13.55%	45
TOTAL		332

Q4 Which of the following improvements are needed for you to use public transportation (rail, bus, paratransit vans) more frequently?

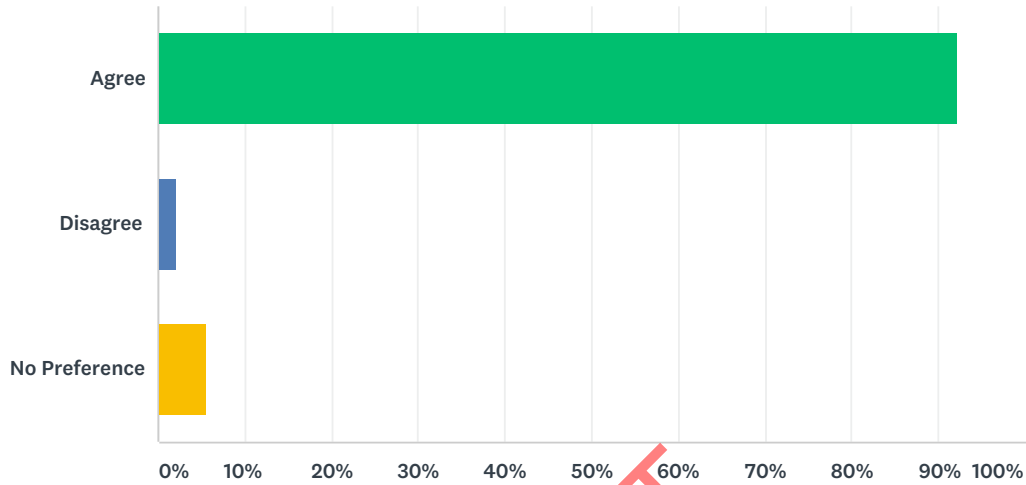
Answered: 331 Skipped: 1



ANSWER CHOICES	RESPONSES	
Service near my home	50.15%	166
Service offered to destinations I visit frequently	52.87%	175
Better understanding on how to use the services (need information about routes/fees/schedules)	28.40%	94
Better rider experience with the service (not being treated poorly, not arriving late, feeling safe)	26.28%	87
Get to destinations relatively fast compared to travel by car	63.44%	210
Less confusing service to use	19.03%	63
Service that is offered at the time I need it	51.36%	170
Inexpensive service	26.89%	89
I just prefer to drive	9.97%	33
Other (please specify)	20.24%	67
Total Respondents: 331		

**Q5 Please indicate whether or not you agree with the following statement:
 "Even though I may or may not personally use the public transportation
 (rail, bus, paratransit van) for transportation, I support the public
 transportation systems in my community."**

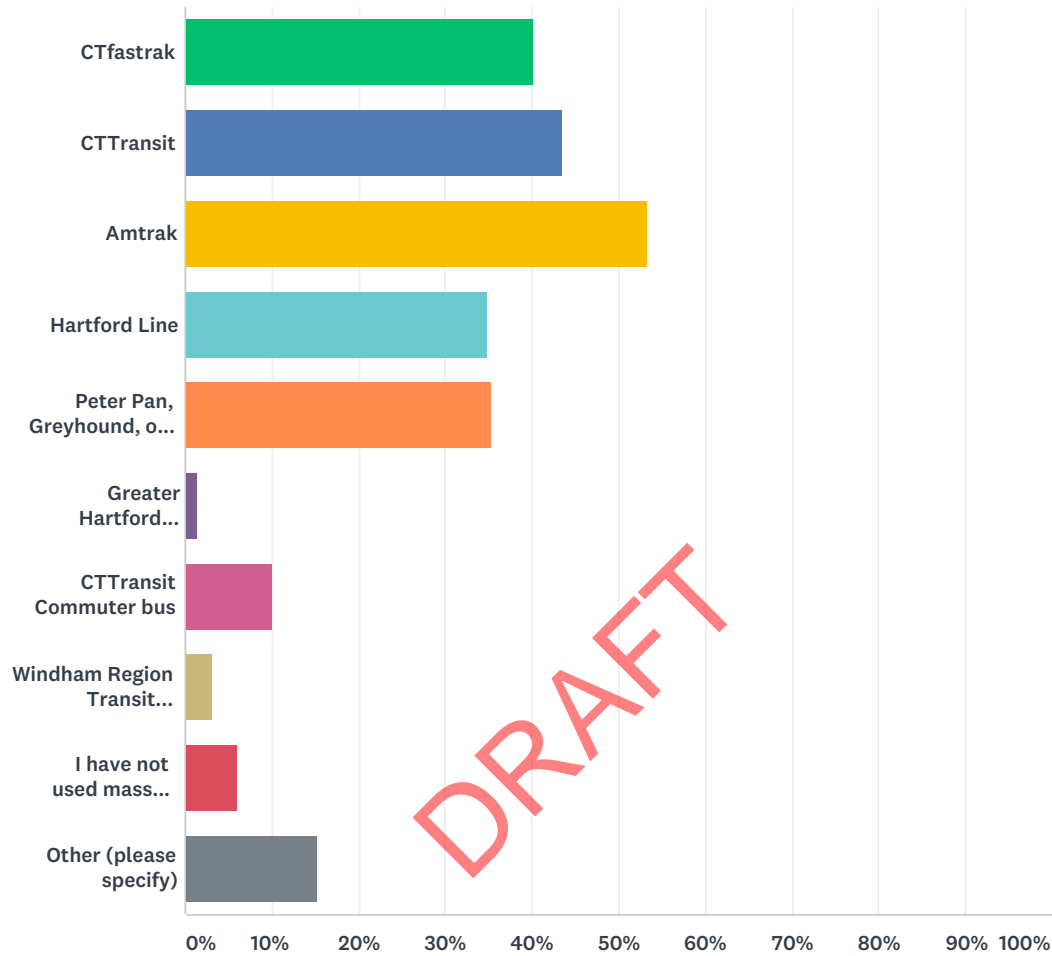
Answered: 332 Skipped: 0



ANSWER CHOICES	RESPONSES	
Agree	92.17%	306
Disagree	2.11%	7
No Preference	5.72%	19
TOTAL		332

Q6 Which of the following mass transit services have you used in the CRCOG region?

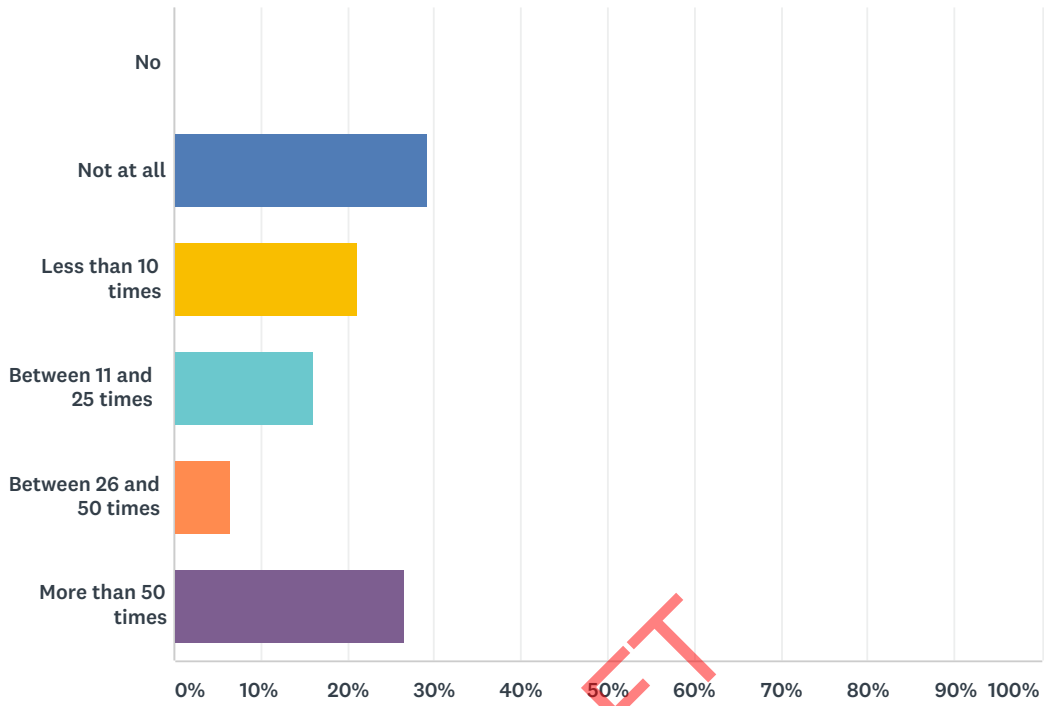
Answered: 326 Skipped: 6



ANSWER CHOICES	RESPONSES	
CTfastrak	40.18%	131
CTTransit	43.56%	142
Amtrak	53.37%	174
Hartford Line	34.97%	114
Peter Pan, Greyhound, or Megabus	35.28%	115
Greater Hartford Transit District Van	1.53%	5
CTTransit Commuter bus	10.12%	33
Windham Region Transit District	3.07%	10
I have not used mass transit services in the CRCOG Region	6.13%	20
Other (please specify)	15.34%	50
Total Respondents: 326		

Q7 How often have you ridden a bicycle in the last 12 months?

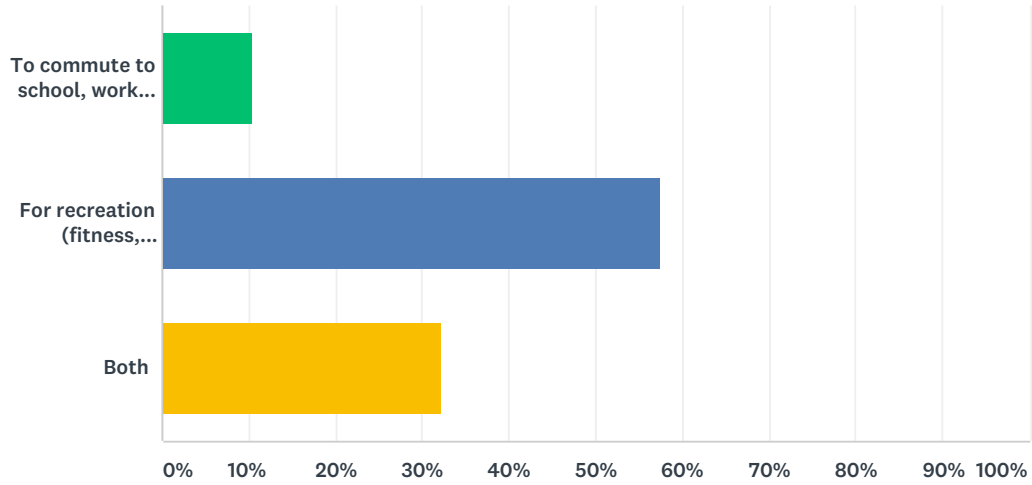
Answered: 327 Skipped: 5



ANSWER CHOICES	RESPONSES	
No	0.31%	1
Not at all	29.36%	96
Less than 10 times	21.10%	69
Between 11 and 25 times	16.21%	53
Between 26 and 50 times	6.42%	21
More than 50 times	26.61%	87
TOTAL		327

Q8 What is the primary reason you ride a bike?

Answered: 280 Skipped: 52

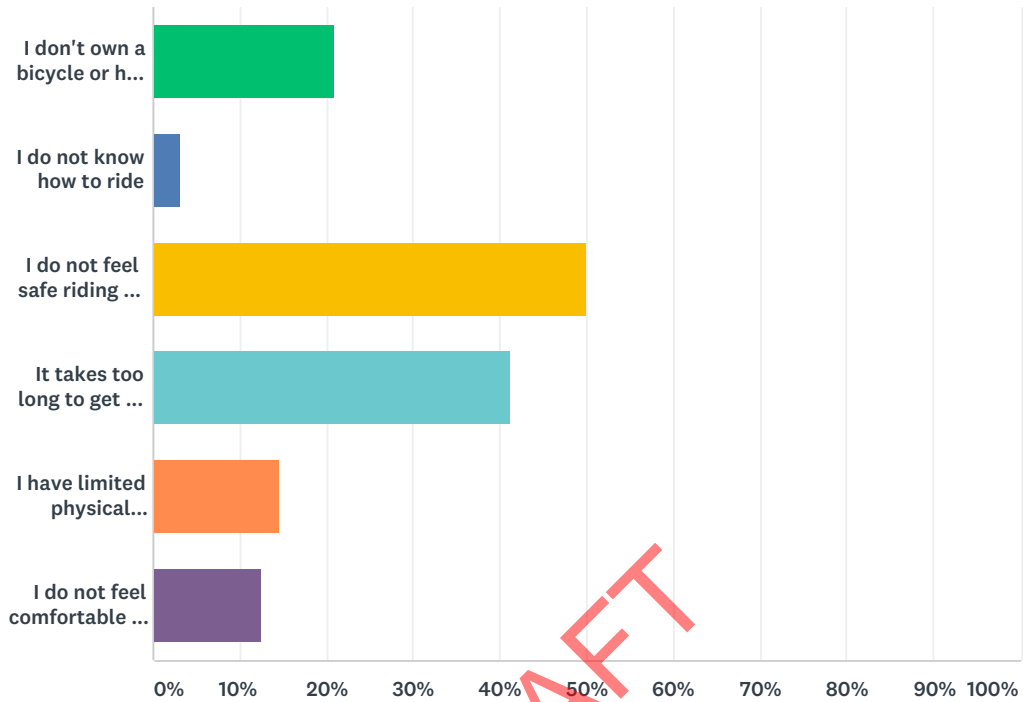


ANSWER CHOICES	RESPONSES	
To commute to school, work, personal business, or shopping trips	10.36%	29
For recreation (fitness, leisure)	57.50%	161
Both	32.14%	90
TOTAL		280

DRAFT

Q9 Which of the following are reasons for why you have not ridden a bicycle in the last 12 months? (Check all that apply)

Answered: 192 Skipped: 140

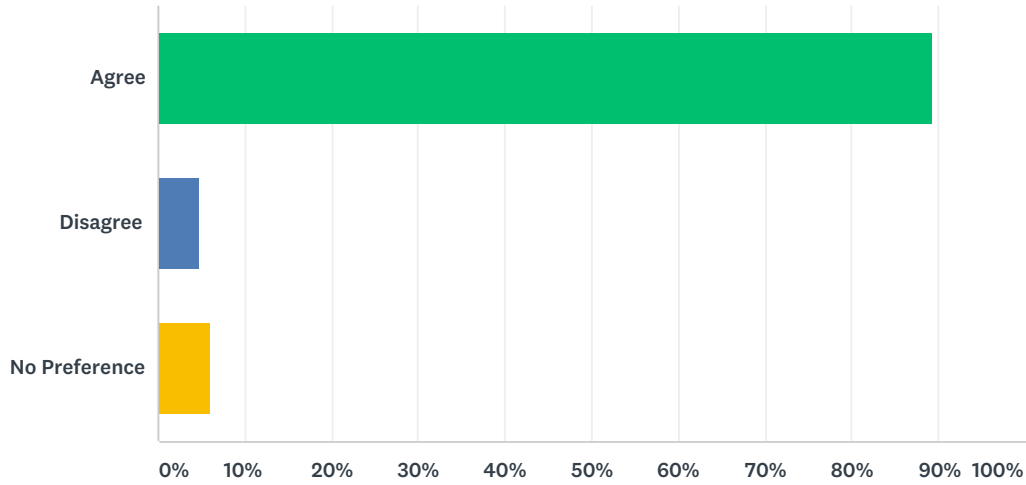


DRAFT

ANSWER CHOICES	RESPONSES	
I don't own a bicycle or have access to one	20.83%	40
I do not know how to ride	3.13%	6
I do not feel safe riding a bicycle	50.00%	96
It takes too long to get to destinations compared to travel by car	41.15%	79
I have limited physical mobility	14.58%	28
I do not feel comfortable or enjoy biking	12.50%	24
Total Respondents: 192		

Q10 Please indicate whether or not you agree with the following statement: "Even though I may or may not personally bike, I support bicycle improvements in my community."

Answered: 318 Skipped: 14

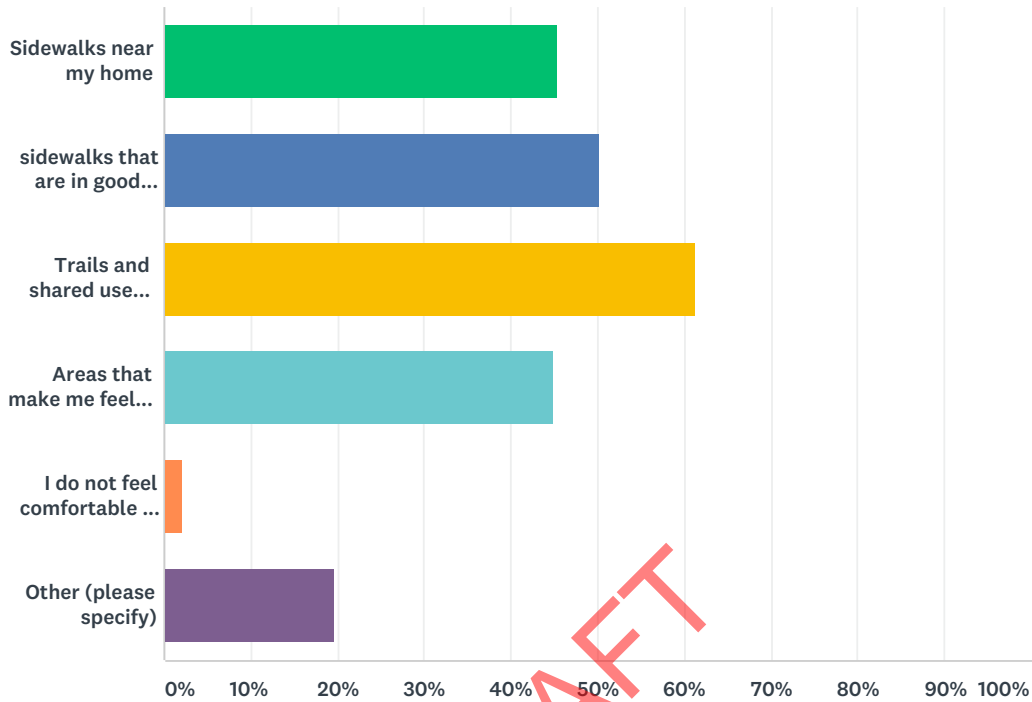


ANSWER CHOICES	RESPONSES
Agree	89.31% 284
Disagree	4.72% 15
No Preference	5.97% 19
TOTAL	318

DRAFT

Q11 Which of the following would encourage more walking for you in the next 12 months? (Check all that apply)

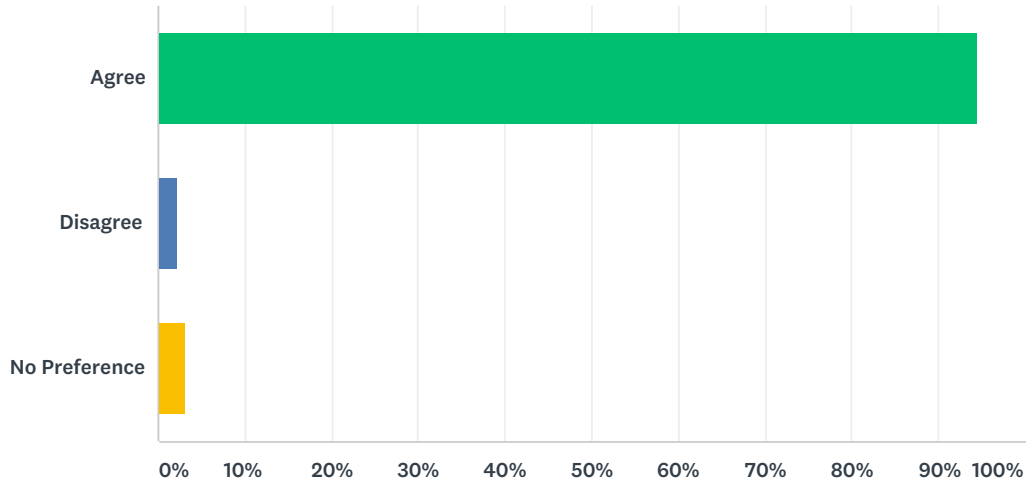
Answered: 320 Skipped: 12



ANSWER CHOICES	RESPONSES	
Sidewalks near my home	45.31%	145
sidewalks that are in good condition	50.31%	161
Trails and shared use paths near my home	61.25%	196
Areas that make me feel safe	45.00%	144
I do not feel comfortable or enjoy walking	2.19%	7
Other (please specify)	19.69%	63
Total Respondents: 320		

Q12 Please indicate whether or not you agree with the following statement: "Even though I may or may not personally walk, I support pedestrian improvements in my community."

Answered: 316 Skipped: 16

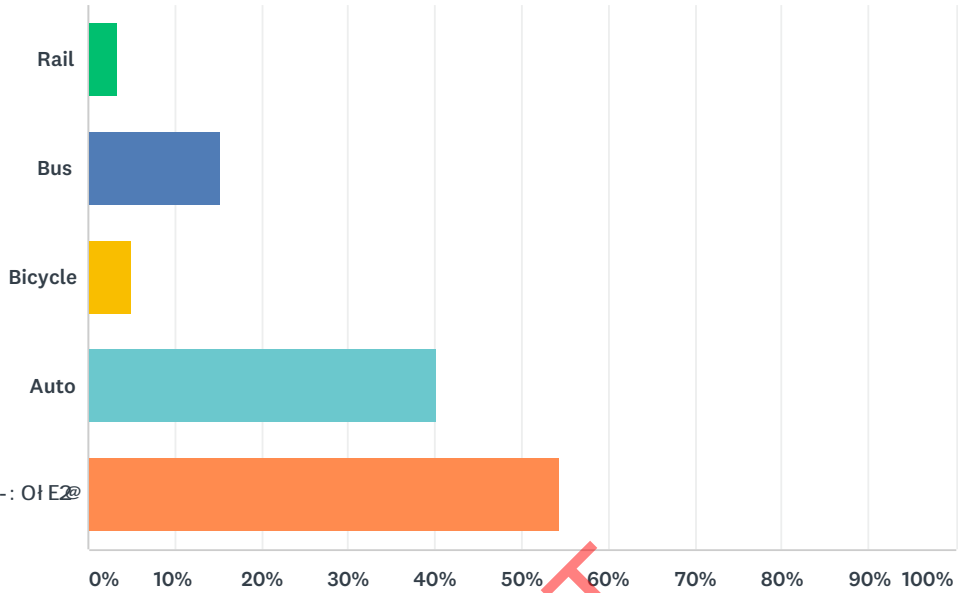


ANSWER CHOICES	RESPONSES
Agree	94.62% 299
Disagree	2.22% 7
No Preference	3.16% 10
TOTAL	316

DRAFT

Q13 Have services such as Uber and Lyft replaced any other mode you may have used previously? (Check all that apply)

Answered: 302 Skipped: 30

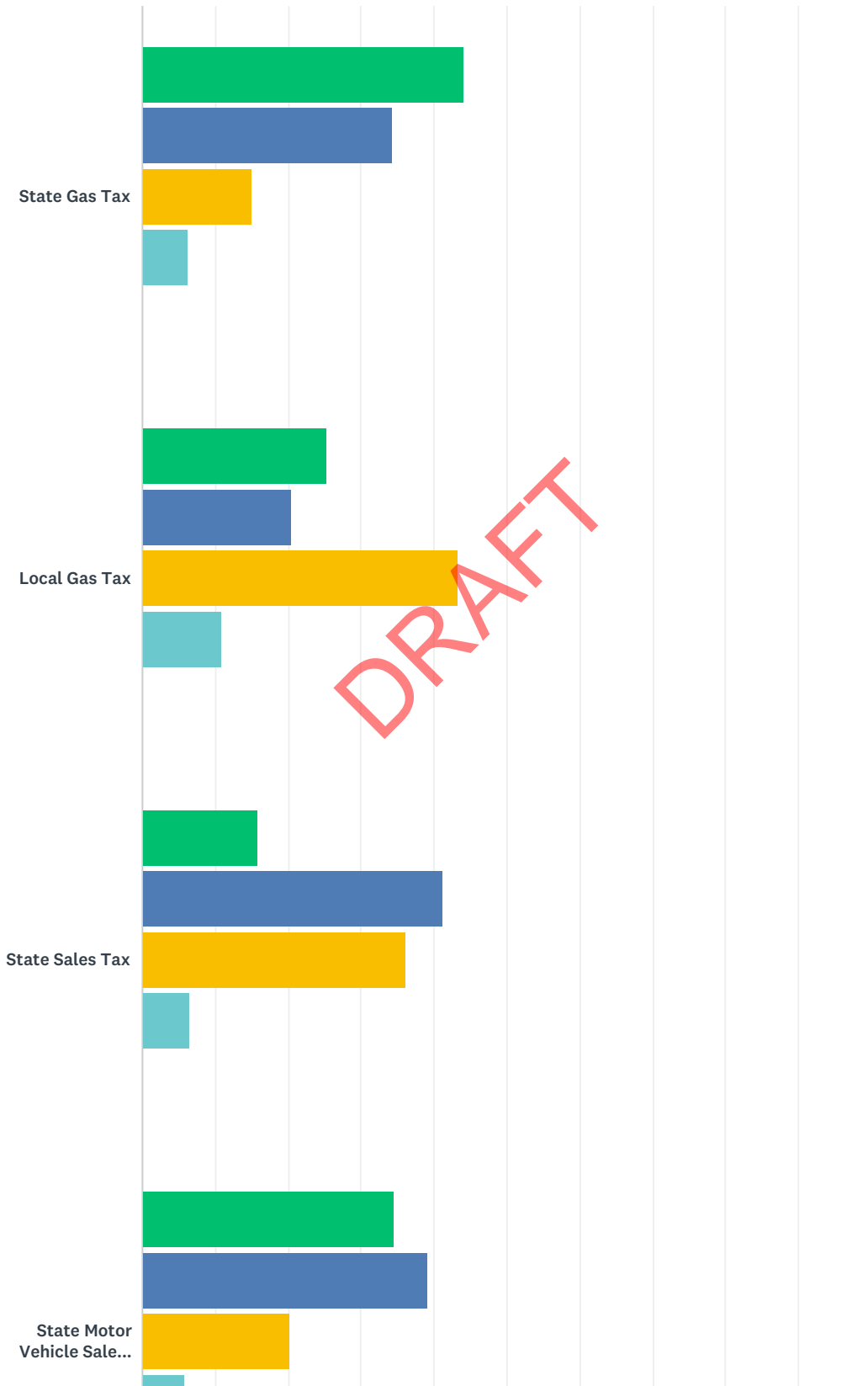


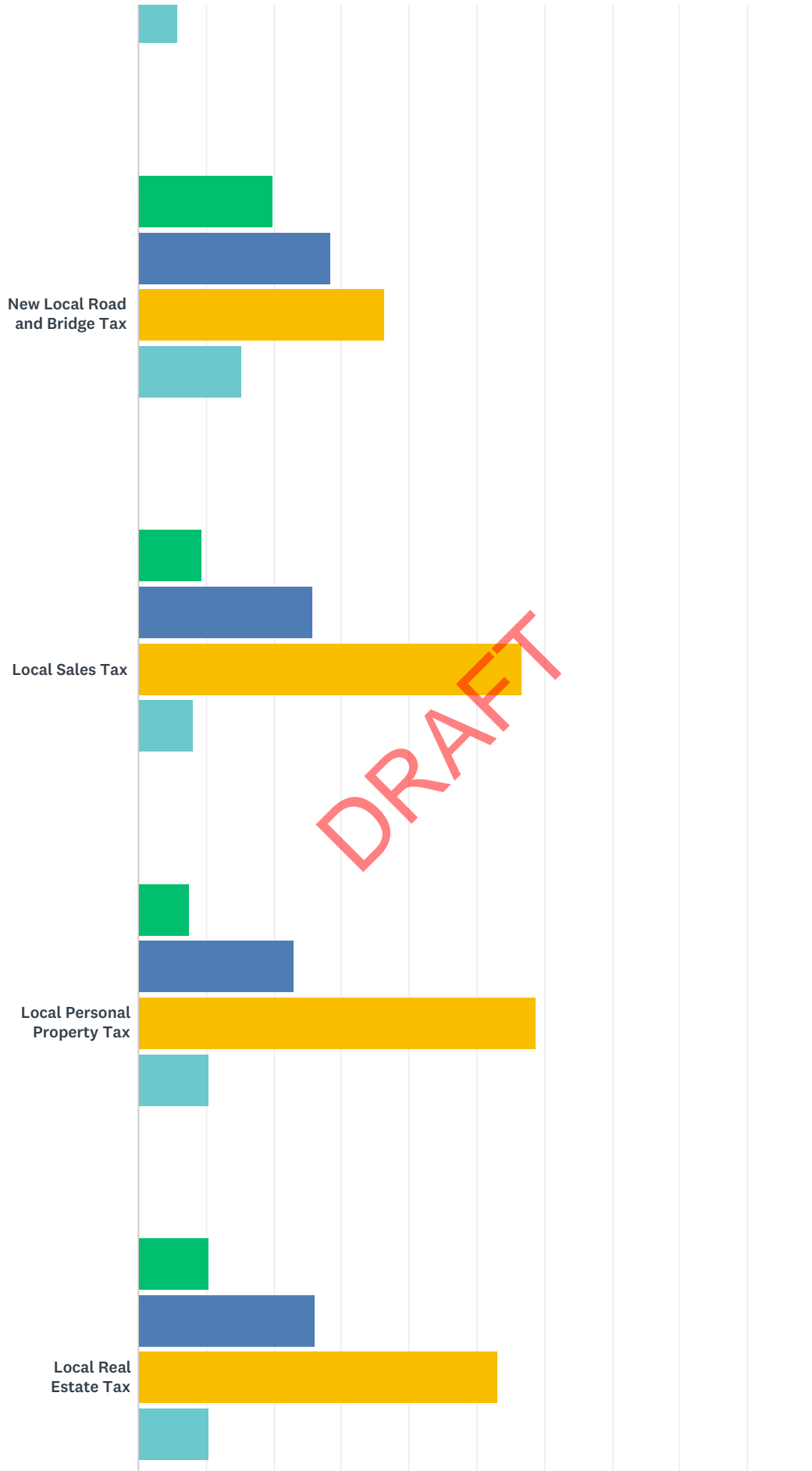
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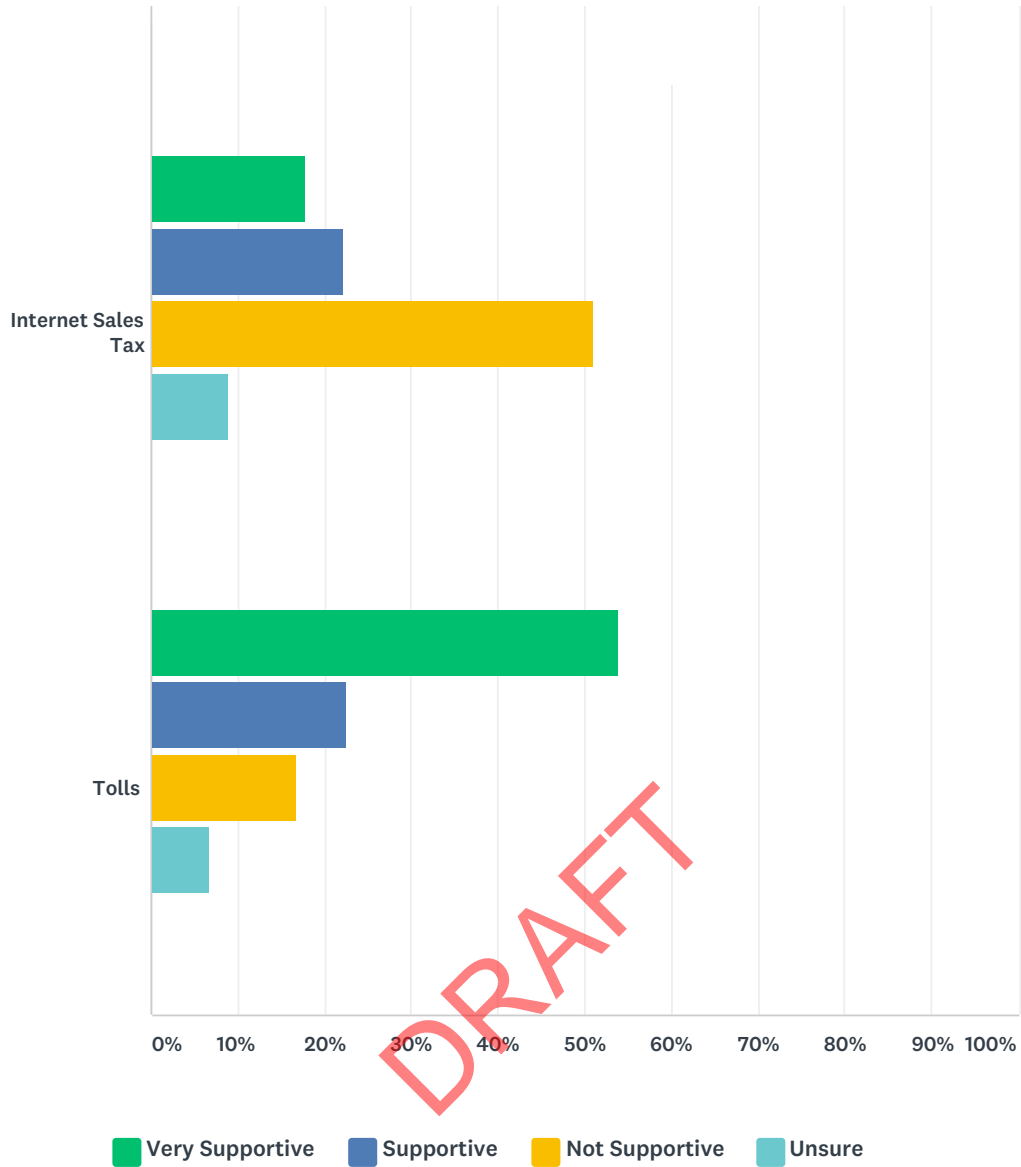
ANSWER CHOICES	RESPONSES	
Rail	3.31%	10
Bus	15.23%	46
Bicycle	4.97%	15
Auto	40.07%	121
I don't use services like Uber and Lyft	54.30%	164
Total Respondents: 302		

Q14 Please indicate your level of support for the following funding options for transportation

Answered: 293 Skipped: 39







DRAFT

	VERY SUPPORTIVE	SUPPORTIVE	NOT SUPPORTIVE	UNSURE	TOTAL
State Gas Tax	44.21% 126	34.39% 98	15.09% 43	6.32% 18	285
Local Gas Tax	25.27% 70	20.58% 57	43.32% 120	10.83% 30	277
State Sales Tax	15.94% 44	41.30% 114	36.23% 100	6.52% 18	276
State Motor Vehicle Sales Tax	34.62% 99	39.16% 112	20.28% 58	5.94% 17	286
New Local Road and Bridge Tax	19.93% 56	28.47% 80	36.30% 102	15.30% 43	281
Local Sales Tax	9.32% 26	25.81% 72	56.63% 158	8.24% 23	279
Local Personal Property Tax	7.58% 21	23.10% 64	58.84% 163	10.47% 29	277
Local Real Estate Tax	10.39% 29	26.16% 73	53.05% 148	10.39% 29	279

CRCOG LRTP Update

Internet Sales Tax	17.86%	22.14%	51.07%	8.93%	
	50	62	143	25	280
<hr/>					
Tolls	54.01%	22.65%	16.72%	6.62%	
	155	65	48	19	287

DRAFT

Q15 What percentage of a \$100 budget would you spend between the following priorities? (The total must add up to 100)

Answered: 275 Skipped: 57



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
#1 - Safety: Prioritize improvements that reduce the frequency and severity of crashes for all transportation users within the region	16	3,887	241
#2 - Community Development: Prioritize the coordination of land use and transportation policies that enhance communities, create connections to jobs, and promote tourism	13	3,070	238
#3 - System Preservation: Prioritize improvements that preserve existing transportation assets, including roadway pavement, bridges, and other existing transportation infrastructure	15	3,702	240
#4 - Alternatives to Driving: Prioritize improvements that promote alternative transportation modes including bus, biking, walking, passenger rail and ride-sharing	19	4,787	254
#5 - Innovation: Support the development and implementation of new technology such as Automated Vehicles to improve traffic flow and overall transportation system efficiency.	8	1,675	218
#6 - Environmental Protection: Prioritize the protection of environmental, cultural and historic sites, and mitigate negative impacts	11	2,413	226
#7 - Economic Prosperity: Prioritize the efficient movement of people and goods by improving infrastructure along regional corridors that improve connections between all forms of transportation, supporting current and future economic development	11	2,559	229

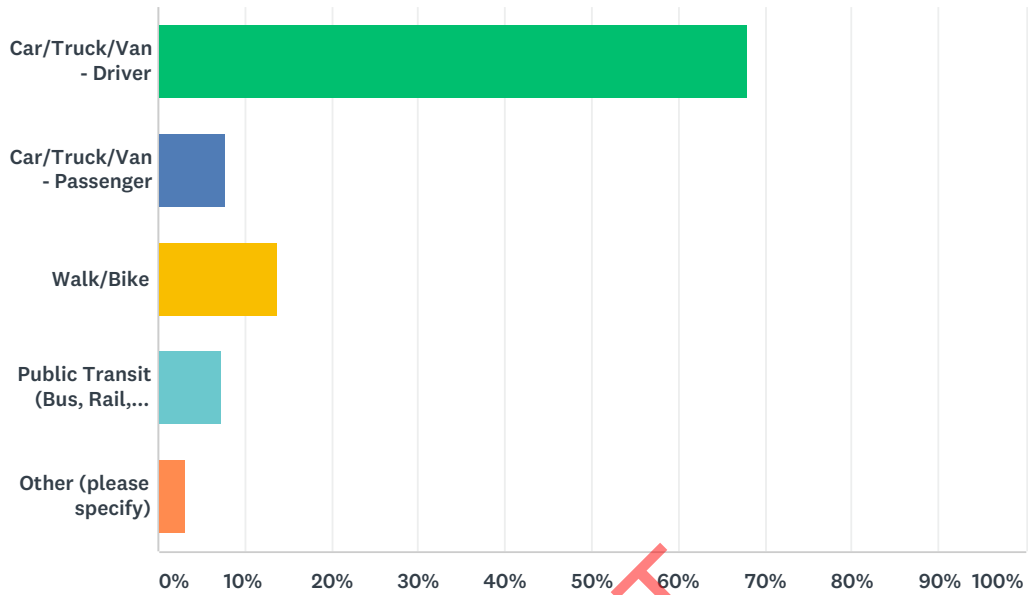
CRCOG LRTP Update

#8 - Equity and Accessibility: Prioritize improvements that directly address the transportation needs of the elderly, people with disabilities, and low-income households	12	2,884	233
#9 - Congestion Relief: Support projects and development practices that reduce the need for single occupant vehicles.	11	2,523	223
Total Respondents: 275			

DRAFT

Q16 Which of the following best describes how you get around most of the time?

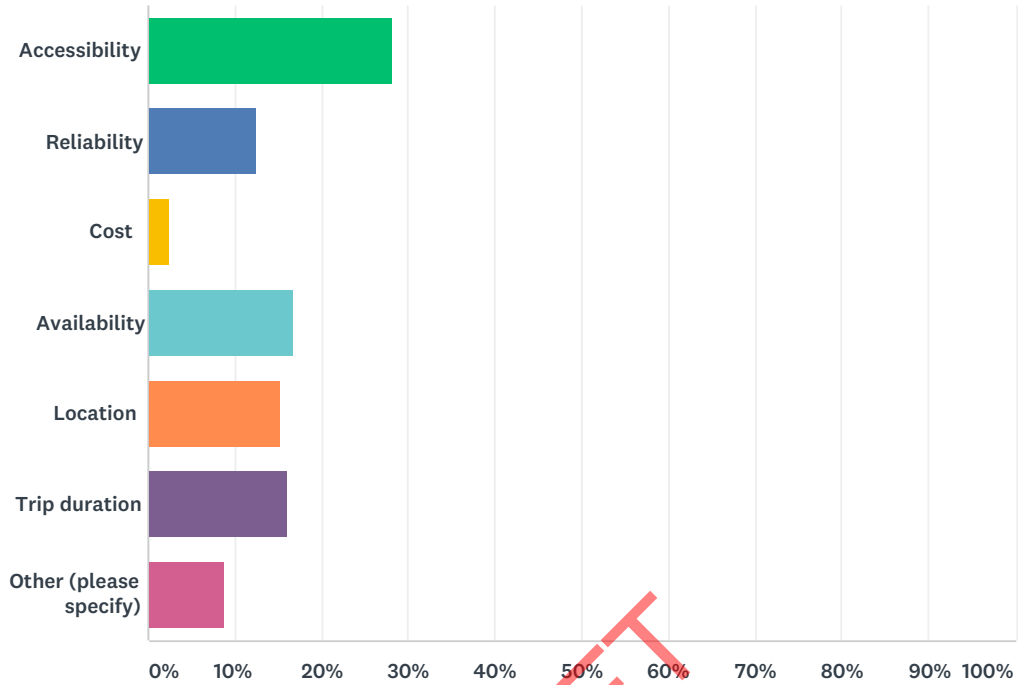
Answered: 288 Skipped: 44



ANSWER CHOICES	RESPONSES	
Car/Truck/Van - Driver	68.06%	196
Car/Truck/Van - Passenger	7.64%	22
Walk/Bike	13.89%	40
Public Transit (Bus, Rail, Paratransit van)	7.29%	21
Other (please specify)	3.13%	9
TOTAL		288

Q17 What is the primary factor that determines your mode of travel?

Answered: 287 Skipped: 45



ANSWER CHOICES	RESPONSES	
Accessibility	28.22%	81
Reliability	12.54%	36
Cost	2.44%	7
Availability	16.72%	48
Location	15.33%	44
Trip duration	16.03%	46
Other (please specify)	8.71%	25
TOTAL		287

Q19 Including yourself, how many person(s) in your household are:

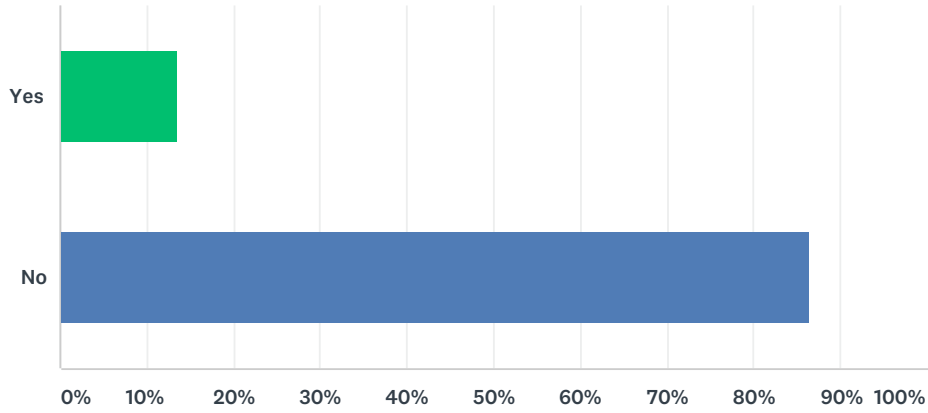
Answered: 273 Skipped: 59

ANSWER CHOICES	RESPONSES	
Under age 5:	26.01%	71
5-9 years:	26.37%	72
10-14 years:	27.47%	75
15-19 years:	27.84%	76
20-24 years:	28.94%	79
25-34 years:	42.49%	116
35-44 years:	39.19%	107
45-54 years:	37.36%	102
55-64 years:	41.76%	114
65+ years:	28.57%	78

DRAFT

Q20 Are you currently a student?

Answered: 278 Skipped: 54

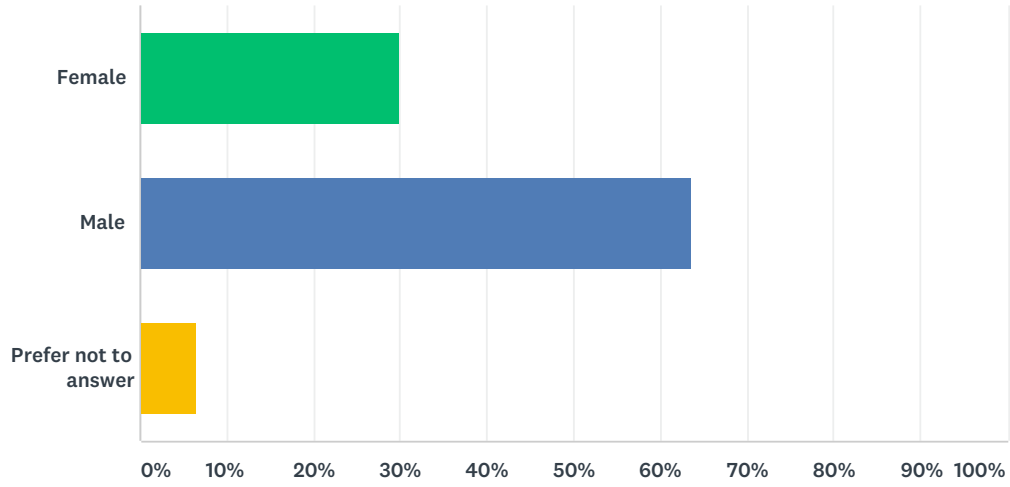


ANSWER CHOICES	RESPONSES	
Yes	13.67%	38
No	86.33%	240
TOTAL		278

DRAFT

Q21 What is your gender?

Answered: 277 Skipped: 55

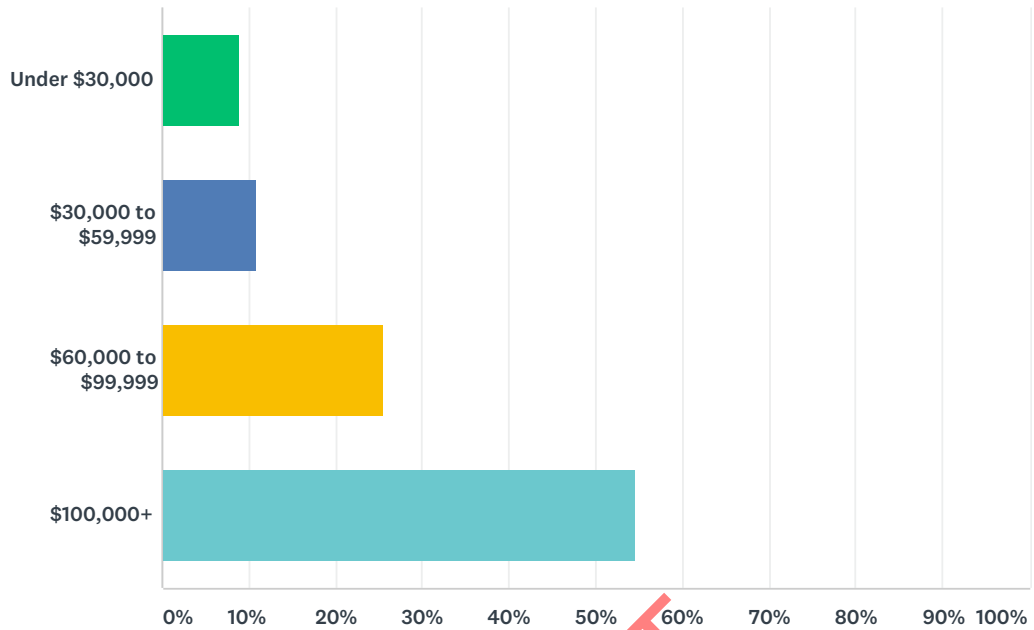


ANSWER CHOICES	RESPONSES	
Female	29.96%	83
Male	63.54%	176
Prefer not to answer	6.50%	18
TOTAL		277

DRAFT

Q22 What is your total gross household income?

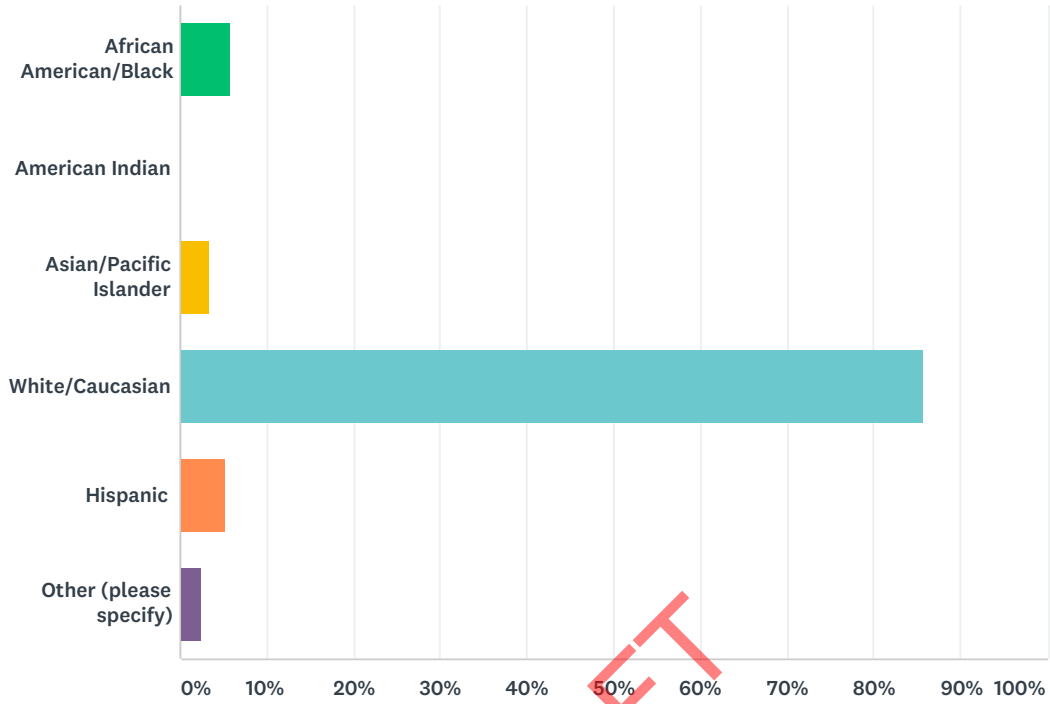
Answered: 275 Skipped: 57



ANSWER CHOICES	RESPONSES	
Under \$30,000	9.09%	25
\$30,000 to \$59,999	10.91%	30
\$60,000 to \$99,999	25.45%	70
\$100,000+	54.55%	150
TOTAL		275

Q23 Which of the following best describes your race?

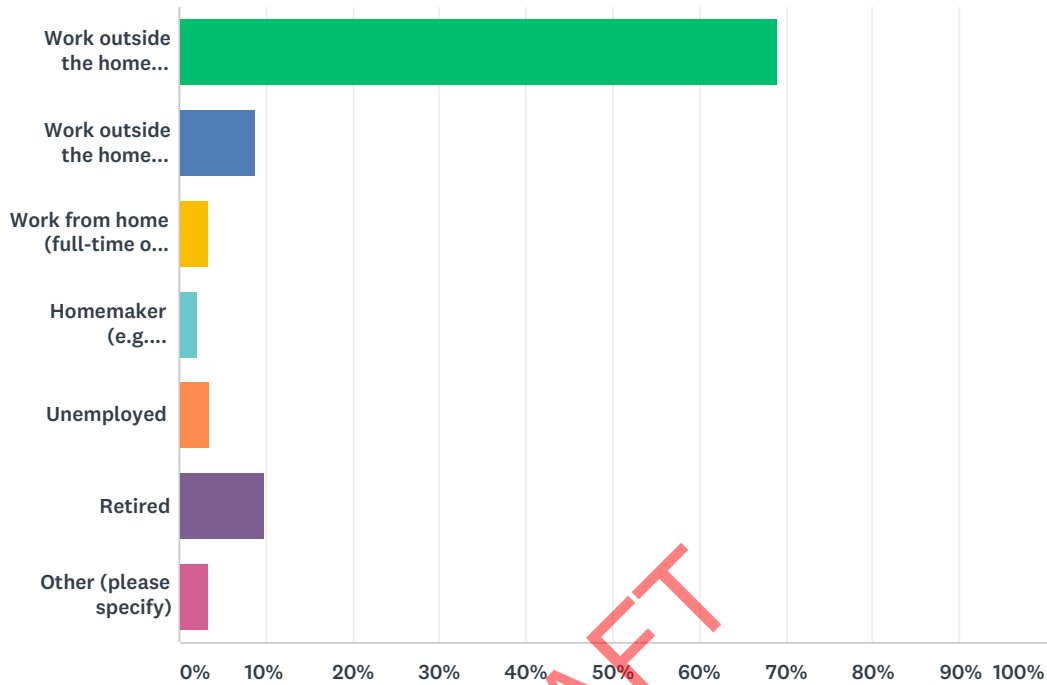
Answered: 273 Skipped: 59



ANSWER CHOICES	RESPONSES
African American/Black	5.86% 16
American Indian	0.00% 0
Asian/Pacific Islander	3.30% 9
White/Caucasian	85.71% 234
Hispanic	5.13% 14
Other (please specify)	2.56% 7
Total Respondents: 273	

Q24 Which of the following best describes your current employment status?

Answered: 274 Skipped: 58



ANSWER CHOICES	RESPONSES	
Work outside the home full-time (30+ hours/week)	68.98%	189
Work outside the home part-time (less than 30 hours/week)	8.76%	24
Work from home (full-time or part-time)	3.28%	9
Homemaker (e.g. "stay-at-home mom/dad")	2.19%	6
Unemployed	3.65%	10
Retired	9.85%	27
Other (please specify)	3.28%	9
TOTAL		274