LOWER CONNECTICUT RIVER VALLEY
COUNCIL OF GOVERNMENTS

2019 - 2045

REGIONAL METROPOLITAN TRANSPORTATION PLAN

LCRVCOG
145 DENNISON ROAD
ESSEX, CONNECTICUT 06426
WWW.RIVERCOG.ORG

ADOPTED
MARCH 2019

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as of 3/27/2019

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RESOLUTION REGARDING THE REVISION TO THE
REGIONAL TRANSPORTATION PLAN FOR THE LOWER CONNECTICUT RIVER VALLEY REGION

WHEREAS, the metropolitan transportation plan serves as a guide for the development and improvement of the transportation network in the Lower Connecticut River Valley Region;

NOW, THEREFORE, BE IT RESOLVED BY THE LOWER CONNECTICUT RIVER VALLEY COUNCIL OF GOVERNMENTS

To endorse the FY 2019 revisions to the Regional Metropolitan Transportation Plan. This endorsement by the Lower Connecticut River Valley Council of Governments constitutes the Metropolitan Planning Organization adoption of these revisions contingent upon no major adverse comments are received during said period.

CERTIFICATION

The undersigned and duly qualified Secretary of the Lower Connecticut River Valley Council of Governments certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Lower Connecticut River Valley Council of Governments on March 27, 2019.

Lauren Gister
Secretary

3-27-19
Date

RESOLUTION ON CONFORMITY WITH THE CLEAN AIR ACT – OZONE

WHEREAS, The Lower Connecticut River Valley Council of Governments is required to submit an Air Quality Conformity Statement to the US Federal Highway Administration (FHWA) and to the US Environmental Protection Agency (EPA) in accordance with the final conformity rule promulgated by EPA (40 CFR 51 and 93) when adopting an annual Transportation Improvement Program or when effecting a significant revision of the Region's Metropolitan Transportation Plan; and

WHEREAS, Title 42, Section 7506 (3) (A) states that conformity of transportation plans and programs will be demonstrated if:

1. the plans and programs are consistent with recent estimates of mobile source emissions;
2. the plans and programs provide for the expeditious implementation of certain transportation control measures;
3. the plans and programs contribute to annual emissions reductions consistent with the Clean Air Act of 1977, as amended; and

WHEREAS, it is the opinion of the Lower Connecticut River Valley Council of Governments that the plans and programs approved today, March 27 2019 and submitted to FHWA and EPA conform to the requirements of Title 42, Section 7506 (3) (A) as interpreted by EPA (40 CFR 51 and 93); and

WHEREAS, The State of Connecticut has elected to assess conformity in the Connecticut portion of the New York-Northern New Jersey Long Island, NY-NJ-CT Ozone Marginal Nonattaiment area (Fairfield, New Haven and Middlesex Counties) and the Greater Connecticut Ozone Marginal Nonattainment Area (Hartford, New London, Tolland, Windham and Litchfield counties), and the Connecticut Department of Transportation has jointly assessed the impact of all transportation plans and programs in these Ozone Nonattainment areas (Ozone and PM 2.5 Air Quality Conformity Determination February 2019); and

WHEREAS, The Connecticut Department of Transportation's assessment (above) has found that plans and programs jointly meet mobile source emission's guidelines advanced by EPA pursuant to Section 7506 (3) (A).

Now, THEREFORE BE IT RESOLVED by the Lower Connecticut River Valley Council of Governments

That the Lower Connecticut River Valley Council of Governments finds that the LCRVCOG 2019-2045 Regional Metropolitan Transportation Plan and the FFY 2018-2021 Transportation Improvement Program conform to air quality requirements of the U.S. Environmental Protection Administration (40 CFR 51 and 93), related U.S. Department of Transportation guidelines (23 CFR 450) and with Title 42, Section 7506 (3) (A) and hereby approves the existing February 2019 Ozone and PM 2.5 Air Quality Conformity Determination contingent upon no major adverse comments are received during said period.

CERTIFICATION

The undersigned duly qualified and acting Secretary of the Lower Connecticut River Valley Council of Governments certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Lower Connecticut River Valley Council of Governments on March 27, 2019.

Lauren Gister 3-27-19

Lauren Gister Date
Secretary

Estuary Transit District | Middletown Transit District | Middlesex County Chamber of Commerce

RiverMPO

Chester | Clinton | Cromwell | Deep River | Durham | East Haddam | East Hampton | Essex | Haddam | Killingworth | Lyme | Middlefield | Middletown | Old Lyme | Old Saybrook | Portland | Westbrook

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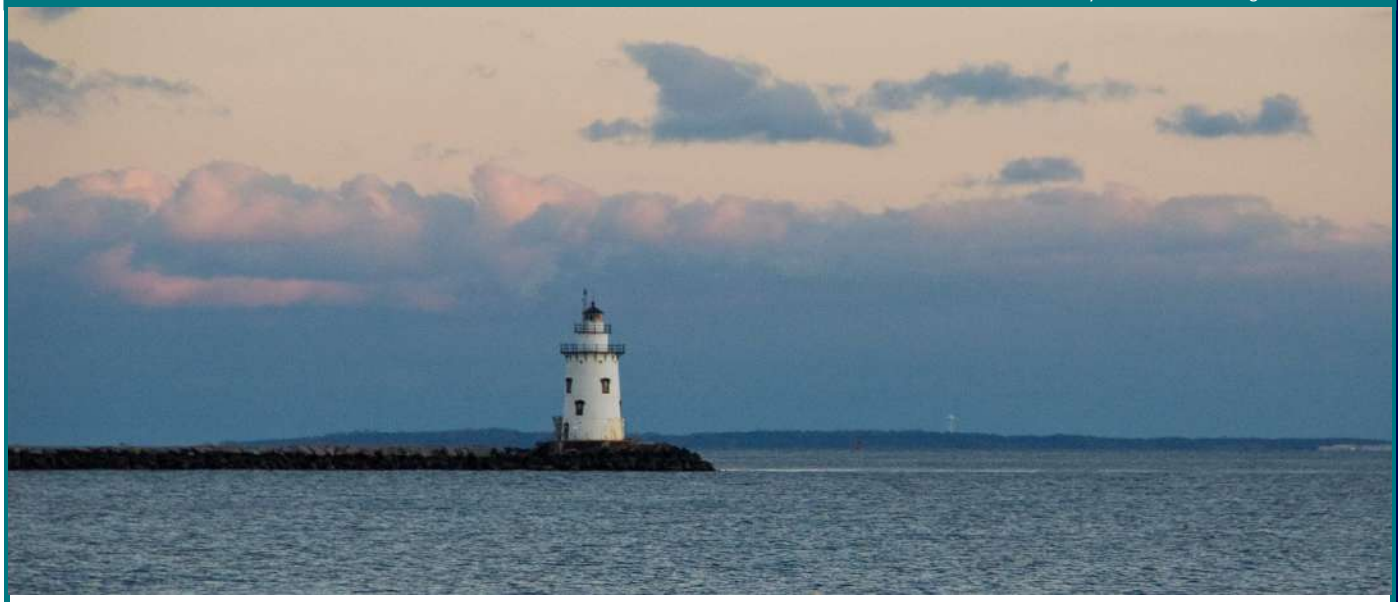
The Old Saybrook Breakwater Lighthouse at dusk.



Chapter 1.

INTRODUCTION

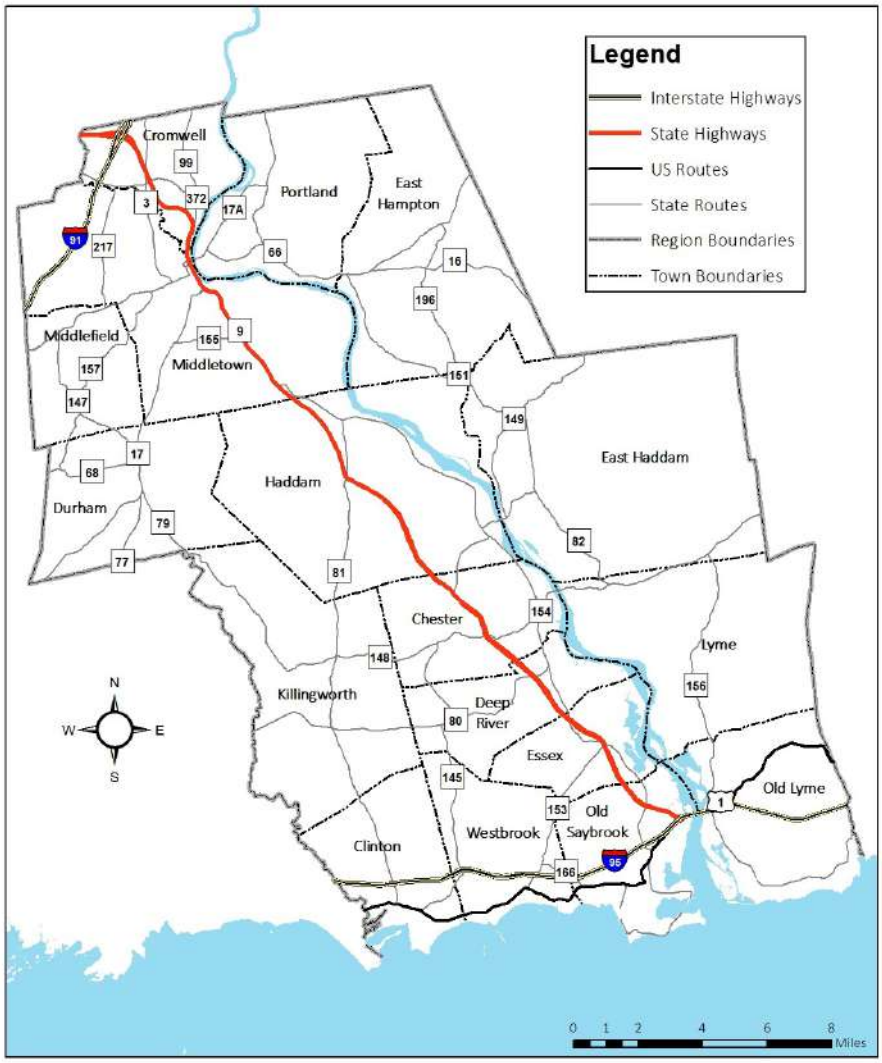
A. INTRODUCTION
B. THE LOWER CONNECTICUT RIVER VALLEY REGION
C. THE LOWER CONNECTICUT RIVER VALLEY COUNCIL OF GOVERNMENTS

A. INTRODUCTION

The Metropolitan Transportation Plan (MTP) for the Lower Connecticut River Valley (LCRV) region defines the region's future transportation vision and outlines regional transportation funding priorities. The MTP also establishes goals, policies, and steps to help achieve that vision. The twenty-five-year scope of the plan gives the MTP a broad perspective of the region's future transportation needs. Although new infrastructure is an important component of the MTP and the future regional transportation system, most future funding will be focused on projects that maintain, operate, or make better use of existing transportation facilities. These, as well as other projects which may be selected for funding in the region's Transportation Improvement Program (TIP), will be chosen based upon their relation to the metropolitan transportation plan. The TIP is a detailed, multimodal list of projects that are programed to receive federal funding over a four-year period and is essentially the short-range implementation plan for the region.

RiverCOG, as well as all MPOs, must prepare a MTP with respect to the development of the metropolitan area's transportation network. This plan must identify how the metropolitan area 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. The MTP, or plan, includes long-range and short-range strategies based on a minimum twenty year planning horizon and is updated every four years in air quality nonattainment and maintenance areas. It is based on the most current plans, data, and information available at the time of endorsement. RiverCOG consults with federal, state, and local agencies when developing the MTP and provides the public with a reasonable opportunity to comment on the plan. RiverCOG may revise the plan at any time using the procedures in 23 CFR Part 450§324. Both this plan and the prior 2015 plan can be viewed at RiverCOG's website, http://www.rivercog.org/ An air quality conformity determination is made when the MTP is updated.

MAP 1.1 LCRV Region Member Municipalities

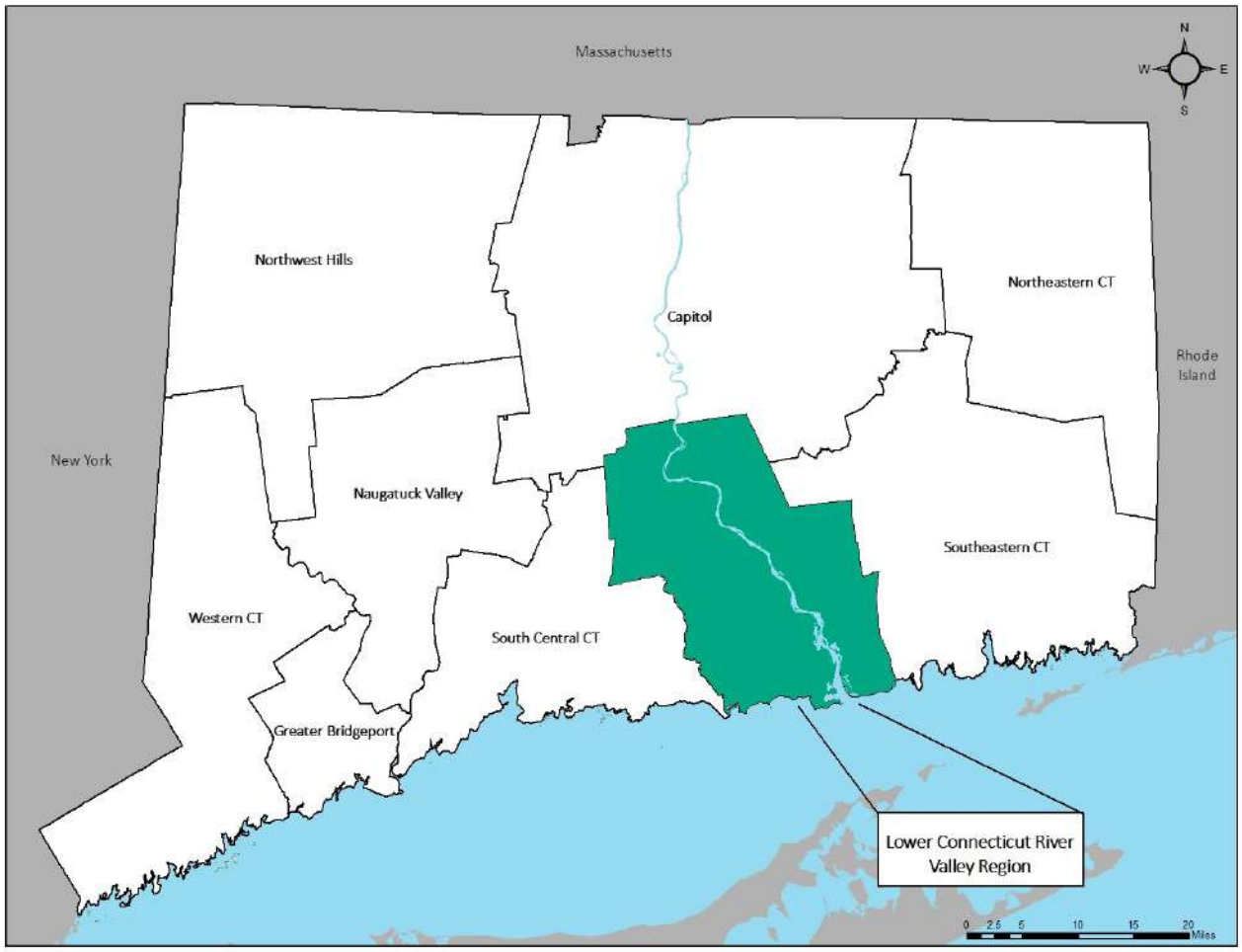


Source: RiverCOG

B. THE LOWER CONNECTICUT RIVER VALLEY REGION

The LCRV region consists of the municipalities of Chester, Clinton, Cromwell, Deep River, Durham, East Haddam, East Hampton, Essex, Haddam, Killingworth, Lyme, Middlefield, Middletown, Old Lyme, Old Saybrook, Portland and Westbrook. These seventeen municipalities collectively occupy an area of approximately 443 square miles with a population of 175,685 according to the 2010 U.S. Census. Much of the land area is rural, with

MAP 1.2 Connecticut Planning Regions



Source: RiverCOG

Middletown, Cromwell, and Portland comprising the region's urban core.

C. THE LOWER CONNECTICUT RIVER VALLEY COUNCIL OF GOVERNMENTS

The Lower Connecticut River Valley Council of Governments is one of nine regional planning organizations in Connecticut, as seen in Map 1.2. The chief elected officials (CEOs) of the region's seventeen municipalities sit on the LCRVCOG board. The LCRVCOG board also serves as the region's Metropolitan Planning Organization (MPO) policy board along with the two regional transit districts and chamber of commerce. The MPO approves the MTP, TIP, and amendments to the TIP. The board also discusses issues of common concern and receives staff reports at monthly meetings. Additional planning groups within LCRVCOG include the Regional Planning Committee, Regional Agricultural Council, and Land Trust Exchange. The LCRVCOG also hosts the operations of the Connecticut River Gateway Commission and the Lower Connecticut River Valley Land Trust.

It is the MPO that is responsible for development of the region's Metropolitan Transportation Plan. The MPO conducts transportation planning for the region and all transportation facilities. Along with the board members mentioned above, the MPO engages legislators, representatives from federal, state, regional and local entities, and the public in an effort to make transportation decisions based on the diverse interests found in the region.

The FAST Act, or the Fixing America's Surface Transportation Act, (PL 114-94) was signed into law in 2015. It funds surface transportation programs for $305 billion in federal fiscal years 2016 through 2020 for highway and

motor vehicle safety, public transportation, motor carrier safety, hazardous materials safety, rail, and research, technology, and statistics programs. An estimated allocation for the State of Connecticut for fiscal years 2016 through 2020 is $2,660,154, 553.

The FAST Act maintains a focus on safety similar to prior legislation since 1991, keeps intact the established structure of the various highway-related programs, and furthers efforts to streamline project delivery. Since the enactment of the FAST Act, states and local governments are moving forward with critical transportation projects with the confidence that they will have a federal partner over the long term.

The FAST Act outlines "10 Factors" that an MPO must consider in its transportation planning activities in cooperation with state and public transportation operators. The metropolitan transportation planning process shall be continuous, cooperative, and comprehensive, and provide for consideration and implementation of projects, strategies, and services to:

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

(2) Increase the safety of the transportation system for motorized and non-motorized users;

(3) Increase the security of the transportation system for motorized and non-motorized users;

(4) Increase accessibility and mobility of people and freight;

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

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

(7) Promote efficient system management and operation;

(8) Emphasize the preservation of the existing transportation system;

(9) Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation; and

(10) Enhance travel and tourism.

Considering these ten broad focus areas and the importance of transportation to all facets of life, a high quality transportation system is vital to maintaining the economic competitiveness and quality of life of the region. Yet at the same time, the facilities required for transportation have a substantial impact on the environment and are expensive to build and maintain. Consequently, the goals of this plan are to:

- Provide a strategy for capital and planning resources for both motorized and non-motorized transportation modes and infrastructure improvements;
- Ensure that people and goods move effectively, efficiently, and safely throughout the region while addressing social, economic and environmental needs;
- Address the transportation issues in the region through both specific and general recommendations;
- Provide an overall view of the regional transportation system to place these recommendations in perspective.

Aerial view of the Baldwin Bridge and the Amtrak Old Saybrook—Old Lyme Bridge spanning the Connecticut River

Chapter 2.

DEMOGRAPHICS

A. DEMOGRAPHIC CHARACTERISTICS
B. ELDERLY & MOBILITY IMPAIRED POPULATION
C. SOCIO-ECONOMIC CONDITIONS
D. POPULATION DENSITY
E. EMPLOYMENT TRENDS

A. DEMOGRAPHIC CHARACTERISTICS

Population statistics should be considered when planning for transportation purposes, since population changes influence regional development. Factors such as housing, infrastructure, utilities, and economic development in turn affect the regional transportation system.

The total population of the Lower Connecticut River Valley (LCRV) region was 174,027 based on the 2013-2017 American Community Survey conducted by the U.S. Census Bureau. This is a decrease of 0.9 % from the 2010 Decennial Census. The American Community Survey data are estimates based on a survey of a small segment of the total population whereas the Decennial Census data are based on counts of larger samples of the population. For this reason, comparison between the two data sets is not exact. Nonetheless, the ACS data is the most recent available and captures important trends that occur during intercensal periods. According to the 2017 ACS estimates, the State of Connecticut's population increased slightly (0.6 percent) from 2010 to 2017. Nearly all of the municipalities in the LCRV region recorded a decline in population during this same time. The estimated decline ranged from 1.9% in Middletown to 0.2 % in Westbrook. The populations of Cromwell and Lyme increased 0.1 and 0.7 % respectively from 2010 to 2017.

The Connecticut State Data Center (SDC) at the University of Connecticut produced population projections for all municipalities in the state in 2015, forecasting until 2040. The projections used vital statistics, net-migration, and other variables to project the statewide populations. Physical factors such as land use limitations, changes in the transportation system, and economic conditions were not factored into municipal projections. For these reasons, there is no exact standard of comparison between projection statistics and those recorded by the Census Bureau. According to the SDC, the LCRV region population will increase 0.2 % to 176,941 by 2020. By 2025, the population will decrease by 0.3 % to 176,340. By 2030, the LCRV region population will decrease an additional 0.3 %. The ongoing population loss is predicted to escalate through 2035 (174,106, a decrease of 1.0 %) and 2040 (172,148, a decrease of 1.1 %). Between 2015 and 2040, the state population is expected to grow by 2.2 %.

TABLE 2.1 Municipal Population Projections

Geography	Total Population				Percent Change		
	2010*	2017**	2025***	2040***	2010 - 2017	2017 - 2025	2025 -2040
Connecticut	3,574,097	3,594,478	3,618,763	3,654,015	0.57%	0.68%	1.00%
LCRV region	175,685	174,027	176,339	172,144	-0.94%	1.33%	-2.40%
Chester	3,994	3,982***	3,765	3,314	-0.30%	-12.18%	-12.00%
Clinton	13,260	13,041	11,632	9,483	-1.65%	-10.80%	-18.50%
Cromwell	14,005	14,021	15,018	16,161	0.11%	7.12%	7.60%
Deep River	4,629	4,547	4,031	3,201	-1.77%	-11.35%	-20.60%
Durham	7,388	7,292	7,361	6,791	-1.30%	0.95%	-7.70%
East Haddam	9,126	9,072	9,022	8,166	-0.59%	-0.55%	-9.50%
East Hampton	12,959	12,890	13,434	11,544	-0.53%	4.22%	-14.10%
Essex	6,683	6,588	5,991	5,082	-1.42%	-9.09%	-15.20%
Haddam	8,346	8,303	8,865	8,631	-0.52%	6.77%	-2.60%
Killingworth	6,525	6,441	5,990	4,946	-1.29%	-6.99%	-17.40%
Lyme	2,406	2,423	2,639	2,742	0.71%	8.91%	3.90%
Middlefield	4,425	4,402	4,397	4,332	-0.52%	-0.14%	-1.50%
Middletown	47,648	46,747	51,751	57,703	-1.89%	10.70%	11.50%
Old Lyme	7,603	7,494	6,875	6,040	-1.43%	-8.26%	-12.10%
Old Saybrook	10,242	10,162	8,644	6,987	-0.78%	-14.94%	-19.20%
Portland	9,508	9,391	9,848	10,146	-1.23%	4.86%	3.00%
Westbrook	6,938	6,927	7,080	6,637	-0.16%	2.21%	-6.30%

*Sources: * 2010 Census of Population and Housing*

*** 2012-2016 American Community Survey 5-year Estimates*

**** Connecticut State Data Center, Population Projections (2015 - 2040)*

Based on the population projections in Table 2.1, Middletown will experience the largest population increase, at 11.5 %growth by 2040. Cromwell, Lyme and Portland are expected to increase in population at a faster rate than the State. Deep River, Old Saybrook, Clinton, and Killingworth will experience the largest decreases in population, and population is expected to decline in Chester, Durham, East Haddam, East Hampton, Essex, Haddam, Middlefield, Old Lyme, and Westbrook.

Historical, current, and projected population age distributions show evidence of an aging population in the LCRV region. In 2017, 18.9 % of the population was age 65 or older. By 2025, it is projected that 21.6 % of the region's population will be age 65 or older. By 2040, the SDC projects 39,431 individuals 65 years of age or older will be residing in the area, or 22.9 % of the total population of the region. This trend of an aging population is consistent with the state, due to the aging baby boomer generation.

TABLE 2.2 Regional Elderly Population, 2017 to 2040

	2017*	2020**	2025**	2030**	2035**	2040**
Connecticut	575,757	579,658	620,873	650,209	653,333	633,098
LCRVR	33,057	35,033	38,085	40,152	40,798	39,431
Chester	1,053	1,098	1,212	1,268	1,238	1,151
Clinton	2,447	2,769	2,990	3,095	3,103	2,932
Cromwell	2,618	2,738	2,929	2,999	3,039	2,995
Deep River	877	874	965	1,001	1,027	994
Durham	1,224	1,291	1,407	1,482	1,512	1,438
East Haddam	1,500	1,770	2,071	2,311	2,413	2,352
East Hampton	1,965	2,480	2,975	3,390	3,658	3,739
Essex	2,050	1,783	1,915	1,991	1,978	1,849
Haddam	1,643	1,629	1,816	1,910	1,933	1,902
Killingworth	1,334	1,579	1,677	1,782	1,804	1,625
Lyme	784	772	820	858	868	844
Middlefield	815	791	887	970	1,021	1,012
Middletown	6,750	7,140	7,628	8,047	8,176	7,933
Old Lyme	2,077	2,018	2,146	2,187	2,117	1,947
Old Saybrook	2,530	2,716	2,720	2,726	2,620	2,403
Portland	1,906	1,811	1,996	2,105	2,222	2,262
Westbrook	1,484	1,774	1,931	2,030	2,069	2,053

Sources: * 2013-2017 American Community Survey 5-year Estimates
** CT State Data Center 2015-2040 Popula-

TABLE 2.3 Non-institutionalized Disabled Population in the LCRVR, 2017

Geography	Total Disabled Persons (non-institutionalized)	Disabled Persons over 65 (non-institutionalized)	Disabled Persons under 65	% Disabled over 65
LCRV Region	18,219	9,318	8,901	51.1%
Chester	497	390	127	74.4%
Clinton	1,313	606	707	46.2%
Cromwell	1,319	820	499	62.2%
Deep River	521	221	300	42.4%
Durham	524	293	231	55.9%
East Haddam	972	446	526	45.9%
East Hampton	1,263	546	717	43.2%
Essex	550	342	208	62.2%
Haddam	681	461	220	67.7%
Killingworth	781	414	367	53.0%
Lyme	248	171	77	69.0%
Middlefield	390	206	184	52.8%
Middletown	5,266	2,361	2,905	44.8%
Old Lyme	731	456	275	62.4%
Old Saybrook	1,207	608	599	50.4%
Portland	1,017	608	409	59.8%
Westbrook	939	389	550	41.4%

Source: 2013-2017 American Community Survey 5-year Estimates

B. ELDERLY & MOBILITY IMPAIRED POPULATION

The elderly and disabled populations have been identified due to their mobility limitation and special transportation needs. Based on the 2013-2017 American Community Survey, the LCRV region was home to an estimated 33,057 individuals over 65 years of age. The elderly population is expected to increase by more than 8,000 individuals by 2040.

As shown in Table 2.2, Middletown is home to the most residents age 65 or older, followed by Cromwell and Clinton. The elderly account for more than 20 % of the total town population in Chester, Essex, Killingworth, Lyme, Old Lyme, Old Saybrook, Portland, and Westbrook. Middletown, East Haddam, Durham, and East Hampton have the lowest percentage of elderly individuals. Approximately 10.6% of the region's non-institutionalized population was classified as disabled according to the 2013-2017 American Community Survey (Table 2.3). Of the 18,219 disabled residents, over half (51.1 % or 9,318 persons) were elderly and the remaining

48.9% were younger than 65.

There will be an increase in the need for para-transit services as the population continues to age over the next few decades. Transportation needs must meet the needs of the elderly and disabled who have difficulty using public or private transportation services. Public programs and policies must address the transportation needs of the elderly and disabled, not just as drivers, but also as passengers and pedestrians. Current policies that provide aid to reduce fares, subsidies for transit operators, FTA's Section 5310 and other programs must continue to be funded at all levels of government, and legislative requirements such as those of the Americans with Disabilities Act must remain implemented.

Future highway design must accommodate the transportation needs of older drivers by increasing the safety and usefulness of the highway system. Driving conditions require speed-distance judgments under time constraints. Although not unique to older drivers, many studies have shown aging often decreases drivers' ability to read signs, follow pavement markings, respond to traffic signals, and maneuver through intersections. The Older Driver Highway Design Handbook published by the U.S. Department of Transportation, provides various recommendations regarding the design of at-grade intersections, grade separation interchanges, roadway curvature and passing zones, and construction/work zones. Many of the recommendations should be considered when facility improvements are planned.

C. SOCIO-ECONOMIC CONDITIONS

Certain socio-economic characteristics of the population related to general demographic factors also affect the regional transportation system, and can create specialized demands on the planning process. These characteristics are persons and vehicles per household, median household income, number of single occupancy vehicle trips to work, and others. These variables influence travel modes and patterns. Households with a greater number of persons generally have access to more vehicles. Likewise, households with higher incomes are more

TABLE 2.4 Regional Household Vehicles, 2017

Geography	Households	Persons per Household	Mean Vehicles per Household	Zero Vehicle Households	Percentage of Zero Vehicle Households
LCRVR	70,907	2.43	1.96	3,867	5.5%
Chester	1,777	2.32	1.91	135	7.6%
Clinton	5,334	2.43	1.89	247	4.6%
Cromwell	5,769	2.35	1.84	419	7.3%
Deep River	1,922	2.35	1.99	64	3.3%
Durham	2,664	2.71	2.51	0	0.0%
East Haddam	3,597	2.48	2.40	21	0.6%
East Hampton	4,941	2.59	2.11	123	2.5%
Essex	3,028	2.16	1.86	132	4.4%
Haddam	3,200	2.57	2.31	102	3.2%
Killingworth	2,411	2.67	2.36	24	1.0%
Lyme	1,093	2.21	2.23	26	2.4%
Middlefield	1,711	2.56	2.21	48	2.8%
Middletown	19,187	2.21	1.64	1,926	10.0%
Old Lyme	3,215	2.32	2.05	44	1.4%
Old Saybrook	4,255	2.36	1.92	195	4.6%
Portland	3,930	2.35	1.98	216	5.5%
Westbrook	2,873	2.37	2.25	145	5.0%

Source: 2013—2017 American Community Survey 5-year Estimates

TABLE 2.5 Regional Income, 2017

Geography	Median Household Income	Median Family Income	Per Capita Income
United States	$57,652	$70,850	$31,177
Connecticut	$73,781	$93,800	$41,365
Middlesex County	$81,673	$104,985	$43,695
New London County	$69,411	$85,198	$36,881
Chester	$86,675	$118,846	$45,195
Clinton	$76,509	$89,967	$39,713
Cromwell	$85,856	$103,644	$45,954
Deep River	$69,028	$97,614	$44,101
Durham	$116,232	$122,450	$55,296
East Haddam	$78,177	$97,801	$40,292
East Hampton	$99,104	$116,790	$43,358
Essex	$87,857	$121,508	$55,048
Haddam	$105,920	$122,332	$48,008
Killingworth	$113,413	$130,263	$50,503
Lyme	$84,922	$95,469	$61,367
Middlefield	$103,844	$123,021	$45,752
Middletown	$63,914	$87,204	$35,992
Old Lyme	$95,175	$120,417	$55,056
Old Saybrook	$74,185	$89,449	$44,026
Portland	$88,433	$109,593	$49,280
Westbrook	$95,583	$131,196	$58,608

Source: 2013—2017 American Community Survey 5-year Estimates

likely to possess a greater number of vehicles than those households with lower incomes. As a result, lower income households are more likely to be dependent on public transportation than personal vehicles. Table 2.4 shows the relationship between persons and vehicles per household, and the number of households without a vehicle.

Of the region's seventeen towns, Durham has the highest vehicle to home ratio with an average of 2.51 vehicles per home. Durham is also home to the fewest households without cars at 0.0% of all residences. The towns with the largest number of zero vehicle homes are Middletown (1,926), Cromwell (419), and Clinton (247).

Households without cars, as well as households with only one car, must be afforded convenient access to public transportation. Table 2.4 indicates of the number of vehicles in relation to the number of licensed drivers in each town. The total number of registrations includes commercial, combination, motorcycles, campers, and other vehicles, all of which have been registered for roadways by the State DMV.

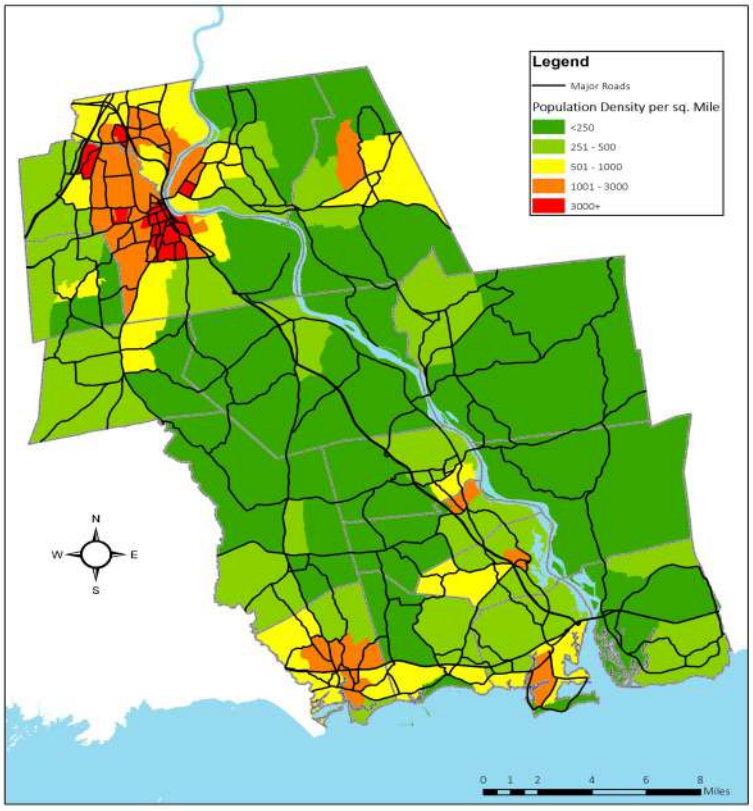
Regional and municipal household, family, and per capita incomes are outlined in Table 2.5. These factors provide an indication of household mobility level, since lower income persons and households tend to be less mobile by

TABLE 2.6 Regional Poverty and Public Assistance, 2017

	Percent Below Poverty Level				Percent of Households		
Geography	Total Population	All Families	Under 18 years	65 years and over	With Cash Assistance or SNAP	Below 150% Poverty Level	Below 50% Poverty Level
Connecticut	10.1%	7.0%	13.5%	7.1%	16.1%	16.3%	4.7%
LCRVR	6.9%	4.3%	7.8%	4.8%	10.1%	11.4%	3.3%
Chester	4.0%	1.5%	4.0%	2.0%	5.7%	7.1%	1.0%
Clinton	8.5%	4.7%	9.2%	7.0%	8.6%	13.4%	4.9%
Cromwell	5.4%	3.1%	7.1%	5.5%	9.2%	9.1%	1.5%
Deep River	6.0%	3.8%	7.0%	3.0%	6.7%	10.0%	2.0%
Durham	3.4%	0.9%	0.0%	3.2%	3.6%	4.3%	3.1%
East Haddam	4.8%	3.3%	5.0%	4.3%	9.0%	11.5%	2.1%
East Hampton	5.7%	2.3%	4.8%	5.0%	5.6%	9.4%	4.3%
Essex	5.0%	0.6%	2.7%	2.1%	5.3%	9.9%	2.1%
Haddam	4.6%	3.7%	3.5%	0.9%	5.4%	7.5%	2.0%
Killingworth	3.4%	2.5%	2.8%	1.2%	4.9%	4.6%	2.2%
Lyme	2.2%	0.0%	0.0%	1.6%	1.1%	6.9%	0.8%
Middlefield	6.4%	2.9%	12.6%	4.6%	11.2%	9.0%	5.1%
Middletown	11.3%	9.3%	15.5%	8.0%	19.2%	17.5%	4.7%
Old Lyme	2.7%	1.4%	2.7%	4.0%	4.1%	6.6%	1.3%
Old Saybrook	4.8%	3.2%	2.9%	7.3%	7.3%	10.9%	3.3%
Portland	7.3%	2.5%	9.3%	3.3%	7.3%	10.0%	1.7%
Westbrook	7.8%	4.8%	3.3%	2.3%	7.5%	12.9%	5.6%

Source: 2012—2016 American Community Survey 5-year Estimates

MAP 2.1 LCRV Region Population Density



Source: U.S. Census Bureau, American Community Survey (2008-2012) 5-year Estimates

D. POPULATION DENSITY

The population density of an area should be considered in developing transportation plans. As density increases, so does the level of economic activity, resulting in a greater demand for public amenities (i.e., water & sewer, schools, etc.), and an increase in issues related to traffic congestion. Thus, traffic congestion can be considered a negative aspect of increasing population density. However, relatively high population densities will generally support public transportation services by providing a large pool of riders to allow the transit system to be economically viable.

Table 2.7 shows that the LCRV region's population density has increased each decade from 1970 to 2010. The population of the LCRV region declined from 2010 to 2017 resulting in a slight decrease in population density for most municipalities. In 2017, there were an estimated 410 residents living in each square mile of the region. The regional population density is significantly less than the state average of 742 residents per square mile. The areas with the highest population densities are Middletown, Crom-

personal vehicle and more dependent on public transportation systems.

Fifteen of the seventeen municipalities in the LCRV region have annual median household income estimates (2017) that exceed the state average. These municipalities are relatively high income earning areas when compared to the state and nearby regions.

Table 2.6 includes data regarding regional poverty and social assistance. As of 2017, 6.9 % of the total population in the LCRV region was below the poverty level, compared to 10.1 % for the state as a whole. Middletown, Clinton, and Westbrook have the highest percentage of residents living in poverty in the LCRV region. Of the region's population younger than 18 years, 7.8 % live below the poverty level, and 4.8 % of the elderly population in the LCRV region are below the poverty level.

TABLE 2.7 Population Density in the LCRV Region, 1980—2017

Geography	Land Area (Sq. Miles)	Population Density Per Square Mile				
		1980	1990	2000	2010	2017
Connecticut	4844.1	642	679	703	738	742
LCRVR	424.2	323	358	388	417	410
Chester	16.0	192	214	234	250	249*
Clinton	16.3	687	783	803	813	800
Cromwell	12.4	828	991	1,038	1,129	1,131
Deep River	13.6	294	319	339	340	334
Durham	23.6	218	243	281	313	309
East Haddam	54.3	104	123	153	168	167
East Hampton	35.6	241	293	375	364	362
Essex	10.4	488	568	625	643	633
Haddam	44.0	145	158	163	190	189
Killingworth	35.3	113	136	170	185	182
Lyme	31.9	57	61	63	75	76
Middlefield	12.7	299	309	331	348	347
Middletown	40.9	955	1,046	1,055	1,189	1,143
Old Lyme	23.1	267	283	321	329	324
Old Saybrook	15.0	619	637	691	683	677
Portland	23.4	358	360	373	406	401
Westbrook	15.7	332	345	401	442	441

Sources: 1980, 1990, 2000, 2010 Decennial Census of Population and Housing, 2013-2017 American Community Survey 5-year Estimates

well, and Clinton. The areas with the lowest population densities are Lyme, East Haddam, Killingworth and Haddam, all with less than 200 individuals per square mile. (See Map 2.1 on previous page.)

E. EMPLOYMENT TRENDS

The economic base in the LCRV region includes a diverse set of industries and employment centers. As of 2015, the region was home to 5,092 firms, the majority categorized as "retail trade". Based on data from the Census Bureau's Longitudinal Employer-Household Dynamics database, 69,423 individuals were employed in the LCRV region in 2015. Of those employed in the region, 18.9 % were employed in the health care and social assistance sector, followed by 13.1 % in the manufacturing sector. Table 2.9 lists the five largest employers by town. Of the 85 firms listed, 18 are in the manufacturing sector, and 12 are in the health care sector. Many of the largest employers in the region are located in Middletown, including Middlesex Hospital, Connecticut Valley Hospital, Wesleyan University, and FedEx Ground, which employs 722 people in a new facility built in 2018. The region's largest employer outside of Middletown is the Lee Company which manufactures hydraulic equipment in their facility on Pettipaug Road in Westbrook. In many of the LCRV region municipalities, the public schools and chain supermarkets are the largest employers. Significant clusters of retail jobs can be found in the region's two outlet malls, Clinton Crossing in Clinton and Tanger Outlets in Westbrook, both located near I-95. More business and employment sector data is available in Tables 2.8 & 2.9.

In 2015, the region's workforce totaled 86,925 individuals, a larger number than those individuals employed within the LCRV region. The majority of LCRV region residents (66.2 %) commuted outside of the region for work. The majority of the region's workers travel north-bound for work, with 11.0 % employed in Middletown and 8.3 % in Hartford. Meriden, East Hartford, New Britain, and Newington are also large employment hubs for the region's residents. With easy access to I-95 for the southernmost municipalities, it is surprising that only 4.2 % of the region's workers commute to New Haven, 1.1 % to Groton, and 1.0 % to New London. See Maps 2.2 and 2.3 for a visual depiction of the region's travel to work flows.

These commuting trends call for better connectivity between the region and employment hubs to the North. The demand for better connectivity is evidenced by the frequent conges-

TABLE 2.8 Jobs & Workers in the LCRV Region by Sector, 2015

Sector	Jobs in the Region		Workers Residing in the Region	
	Count	Share	Count	Share
Total	69,423	100.0%	86,925	100.0%
Agriculture, Forestry, Fishing and Hunting	457	0.7%	324	0.4%
Mining, Quarrying, and Oil and Gas Extraction	12	0.0%	22	0.0%
Utilities	425	0.6%	581	0.7%
Construction	3,537	5.1%	3,573	4.1%
Manufacturing	9,128	13.1%	9,305	10.7%
Wholesale Trade	2,982	4.3%	3,823	4.4%
Retail Trade	8,503	12.2%	9,292	10.7%
Transportation and Warehousing	1,230	1.8%	1,836	2.1%
Information	829	1.2%	1,817	2.1%
Finance and Insurance	1,851	2.7%	5,642	6.5%
Real Estate and Rental and Leasing	555	0.8%	900	1.0%
Professional, Scientific, and Technical Services	3,013	4.3%	5,369	6.2%
Management of Companies and Enterprises	1,245	1.8%	1,566	1.8%
Administration & Support, Waste Management and Remediation	2,578	3.7%	3,545	4.1%
Educational Services	7,441	10.7%	10,205	11.7%
Health Care and Social Assistance	13,108	18.9%	14,387	16.6%
Arts, Entertainment, and Recreation	1,030	1.5%	1,520	1.7%
Accommodation and Food Services	6,122	8.8%	6,026	6.9%
Other Services (excluding Public Administration)	2,800	4.0%	2,999	3.5%
Public Administration	2,577	3.7%	4,193	4.8%

Source: U.S. Census Bureau (2015) LODES On the Map

TABLE 2.9 Top Five Employers by Town, 2017

Chester	Whelen Engineering	Greenwald Industries	Roto Frank	Camp Hazen	Norma Terris Theatre
Clinton	Stop and Shop	Shop Rite	Joel School	Morgan School	National Sintered Alloys
Cromwell	Stop and Shop	Radisson	Lowe's	Apple Rehab	Apria Healthcare
Deep River	Adam's	Hale-Ray Middle School	Silgan Plastics	GBR Systems	Deep River Elementary School
Durham	Hobson Motzer	Durham Manufacturing	Coginchaug High School	Brewster School	Strong School
East Haddam	Chestelm Health and Rehab	New England Propeller	Goodspeed Theater	Hale-Ray High School	Hale-Ray Middle School
East Hampton	American Distilling	Stop and Shop	Cobalt Healthcare & Rehab Center	East Hampton High School	East Hampton Memorial School
Essex	Essex Steam Train	Underwater Construction	Essex Meadows	L.C. Doane	Tower Labs
Haddam	Saybrook at Haddam	Haddam Elementary School	Burr District Elementary School	Haddam-Killingworth High School	Higganum Family Medical Group
Killingworth	Killingworth Elementary School	Killingworth True Value	Sunset Limousine	Cooking Company	Killingworth Ambulance
Lyme	H.P. Broom Housewright Inc.	Hadlyme Public Hall	Countryside Realty	Armadillo Dumpster	Flanders Diner
Middlefield	Ametek Zygo	Marquee Events	Cooper-Atkins	Lyman Orchards	Memorial Middle School
Middletown	Connecticut Valley Hospital	Middlesex Hospital	Wesleyan University	Fed Ex	Whiting Forensic Institute
Old Lyme	Big Y	Center School	Mile Creek School	Lyme-Old Lyme Public Schools	Old Lyme Golf Course
Old Saybrook	Big Y	Gladeview	Saybrook Convalescent	Old Saybrook Middle School	Pathway Lighting
Portland	Standard-Knapp	YMCA	Roncalli Health Care	Saint Clement's Castle	Valley View School
Westbrook	Lee Company	Water's Edge Resort and Spa	Shoreline Medical Center	YMCA	Clinton Nurseries

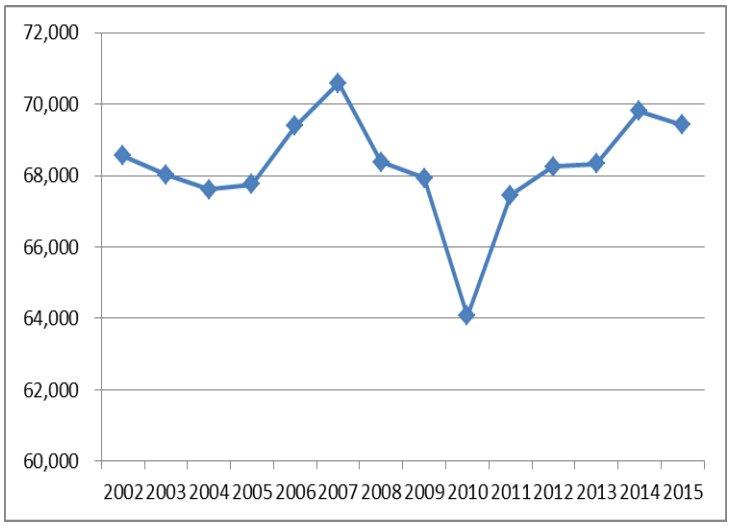
Source: Connecticut Department of Labor (2017). Labor Market Information.

tion during commuting hours on Route 9 in the Middletown area, as well as traffic build-up on the I-91 on and off ramps in Cromwell.

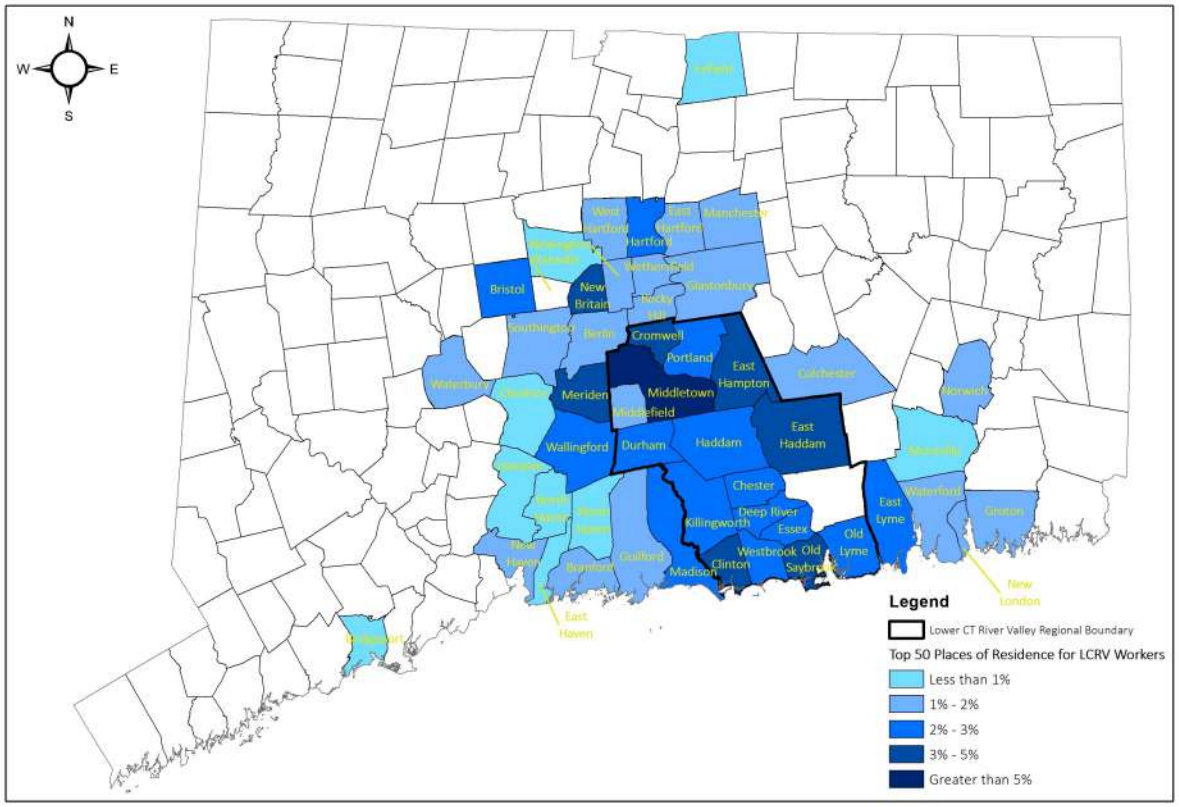
Following the recession of 2007/2008, employment within the region decreased but has since recovered slightly as of 2015. The biggest contributor to decreasing employment (68.5%) was in the financial sector . The share of jobs in the manufacturing sector has followed a downward trend while health care and social service jobs have steadily increased. Education, retail, and accommodation and food services employment has remained relatively constant following the recession. Chart 2.1 depicts the total number of jobs in the region from 2002 to 2015.

Regional employment rates have increased steadily since the Great Recession and have now approached pre-recession levels. The unemployment rates have mirrored those of the state, although tracking one-half to one percent less.

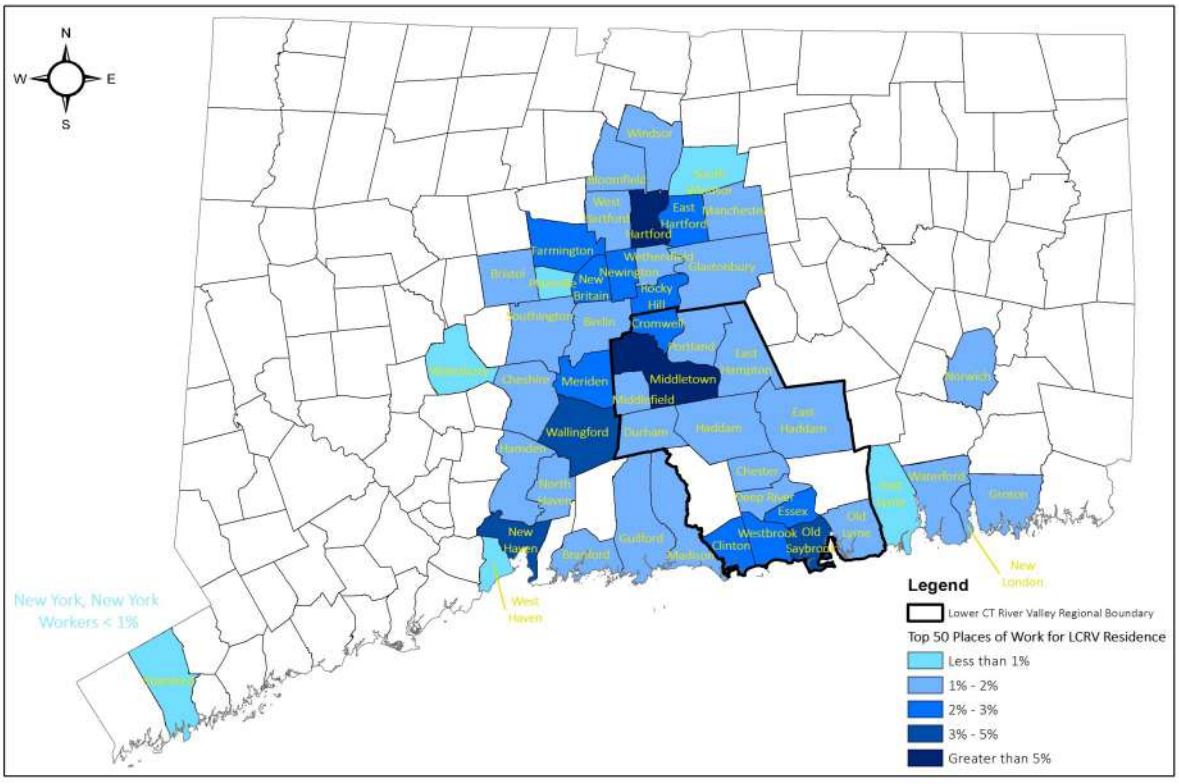
CHART 2.1 Total Number of Jobs in LCRVR, 2002 to 2015



MAP 2.2 Top 50 Places of Residence for LCRV Region Workers



MAP 2.3 Top 50 Places of Work for LCRV Region Residents



Source: U.S. Census Bureau, Longitudinal Employer-Household Dynamics, "On The Map" Tool (2015)

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The Essex Steam Train just north of Deep River Landing.

Chapter 3.

EXISTING TRANSPORTATION NETWORK

A. INTRODUCTION
B. TRANSIT SYSTEM
C. HIGHWAYS
D. BRIDGES
E. WATERWAYS
F. AIRPORTS
G. BICYCLES, PEDESTRIANS & TRAILS
H. AGRICULTURE

A. EXISTING TRANSPORTION NETWORK

The transportation network of the Lower Connecticut River Valley (LCRV) region reflects the history, topography, and settlement patterns of the region. The LCRV region is defined by the Connecticut River which drove the development of the communities along the river and still plays an important role in the region's economy. The region's expressways (I-95, Rte. 9, and I-91), state routes, and local roads make up the majority of the region's transportation infrastructure.

The density of roads in the region reflects the population density of the area. From Middletown with its urban center, to Cromwell, Portland, and East Hampton which are suburban in character, the northern area of the region contains a denser network of town roads, bridges and urban streets. The remaining majority of the region is more rural in nature, with a less dense street network. Other significant components of the region's transportation network include railroads, public transit, bicycle routes, and sidewalks.

B. TRANSIT SYSTEM

RAIL

The railroads are an important component of the LCRV region's multi-modal transportation system and are vital to the regional economy. Amtrak, CTDOT, Tilcon, and CTDEEP all own rail lines in the region on which passenger, tourist, and freight services are provided. Map 3.1 shows all rail lines and stations within the LCRV region.

Amtrak

The national passenger railroad company, Amtrak, provides rail service along the Northeast Corridor between Boston, MA and Washington, DC on the Acela Express and between Boston and Roanoke/Norfolk/Newport News on the Northeast Regional. There is one stop within the LCRV region at Old Saybrook. This station was originally constructed in 1873 by the New Haven Railroad. Normal service between New York City and Boston, with intermediate stops, is approximately four hours. Based on the schedule, effective June, 9, 2018, average weekday service between Old Saybrook and Boston (South Station) is about two hours and thirteen minutes. Average weekday service between Old Saybrook and New York (Penn Station) is about two hours and eighteen minutes. Average weekday service between Old Saybrook and Washington DC (Union Station) is approximately six hours and seven minutes. Amtrak owns a portion of the Northeast Corridor from New Haven to the Connecticut/Rhode Island state line, including the approximately eighteen miles in the LCRV region.

Shoreline East

Shoreline East (SLE) is a commuter rail service of the Connecticut Department of Transportation (CTDOT) between New Haven and New London with stops in Branford, Guilford, Madison, Clinton, Westbrook and Old Saybrook. Effective July 23, 2018, some trains are being replaced with bus service. Buses will depart earlier than the train they are replacing in order to arrive in New Haven in time to make scheduled connecting services.

As of July23, 2018, westbound service consists of four buses from Clinton to New Haven, seven buses from Old Saybrook to New Haven, seven trains from New London to New Haven, and four trains from Old Saybrook to New Haven for a total of twenty-two trips on weekdays. These trips connect to thirty Metro North trains heading to New York City. Eastbound service consists of five buses from New Haven to Clinton, eight buses from New Haven to Old Saybrook, five trains from New Haven to New London, and five trains from New Haven to Old Saybrook for a total of twenty-three trips on weekdays. These trips connect from thirty-six Metro North trains heading out of New York City.

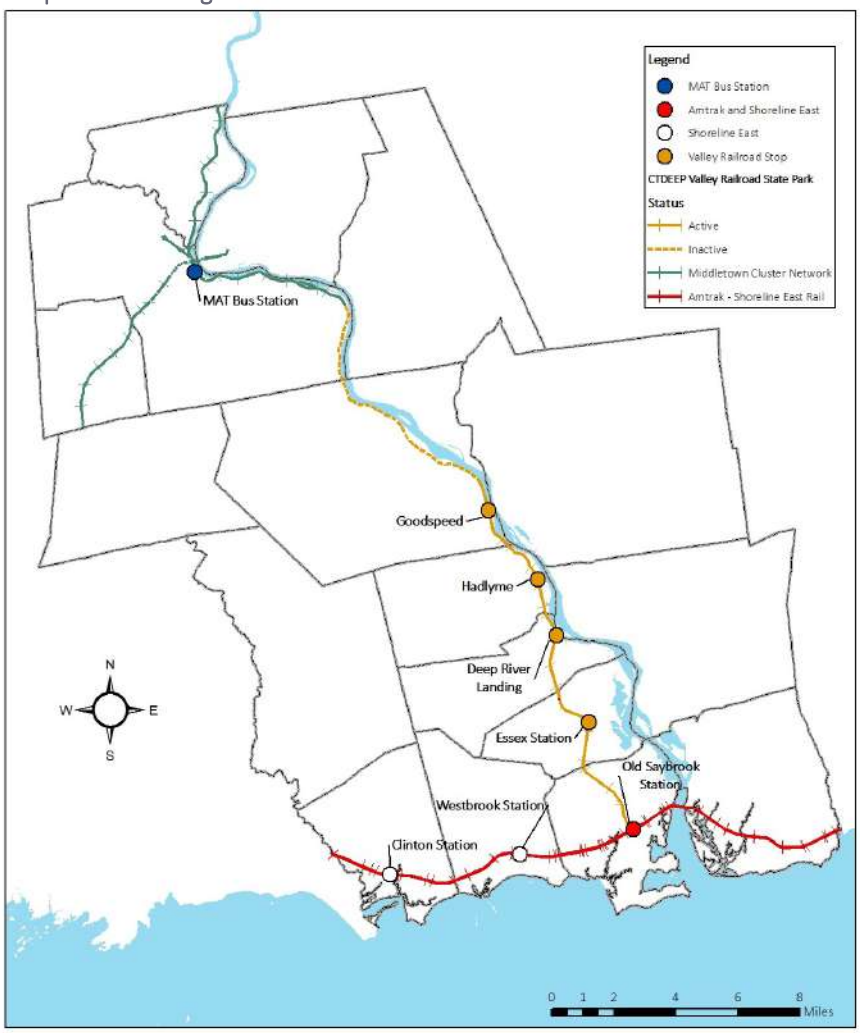
Weekend and holiday service consists of eight westbound trains between New London and New Haven and two between Old Saybrook and New Haven. There are eight eastbound trains between New Haven and New London and three between New Haven and Old Saybrook all connecting to Metro North trains. These figures do not include Amtrak trains operating on the SLE line. Through a cooperative agreement with CTDOT, AMTRAK honors subscription Shoreline East riders and allows bicycles on all trains. The SLE tracks are constructed with continuously welded rail and electrical power available via overhead catenary lines. The tracks are maintained at Federal Railroad Administration Class 6 and Class 7 standards. Therefore the line is capable of 125 mph operations but the current equipment's allowable operating speed is 80 mph.

SLE rolling stock includes thirty-three Mafersa electric push/pull coaches, six GP40-2H locomotives, and eight P40 locomotives. The locomotives are diesel-electric. The diesel engine is directly coupled with an alternator that generates electricity which is distributed to traction motors located on each wheel set. CTDOT acquired four GE P40DC locomotives from New Jersey Transit in 2015.

In January 2018, CTDOT awarded a contract to Amtrak to overhaul all twelve P40DC locomotives. The GP40-2H locomotives, sent to NRE for rebuilding in 2017 and 2018, are to be used use on the new Hartford Line service. CTDOT plans call for the Kawasaki M8 to replace most or all of the locomotives and coaches currently in service on Shore Line East.

In 2013, 657,832 passenger trips were recorded for Shoreline East between New Haven, Old Saybrook, and New London. This is an increase of 12.4% from 585,218 trips in 2010. Shoreline East provides service to three train stations in the LCRV Region: Clinton, Westbrook, and Old Saybrook. SLE service is expected to double between New Haven and Old Saybrook by the year 2030. Increased service will require double side or up-and-over commuter platforms and agreement by CTDEEP regarding the number of trains operating over movable bridges.

Map 3.1 LCRV Region Rail Service



Source: CT Department of Energy and Environmental Protection, RiverCOG

Shoreline Freight

Freight service along the shoreline is operated by Providence and Worcester (P&W) Railroad with options for freight service up to six daily trips or as allowed through CTDEEP permits. P&W was acquired by the Genesee and Wyoming (G&W) Railroad in 2016.

Middletown Rail Cluster

The Middletown Cluster consists of four lines originating from the City of Middletown. The State of Connecticut owns these lines which are maintained to FRA Class 1 or Class 2 track standards. There is no passenger or through freight service on these lines, only freight service provided by G&W.

The Middletown Rail Cluster is comprised of the following four lines:

- The Portland Line travels 1 mile east from Middletown across the Connecticut River into Portland.
- The East Berlin Line travels 1.1 miles northwest from the Middletown diamond towards Berlin. The Middletown diamond is a superimposed pair of crossovers, resembling the letter "X", permitting travel in either direction between a pair of parallel tracks.
- The Middletown Secondary Line traverses 7.3 miles southwest from the Middletown diamond through Middletown, Middlefield, and Durham to Reeds Gap. From Reeds Gap to North Haven, the line is owned by Tilcon and operated by the G&W Railroad.
- The Laurel Track traverses 5.5 miles southeast from Middletown towards Haddam and connects to the CTDEEP owned Valley Rail Line. The Laurel Track is currently out of service.

Wethersfield Secondary Line

The Wethersfield Secondary Line traverses 16.6 miles north from the Middletown Cluster to the Hartford inter-

change. This line was inactive south of Hartford for approximately twenty years, but service recommenced in 2002 following restoration by P&W and the Department of Transportation. P&W/G&W provides weekly through freight service between Middletown and Hartford on this line.

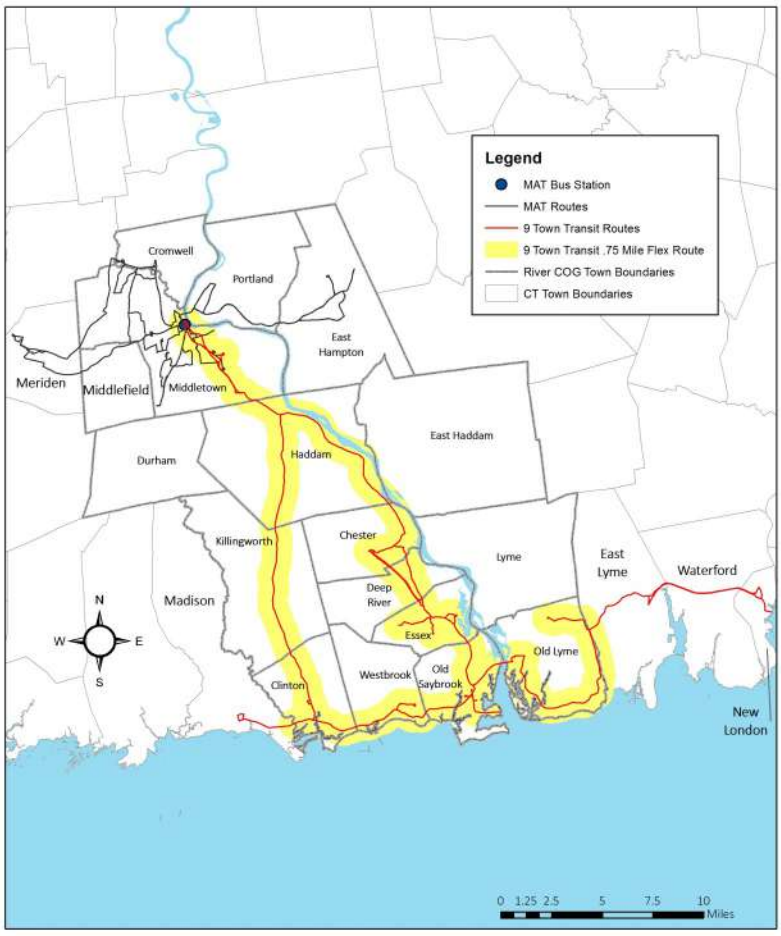
Valley Rail Line

The Valley Rail Line traverses 22.5 miles from a connection with Amtrak's Northeast Corridor at Old Saybrook to a connection with the Laurel Track in southern Middletown. The Valley Railroad Company has operated tourist train passenger service since 1971 between Old Saybrook and Haddam using historic locomotives and coaches. According to the Valley Railroad, approximately 140,000 passengers ride the line a year. Almost all passengers board and alight at the Valley Railroad depot in Essex. The Valley Rail Line is out of service between mile post 12.9 in Haddam and mile post 22 in Middletown, although this portion of the right of way is cleared for maintenance equipment, vegetation control, and property surveillance. The line is a state park owned by CTDEEP and leased to the Valley Railroad Company. The property was purchased with federal conservation funds for public recreational use. The Valley Railroad Company has worked with CTDEEP on property encroachment issues, particularly on the out-of-service portion of the line in Haddam and the Maromas section of Middletown. The Valley Railroad Company does not currently carry freight but retains the right to do so in its lease with CTDEEP. The track from Old Saybrook to Essex is mostly 78 pound rail maintained to FRA Class 1 standard which provides for 10 mph freight speeds. From Essex to Chester there are significant portions of 107 pound rail and stone ballast, all installed and funded by Valley Railroad Company. This portion is maintained to FRA Class 2 standards providing for 25 mph freight speeds.

The 2014 Valley Railroad State Park Scenic Corridor Study analyzes the regional and local context of the northern nine miles of the Valley Rail Line corridor and the existing conditions along the corridor between Tylerville and the Maromas area of Middletown. Approximately eight miles of this rail has not been used for train travel since 1968. The report provides conceptual designs and design guidelines for development of a multiuse trail along the corridor. The study examines the role that this asset should play in regional planning efforts related to transportation, conservation, and economic development.

The 2015 Valley Railroad State Park Economic Impacts Study identifies various costs and impacts of future uses of the Connecticut Valley Railroad State Park right of way to determine the future best use or uses of the corridor. These uses include construction of a multi-use trail, expanded use of the rail line for freight purposes, expanded uses of the rail line for passenger rail purposes, or extension of the rail line for continued scenic rail service. The study identifies costs and benefits related to the future uses contemplated for the corridor, as well as conditions that bring into question the feasibility of potential future uses.

Map 3.2 LCRV Region Public Bus Routes Fixed and Flex Systems



Source: CT Department of Transportation, RiverCOG, Middletown Area Transit, Estuary Transit District

Rail Parking

Parking at the region's three rail stations (Clinton, Westbrook, and Old Saybrook) is a continuing issue. Currently, Clinton's parking capacity is 125 spaces, and the station is scheduled to be upgraded over the next few years. Westbrook's updated rail station, which opened in March 2014, has 210 spaces, a significant increase from the previous forty spaces. Old Saybrook's train station has designated parking for Shoreline East with 137 spaces and approximately seventy-five spaces for Amtrak parking. Station parking is free and unpatrolled at the three stations. In addition, CTDOT has constructed a 199 space parking lot adjacent to the track on the west side of North Main Street which opened in 2016. Sidewalks, amenities, and roadway improvements along North Main were completed in 2018 using LOTCIP funds to improve access to the station. The new lot increased total parking to 324 spaces and allowed overnight parking for the first time. As CTDOT improves rail parking and station access in all three rail lots connecting to Estuary Transit District's Shoreline Route, bicycle storage and pedestrian connections become priorities for the region.

PUBLIC BUS

Middletown Transit District

Map 3.2 shows the public bus routes within the LCRV Region including both the Middletown Transit District and the Estuary Transit District. Middletown Transit District (MTD) operates five regularly scheduled bus routes (routes A-E) in the city of Middletown and Cromwell and a bus terminal in downtown Middletown. MTD also operates one rural transportation route (route F) that serves residents in the towns of Portland and East Hampton. In cooperation with the Meriden Transit District, MTD provides a route (M-Link) that connects Middletown with Meriden. Routes H-South, and I-North are a combination of the regular routes providing service from 7:00 p.m. to 11:00 p.m. and are valuable to workers in commercial areas of the city. Routes S-1, S-2, and S-3 are Saturday only routes. Route S-1 is an expanded A route/ Saybrook Road. Route S-2 is a combined B and C Wesleyan Hills/Washington Street route, and S-3 is a combined D and E Newfield Street/Westlake Drive route. In cooperation with the Estuary Transit District, service is also available from the Old Saybrook railroad station to the MTD terminal in Middletown.

MTD also provides paratransit services for elderly and handicapped citizens. Door-to-door bus service is provided to eligible persons with disabilities in accordance to the ADA Act of 1990. Service is similar to the level provided to individuals without disabilities who use the fixed route bus system and operates Monday through Saturday. Dial-A-Ride service is provided for persons over sixty years of age in Durham, East Hampton, Middlefield, Middletown, and Portland beyond three quarters of a mile of the fixed routes. Appointments must be made one day in advance and the fare is $3.50. In order to qualify for either of these services, one must first fill out an application and be accepted into the system after eligibility requirements are satisfied. All MTD vehicles are wheelchair accessible and have bicycle racks.

Estuary Transit District

The Estuary Transit District operates five bus routes as Nine Town Transit (9TT). Route 641 serves Old Saybrook to Madison via RT 1. Route 642 serves Old Saybrook to Chester via RT 154. Route 643 serves Old Saybrook to New London via RT 156. Route 644 serves Old Saybrook to Middletown via RT 154. RT 645 serves Madison to Middletown via RT 81. These routes operate as flex route services deviating up to three quarters of a mile off the primary route. Beyond established bus stops, potential riders may flag down a bus at any point along the route where it is safe for the bus to stop.

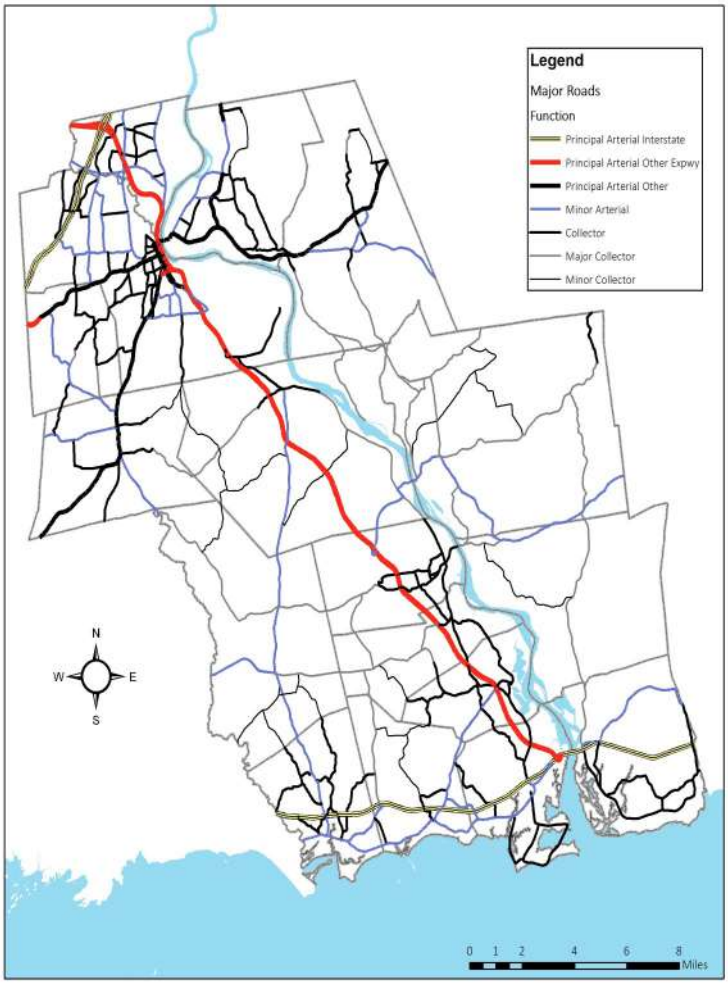
ADA paratransit services are open to the public, however many neighboring districts only provide door-to-door service for people who are ADA paratransit certified. This is a service for people who are unable to use a fixed route bus for certain trips. ADA paratransit certification will also qualify riders for half-price taxi vouchers. For trips to or from destinations not within a deviated fixed route service area or for persons who have difficulty using the deviated fixed route because of a disability, 9TT also operates door-to-door Dial-A-Ride service. With one day advance reservation, Dial-A-Ride provides transportation from the door of your pick-up location to the door of your destination anywhere within the towns of Chester, Clinton, Deep River, Durham, Essex, East Haddam, Haddam, Killingworth, Lyme, Old Lyme, Old Saybrook and Westbrook. Trips may also be made to limited portions of Middletown and Colchester, provided they start or end in one of the towns listed.

Nine Town Transit has 13 buses, all equipped with bicycle racks and accessible to persons with disabilities. Transfers to connecting buses are issued free of charge.

CTTransit

Connecticut Transit's Hartford Division operates one local bus route (55) and two commuter express bus routes (906 and 921) on weekdays. Route 55 runs between

Map 3.3 LCRV Region Functional Classification of Roadways



Source: CT Department of Transportation

Hartford and Middletown via the Silas Deane Highway with stops in Wethersfield, Rocky Hill and Cromwell. Route 906 runs between Hartford and Cromwell, and Route 921 between Hartford and Old Saybrook via RT 9 and I-91. Free transfers are available between CTTransit routes, MTD, and 9TT routes. CTTransit buses are equipped with bike racks.

C. HIGHWAYS

EXISTING NETWORK

The LCRV region contains 1,514 miles of actively maintained roads. Of this total, 314 miles (20.7%) are owned and maintained by CTDOT and the remaining 1,200 miles (79.3%) are maintained by LCVR municipalities. Middletown has the largest amount of roads in the region with 229.8 miles and Middlefield has the smallest in the region with 46.1 miles.

Of the region's state owned roadways, 253 miles are contiguous two or four lane state highways and 58 miles are four to six lane divided limited access expressways. There are another 27 miles of state-owned expressway ramps and connectors.

The region's most traveled expressway is Interstate 91, connecting New Haven and Hartford, and passing through Middletown and Cromwell in the northwest corner of the LCRV region. This five mile segment of highway had average daily traffic (ADT) between 107,100 and 151,500 in 2015.

I-95 is the LCRV region's second most heavily traveled expressway. The region's section of I-95 travels approximately 16.9 miles east to west through the towns of Old Lyme, Old Saybrook, Westbrook, and Clinton, crossing the Connecticut River on the Baldwin Bridge. This section of I-95 connects New Haven and New London and has an ADT between 52,400 and 76,000.

Connecticut Route 9 is the region's third most heavily traveled and the longest expressway with a length of approximately 30.7 miles in the LCRV region. Route 9 runs through Cromwell, Middletown, Haddam, Chester, Deep River, Essex, and Old Saybrook. Portland has access to Route 9 via the Arrigoni Bridge in Middletown. ADT's ranged between 23,600 and 68,200. Route 9 connects these municipalities to New Britain and I-84 in West Hartford.

Table 3.1 LCRV Region Functional Classification of Roadways

Functional System	Services Provided
Arterial	Provides the highest level of service at the greatest speed for the longest uninterrupted distance with some degree of access control.
Collector	Provides a less highly developed level of service at a lower speed for shorter distances by collecting traffic from local roads and connecting them with arterials.
Local	Consists of all roads not defined as arterials or collectors; primarily provides access to land with little or no through movement.

Table 3.2 LCRV Region Functional Classification of Roadways

Interstate	Provides a network of limited access, divided highways offering high levels of mobility while linking the major urban areas
Other Freeway/ Expressway	Designed as directional travel lanes, usually separated by some type of physical barrier with access and egress points that are limited to on- and off-ramp locations or a very limited number of at-grade intersections.
Principal Arterial	Major activity centers, have the highest volumes, and longest trip desires.
Minor Arterial	Serves trips of moderate lengths, with a greater emphasis on land access, and a lower level of traffic mobility and primary bus routes
Major Collector	Collect traffic from local streets and direct it to the arterials.
Minor Collector	Link traffic generators such as neighborhood stores with outlying rural areas and collect traffic from local roads
Local	Local streets provide direct access to abutting properties and the higher classified roadways.

FUNCTIONAL CLASSIFICATION

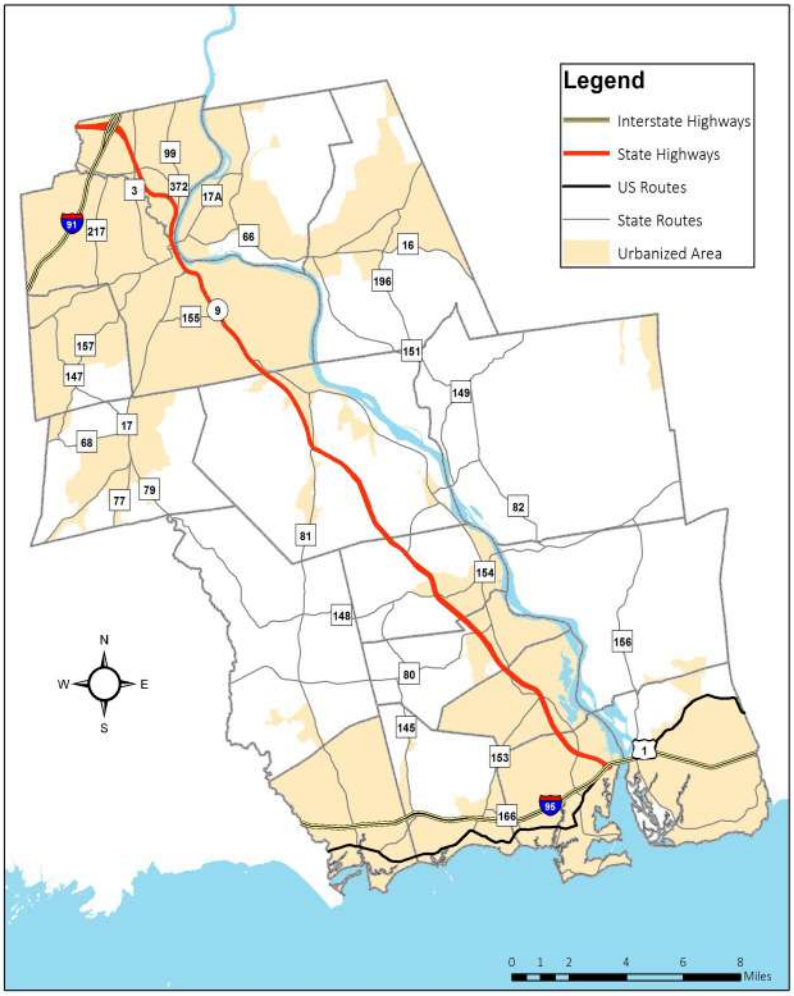
All roadways can be classified based on the character of traffic service that they provide (i.e., local or long distance) and the degree of access to adjacent land that they provide. There are three highway functional classifications: arterial, collector, and local roads. How drivers use roadways will determine both the functional classification and the requisite design and capacity of the road. Table 3.1 describes the characteristics of the three primary road classes. The Federal Highway Administration (FHWA) and CTDOT provide a more detailed classification system for Connecticut highways and roads as described in Table 3.2. A visual depiction of regional roadway classification is available in Map 3.3.

Funding eligibility for improvements and maintenance is an important element of the functional classification of roadways. Federal or State Highway funds are only designated for those roads with functional classifications of interstate, expressway, arterial, or major collector. Every ten years, coinciding with the decennial census, CTDOT and Connecticut's Metropolitan Planning Organizations review and adjust the functional classification of roadways. The functional classification of specific roads may be reviewed outside of the decennial review on an as needed basis or in conjunction with other state or local programs.

CAPACITY & CONGESTION

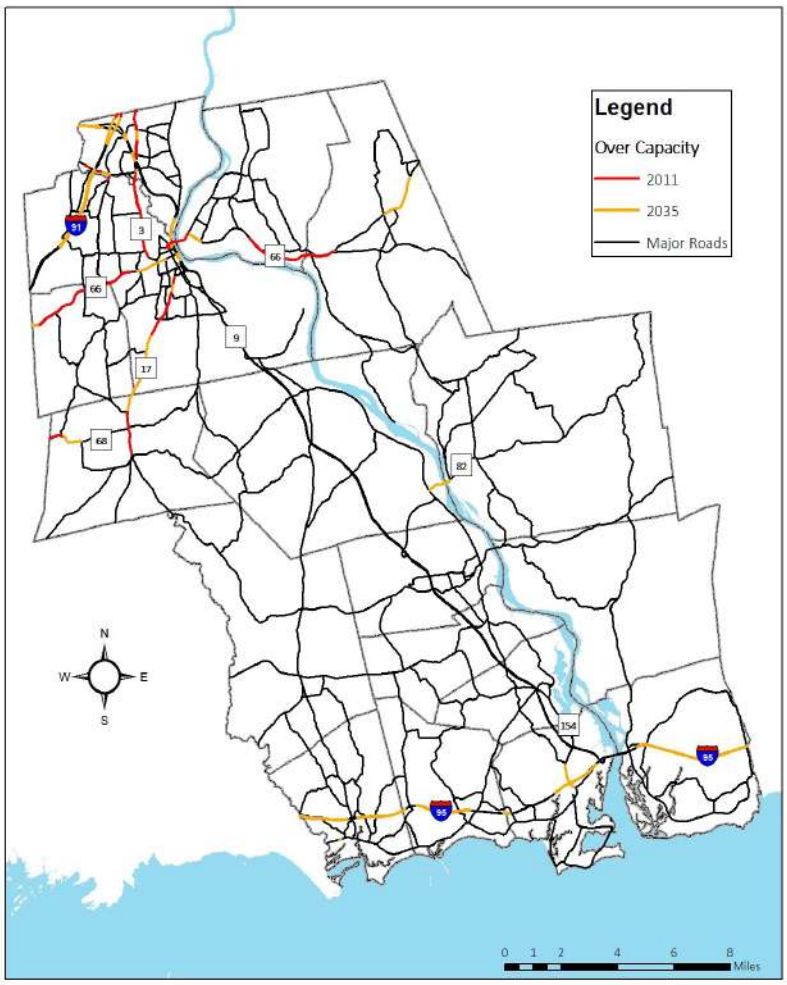
With the exception of I-95 during an accident or summer weekend, few areas of the region's road network can be considered truly congested. During the summer tourist season, the average daily traffic on Route 1 and other major connectors near the shoreline increases significantly. This occurs primarily along the Route 1 commercial corridor west of the Connecticut River and along connector routes such as Routes 153 and 154 in Old Saybrook and 156 in Old Lyme. Other areas that experience minor congestion is Route 9 in Middletown at the a.m. and p.m. peak hours primarily due to its traffic

Map 3.4 LCRV Region Roadway Network



Source: CT Department of Transportation

Map 3.5 LCRV Region Roadway Capacity



Source: CT Department of Transportation

light configuration and Routes 66 & 17 in Portland leading up toward the Arrigoni Bridge. A map of the regional roadway network is located in Map 3.4.

Capacity Analysis

Capacity analysis is a tool that helps identify roads that are congested or will become congested if current trends continue without roadway improvements. According to CTDOT, the LCRV region has many segments of highways that were near or exceeding their capacity in 2011. By 2035 it is projected that many more highway segments will be near or over capacity. See Table 3.3 for roadway capacity estimates in 2011 and 2035. As shown in Map 3.5, roadways of concern include I-95 and I-91, as well as Routes 3, 17, and 66.

If current growth patterns continue without improvements to roadways or a change in land-use policies, even larger areas of the region will experience traffic congestion in the future. In addition to improvement to infrastructure, congestion management strategies can be formulated to alleviate existing and potential congestion and enhance the mobility of people and goods. Examples of potential congestion management strategies related to roadway operations include: geometric improvements at bottlenecks, access management, signalization improvements, incident management, and special event/work zone management. Other potential alternative modes of congestion management strategies are revised transit services and ridesharing programs. Other demand management strategies could include traveler information systems, telecommuting programs, and flexible work schedules. These types of strategies would help lessen congestion when implemented along areas that are or will be over capacity.

The level of capacity was determined by the road's volume-to-capacity ratio (V/C). A V/C ratio between 0.90 and 0.99 suggests a roadway is approaching capacity, whereas ratios of 1.00 or greater are roadways that are over capacity. In 2011 there were 313.51 miles of state roadways in the region. Of those, 290.4 (92.6%) miles were under capacity, 7.0 (2.2%) miles were approaching capacity, and 16.1 (5.2%) miles were over capacity. Statewide the percentage of roadways approaching capacity is slightly greater than the region at 4.8%, and the percentage over capacity is also greater at 9.2%. Year 2035 projections by CTDOT indicate 257.3 (82.1%) miles will be under capacity, 13.8 (4.4%) miles will be approaching

TABLE 3.3 Roadway Capacity in 2011 and 2035

LCRV Region	2011	2035
Under Capacity	93%	82%
Approaching Capacity	2%	4%
Over Capacity	5%	14%
State of Connecticut	2011	2035
Under Capacity	86%	77%
Approaching Capacity	5%	5%
Over Capacity	9%	18%

TABLE 3.4 LCRV Region Commuter Lot Capacity

Municipality	Location	Capacity
Chester	RT 9 at RT 148 (exit 6)	75
Clinton	I-95 at RT 81 (exit 63)	135
Cromwell	I-91 at RT 372 (exit 21)	70
East Hampton	RT 66 at RT 16	27
Essex	RT 9 at RT 154 (exit 4)	100
Haddam	RT 9 at Beaver Meadow Road (exit 8)	25
Killingworth	RT 80 at RT 81	25
Middletown	Industrial Park Road (off RT 372)	250
Middletown	Eastern Drive (Connecticut Valley Hospital)	12
Middletown	RT 9 at Silver Street (exit 12)	86
Middletown	I-91 at Country Club Road (exit 20)	50
Old Lyme	I-95 at RT 156 (exit 70)	50
Old Lyme	I-94 at Four Mile River Road (exit 71)	28
Old Saybrook	RT 154 at CTDOT maintenance garage	37
Westbrook	I-95 at RT 153 (exit 65)	50
Westbrook	I-95 at RT 145 (exit 64)	23

capacity, and 42.4 (13.5%) miles were over capacity. Statewide, the percentage of roadways approaching capacity is greater than the region at 5.3% and the percentage over capacity is also greater at 17.4%.

Average daily traffic (ADT) on state routes is shown on Map 3.6 (p. 31). Roads that are at or approaching capacity are also the roads with the highest ADT including I-91 and I-95. Route 9 has the third highest traffic volume in the region, but typically congestion occurs only at the signals in Middletown and ramps in Cromwell.

The LCRV region has sixteen commuter parking lots located near interstates and major arterials. Ridesharing options are available through individual arrangements and CTDOT sponsored ride share programs such as CTRides. The CTTransit route #906/Cromwell Express to Hartford serves several commuter lots along Route 9 on weekdays. RiverCOG tracks commuter lot usage on a quarterly basis. Recent counts show commuter lot usage has remained steady between Fiscal Year (FY) 17 and FY 18 with about 1,740 parked vehicles per year. Quarterly counts show the lots are approximately 40% filled based on current capacity. See Table 3.4 for a list of commuter lots.

D. BRIDGES

Many state bridges in the region have been either replaced or refurbished between 2005 and 2019. The CT DOT partners with the region to identify, maintain, and replace bridges on state and local roads within the region. There are several bridges slated for replacement within the region. The challenge is to ensure that bridge design is coordinated with towns and other CTDOT departments to ensure that design accommodates users of multiple transportation modes and reflects municipal plans and goals.

CTDOT administers a bridge program in conjunction with federal programs since many bridges may be eligible for the federal funding. In the State Bridge Program, all bridges on the state highway system and

TABLE 3.5 Eligible Bridges 2018 (Continues to P. 30)

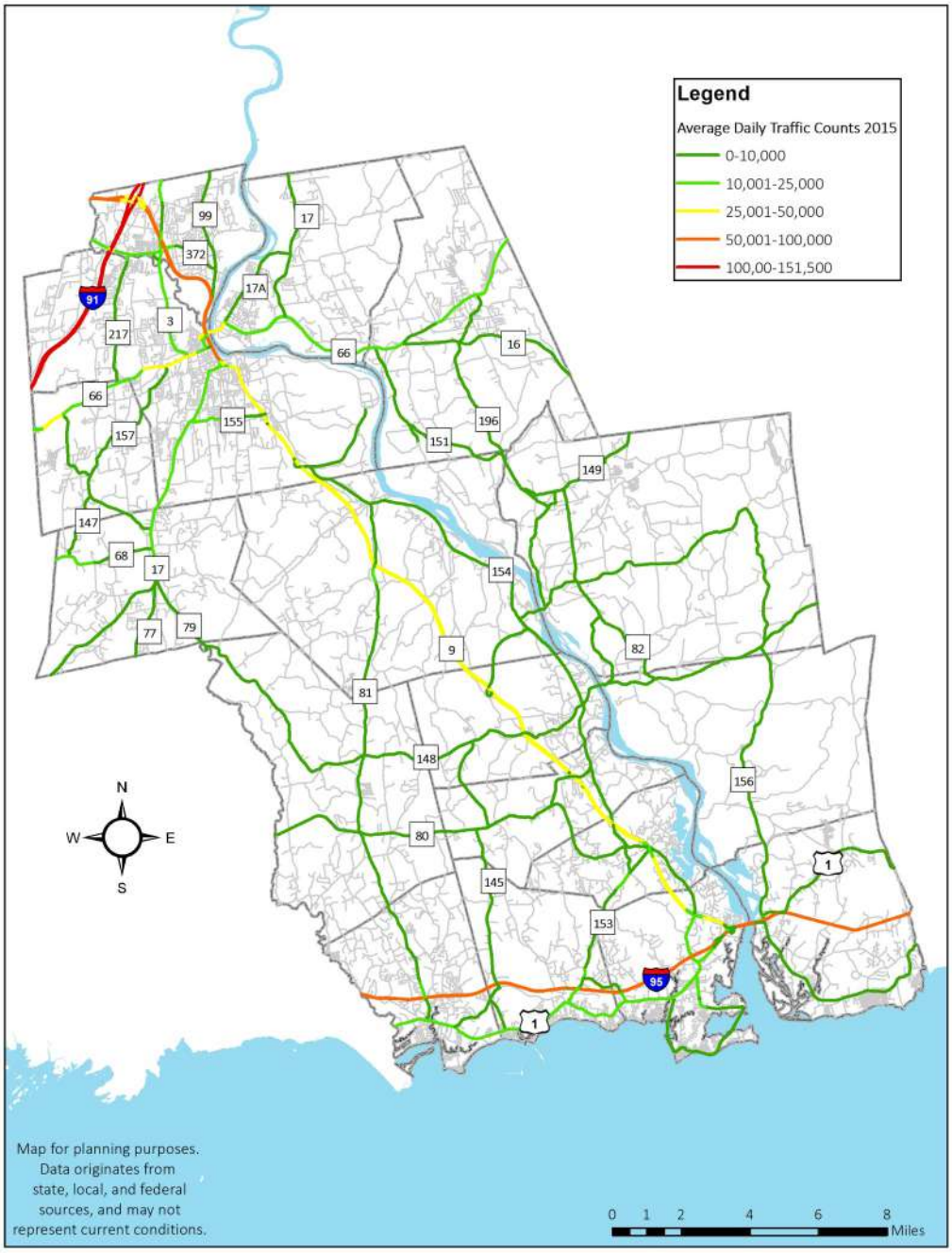
Municipality	Eligible Bridges
Chester	04608 Wig Hill Road over Pattaconk Brook 026001 Cedar Lake Road over Pattaconk Brook 026002 Bailey Road over Pattaconk Brook 026011 Dock Road over Chester Creek tributary
Clinton	04118 Beach Park Road over Hammock River 04612 Kelseytown Road over Menunketesuck River 05662 Brickyard Road over Menunketesuck River 06195 Liberty Street over Amtrak Railroad 06296 Waterside Lane over Hammock River 06956 Country Village Road over brook 027002 Cream Pot Road over Indian River 027003 Hurd Bridge Road over Indian Stream 027004 Woods Lane over Menunketesuck River 027005 Knollwood Drive over un-named stream
Deep River	04637 Union Street over Deep River 06056 Bridge Street over Deep River 122001 Tower Hill Road over un-named brook 122002 Plains Road over Deep River
Durham	04850 Maple Avenue over Allyn Brook 037001 Air Line Drive over Asmon Brook 037002 Howd Road over Sawmill Brook 037005 Indian Lane over Parmalee Brook 037006 Parmalee Hill Road over Parmalee Brook 037007 Meetinghouse Hill Road over Coginchaug River 037008 Maiden Road over stream 037009 Pisgah Road over Cream Pot Brook
East Haddam	04647 EH/Col Turnpike over Moodus Reservoir 04648 Gristmill Road over Moodus River 04649 Clark Hill Road over Roaring Brook 06126 Haywardville Road over Eight Mile River 040001 East Shore Drive over stream 040003 Falls Bashan Road over Moodus River 040004 Falls Bashan Road over Moodus River 040008 Joe Williams Road over Shady Brook 040009 Bashan Road over stream

TABLE 3.5, cont'd., Eligible Bridges 2018

East Hampton	05610 Shipyard Road over Mine Brook
	041001 White Birch Road over Fawn Hill Brook
	041002 Walnut Ave over Pocotopaug Creek
	041003 Main Street over Pocotopaug Creek
	041004 Niles Street over Pocotopaug Creek
	041005 Flat Brook Road over Flat Brook
	041006 Flat Brook Road over Flat Brook
	041007 Blacksmith Road over un-named brook
	041008 Terp Road over Pine Brook
	041009 Old Chestnut Hill Road over Pocotopaug Creek
	041011 Wopowog Street over Safstrom Brook
Essex	04356 Pond Meadow Road over Falls River
	04662 Dennison Road over Falls River
	04663 River Road over Falls River
	04664 Dennison Road over Falls River
	05288 Cheney Road over brook
	05289 Main Street over brook
	049001 Ivory Street over Falls River
	049002 Ivory Street over Falls River
	049003 Falls River Drive over Falls River
	049004 Old Deep River Road over un-named brook
Haddam	04816 Depot Road over Ponset Brook
	04817 Scovil Road over Candlewood Hill Brook
	05405 Depot Road over Candlewood Hill Brook
	05515 Jail Hill Road over Beaver Meadow Brook
	05537 Beaver Meadow Road over Beaver Meadow Brook
	06020 Thayer Road over Bible Rock Brook
	06028 Grapevine Road over Candlewood Hill Brook
	06938 Beaver Meadow Road over Beaver Meadow Brook
	060007 Candlewood Hill Road over Candlewood Hill Brook
	060008 Hidden Lake Road over Hidden Lake spillway
	060009 Wiese Albert Road over Candlewood Hill Brook
	060011 Oxbow Road over Bible Rock Brook
Killingworth	06614 Abner Lane over Pond Meadow Brook
	069001 Burr Hill Road over un-named brook
	069002 Bunell Bridge Road over Hammonassett River
	069003 Emanuel Church Road over un-named brook
	069005 Birch Mill Road over Pond Meadow Brook
	069006 Alders Bridge Road over un-named brook
	069007 Roast Meat Hill Road over Menunketesuck River
	069008 River Road over un-named brook
	069009 Paper Mill Road over Chatfield Hollow Brook
	069010 River Road over un-named brook
Lyme	04723 Mount Archer Road over Eight Mile River
	04724 Joshuatown Road over Eight Mile River
	04726 MacIntosh Road over Eight Mile River
	05818 Day Hill Road over Raging Brook
	06039 Salem Road over Eight Mile River
	074002 Beaver Brook Road over Cedar Pond Brook
	074005 Joshuatown Road over Joshua Creek
	074006 Cover Road over Hamburg Cove
	074007 Birch Mill Road over Falls Brook
	074008 Sterling City Road over Falls Brook
Middlefield	04843 Miller Road over Coginchaug River
	04844 Strickland Road over Coginchaug River
	05553 Cider Mill Road over Coginchaug River
Middletown	04187 Main Street Extension over Sumner Brook
	04189 Ridge Road over Sumner Brook
	04190 River Road over Sumner Brook
	04533 Mill Street over Sumner Brook
	04535 Middlefield Street over Coginchaug River
	04538 Miner Street over Fall Brook
	04542 Bell Street over Sawmill Brook
	05450 Mill Brook Road over Sumner Brook
	05564 Russell Street over Sumner Brook
	05957 River Road over brook
	05958 Wesleyan Hills Road over Long Hill Brook
	082001 Country Club Road over West Highland Brook
	082006 Freeman Road over un-named stream
	082009 Reservoir Road over Reservoir Brook
	082010 Bow Lane over un-named stream
	082011 Chamberlain Road over Harris Brook
	082012 Mill Brook Road over un-named stream
	082017 Anderson Road over Laurel Brook
	082022 Butternut Street over un-named stream
	082024 High Street over un-named stream
	082028 Ridgewood Road over un-named stream
	082031 Industrial Park Road over Fall Brook
	082038 Lee Street over Prout Brook
Old Lyme	04346 Button Ball Road over Amtrak Railroad
	04738 Town Woods Road over Mill Brook
	04739 Sill Lane over Mill Brook
	04747 Mile Creek Road over Blackhall River
	04818 Sill Lane over Mill Brook
	104001 Tantummaheag Road over un-named brook
	104004 McCurdy Road over Duck River
Old Saybrook	05923 Ingham Hill Road over Amtrak Railroad
	06021 Schoolhouse Road over Amtrak Railroad
	105002 Ingham Hill Road over Fishing Brook
Portland	112009 Isinglass Hill Road over un-named stream
Westbrook	03894 Old Clinton Road over un-named brook
	04807 Old Clinton Road over Patchogue River
	06084 Wesley Avenue over Patchogue River
	06658 Flat Rock Place over wetlands
	06659 Flat Rock Place over wetlands
	06660 Flat Rock Place over wetlands
	154006 Brookwood Drive over Spring Lot Brook
	154009 Toby Hill Road over Trout Brook

municipal bridges more than twenty feet in length are inspected and rated every two years. CTDOT analyzes the substructure, superstructure, deck, or culvert, and safe load capacity. The sufficiency rating is used to develop and annual ranked list of candidate bridges to be considered under the programs. This rating takes into account the condition and strength of the bridge, num-

MAP 3.6 LCRV Region Average Daily Traffic Counts 2015



Source: CT Department of Transportation

ber of vehicles using the bridge per day, and length of alternative routes if the bridge were to be closed. The service life of a rehabilitated bridge is projected to be a minimum of twenty years, and fifty years for replacements.

The Local Bridge Program is similar to the state bridge programs except that the bridges are municipally owned and are over six feet in length. Since 1985 local bridge grants for qualifying projects have been available on a sliding scale ranging from 10% to 33% of the total project cost. P.A. 16-151 includes a change of the grant rate to 50% for all municipalities and extends eligibility to bridges that are not currently structurally deficient but have other issues. These include bridges that are functionally obsolete or score in the critical range, or bridges that could benefit from minor repairs to extend their useful life. The change took effect on July 1, 2016, and the grant rate for FY17 projects is 50%. CTDOT plans to revise the program regulations for FY18 application criteria for bridges that are not yet structurally deficient. Some of the local bridge projects may qualify for federal funding under the Off-System Program. If qualifications are met, the municipality may receive up to 80% federal funds for the project, and the other 10%-20% from the state's Local Bridge Program, effectively requiring no local funds.

The primary difference between the Local Bridge Program and State Bridge Program is that CTDOT inspects the bridges more than twenty feet in length biannually, whereas the local bridges spanning between six and twenty feet were inspected once as mandated by Public Act 87-584. CTDOT does not intend to inspect the local bridges again unless mandated by the Legislature. As a

Pilot's Point Marina located in Westbrook.

result, the Local Bridge Program eligibility list remains static. Bridges not on the list may be eligible for funding, but the municipality has to prove the bridge to be deficient. If found deficient, and approved for eligibility, the state adds the bridge to the list of eligible bridges and establishes a priority ranking. Funding authorization will be determined annually by the ranking and available funds. If not authorized in one fiscal year, project applications must be resubmitted for consideration during the next fiscal year. A bridge is not eligible if it has received assistance from the state bridge program within the last twenty years.

The 2018 list of currently eligible bridges is located in Table 3.5. A list of bridges under and over twenty feet can be found in Appendix B.

E. WATERWAYS

CONNECTICUT RIVER

The Connecticut River is the largest river in New England. It begins at the Connecticut Lakes in northern New Hampshire and flows 405 miles south to Long Island Sound. The river has a drainage basin extending over 11,250 square miles. The mean fresh water discharge into Long Island Sound is 19,600 cubic feet per second and the river is tidal north to Windsor Locks. The river carries large amounts of silt especially during the spring snow melt which forms a sandbar near its mouth and hinders navigation. Historic difficulty in navigation is a main reason why there is not a major city located near the river's mouth. The EPA designated the Connecticut River, one of fourteen nationwide, an American Heritage River in 1997. The American Heritage Rivers initiative helps river communities seek federal assistance to protect environmental and natural resources, preserve historical and cultural resources, and promote economic revitalization along the river.

NATIONAL BLUEWAY

Although the former Secretary of the Interior, Sally Jewell, released a Secretarial Order in January 2014 eliminating the National Blueway System that had been established by Secretarial Order in 2012, the Connecticut River retains its designation as the nation's first and only National Blueway. The Connecticut River National Blueway designation recognizes the collaborative leadership of more than forty partner organizations under the umbrella of the Friends of the Silvio O. Conte National Fish and Wildlife Refuge and the cumulative successes of the Connecticut River Watershed Council, states, and many other partners.

RIVER TRAFFIC

A 2010 study conducted by RiverCOG analyzed the marina and boating traffic in the lower Connecticut River. The study reported a total of thirty-two boating facilities on the Connecticut River that provide slips for recreational and commercial boating. Within those thirty-two facilities, there are approximately 2,855 slips. There are approximately 810 moorings in place, both private and public. Of those 810 moorings, approximately 791 were occupied for an occupancy rate of approximately 98%. In addition to the number of slips available in the lower Connecticut River, there are approximately 251 private residential docks that are, for the most part, at full capacity. An occupancy rate similar to that for marinas was used to estimate the occupancy rate for boats at private residential docks. Of the approximately 4,200 boats present in a study of boat traffic on the Connecticut River in 2011, the number of sailboats was estimated to be approximately 10% of the total. In addition to the commercial marinas and harbors, there are twelve limited access inlets and coves that are accessible to small craft and/or kayaks and canoes. Boating on the Connecticut River is an important driver of the region's tourism economy.

There are three commercial recreational river tour vessels and several charter companies offering sightseeing tours, including the Valley Railroad combined steam train and riverboat roundtrip . The Valley Railroad's seventy foot riverboat, the *Becky Thatcher,* offers a round-trip cruise from Deep River Landing to the Goodspeed Opera House and swing bridge in East Haddam. The riverboat is also available for charters. Lady Katherine Cruises operates the 113-foot *Mystique* and *Lady Katherine* from Harbor Park Landing in Middletown and Charter Oak Landing in Hartford. They operate brunch and lunch cruises, entertainment cruises, fall foliage cruises, holiday cruises and other types of cruises. The ships are also available for private charters. The RiverQuest is a sixty-four foot vessel operated by Connecticut River Expeditions out of Eagle Landing State Park in Haddam. The RiverQuest is available for daytime, evening, and private educational and scenic excursions.

Crew/Rowing is popular with boathouses on the Connecticut River and others outside region also using the river for their rowing programs. There are two boathouses in Middletown one for Wesleyan, Middletown High School, Xavier, and a Middletown recreational summer rowing program all row in Middletown. Choate Rosemary Hall in Wallingford practices on the river on occasion. Crew races occur in the spring months in Middletown on the Connecticut River. Pettipaug Yacht Club and Sailing Academy is located in Essex and holds rowing, sailing, and powerboat classes on the lower river.

Kayaking is growing on the river as well. Two high use locations are the Mattabessett River Canoe Kayak Trail in Middletown and the Seldon Neck State Park area in Lyme. Similarly the Town of Westbrook recently received an Easter Federal Land Access Program grant to improve the park and boat lance at Kirtland Landing to improve access to the Stewart B. McKinney National Wildlife Refuge and Long Island Sound. There are many other launch and paddle places in the region which can be found on the CT River Paddlers Trails website. Similarly, businesses rent kayaks and canoes providing lessons across regional waterways.

COMMERCIAL BARGE TRAFFIC & RIVER MAINTENANCE

Barge traffic on the Connecticut River consists primarily of black oil and petroleum distillates, although the majority of these products are now shipped by pipeline. The petroleum products are transported to the Connecticut Kleen Energy power plant in Middletown, the Valley Oil Division of the Briggs Corporation in Portland, and the Northeast Petroleum Division of Cargill, Inc. in Wethersfield. During the summer months, asphalt is occasionally transported by barge to Portland. In recent years, barge traffic has significantly decreased from previous levels.

Coast Guard Sector Long Island Sound was established on May 31, 2005 by consolidating CG Group/MSO Long Island Sound and Coast Guard Group Moriches. CG Sector Long Island Sound performs all of the traditional marine safety duties plus the traditional missions of a Coast

The Chester Ferry crossing the Connecticut River

Guard Group. The United States Coast Guard Cutter *Bollard* has operated along the Connecticut River and throughout Long Island Sound and north to Narragansett Bay, since it was commissioned in 1967. The vessel's home port is New Haven. With a crew of six, the unit services aids to navigation, conducts domestic ice operations, search and rescue, law enforcement, and homeland security missions. The sixty-five foot *Bollard* conducts the majority of its ice breaking on the Connecticut River, where it escorts fuel barges through the river to the Middletown power plant and beyond. It can break ice up to a foot thick. It is one of four cutters that work the Long Island Sound sector.

Operations for Long Island Sound, including the south shore of Long Island and along coastal Connecticut, are coordinated from a single command center located at Sector Long Island Sound on the eastern side of New Haven Harbor. There are approximately 500 active duty, 200 reservists, and 1,200 volunteer CG Auxiliary members working the sector. The other ship units include the *Morro Bay, Chinook*, and *Ridley*.

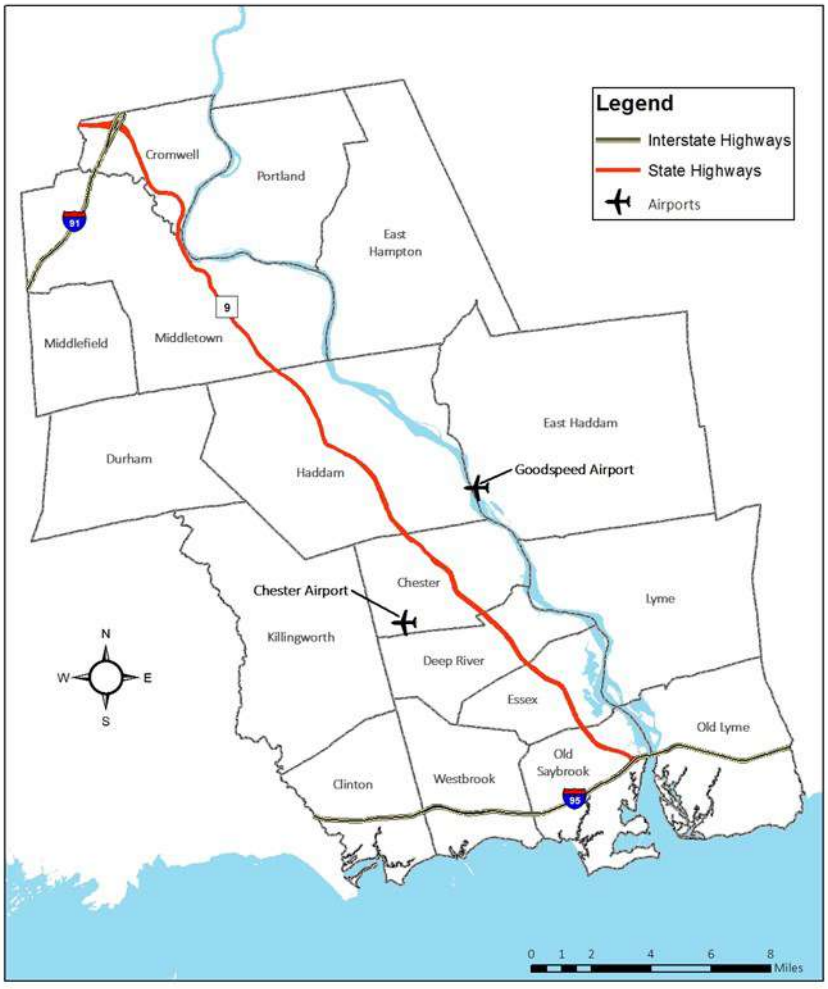
FERRY SERVICE

The Chester-Hadlyme Ferry is one of two historic river ferries in operation in Connecticut. It is both a scenic and economic asset for the region during its seasonal operations across the Connecticut River from April 1 through November 30 (weather permitting). The Valley Railroad works cooperatively to link rail passengers on the Essex Steam Train to the Chester Ferry for access to Gillette's State Park for hiking and castle tours. In addition to the East Haddam Swing Bridge, the ferry provides emergency service options for Hadlyme and Lyme for ambulance and emergency transport to services in Middletown and Westbrook. Both of these river crossings are essential for the safety of residents along the river, particularly for residents of Haddam, East Haddam, Chester, and Lyme in the event of a natural or man-made disaster.

The Chester-Hadlyme Ferry service began in 1769 by Jonathan Warner who owned land on both sides of the river. The ferry was used during the Revolutionary War to transport supplies across the river. A steam power barge began service in 1879. The State has operated the ferry since 1917 and currently operates the *Selden III*, built in 1949. It is an open, self-propelled craft sixty-five feet long and thiry feet wide and accommodates eight to nine cars. In 2013, there were 21,122 crossings carrying 37,737 vehicles and 78,764 passengers. $145,286 of revenue was generated in ticket sales. The fee is $5.00 per vehicle on weekdays and $6.00 on weekends. A $3.00 pre-purchase commuter rate is available, and bicyclists and pedestrians pay $2.00

The LCRV region is also home to the Plum Island ferry which hails out of Harbor One Marina in Old Saybrook. The passenger ferry delivers 200 employees to Plum Island each day. The trip between Old Saybrook and Plum Island crosses Long Island Sound and spans a little over ten miles. The 840 acre island currently houses the Plum

Map 3.7 LCRV Region Airport Locations



Source: RiverCOG

Island Animal Disease Center, a Biosafety Level 3 laboratory facility operated by the United States Department of Agriculture (USDA). Due to restricted access on the island, the ferry is not open to the public.

LONG ISLAND SOUND TRAFFIC

The LCRV region's four shoreline municipalities have a significant amount of boating and infrastructures on Long Island Sound. There are nine marinas in Westbrook hosting 1,327 slips within the lower mouth of the Patchogue River. Clinton has eight marinas hosting 908 slips and a charter cruise sailing vessel. Old Lyme has a marina at Point of Woods hosting seventy-five slips for small boats. Several of the marinas also offer boat rentals.

PUBLIC BOAT LAUNCHES

Within the LCRV region, there are seventeen state owned public boat launches and six car-top boat launch locations.

DREDGING

Harbor maintenance and dredging of navigable waterways are essential to the region's marine and boating economy. Maintaining navigable harbors and waterways is also an important component of the region's emergency management planning. Dredging of sediment is a difficult issue for both economic and environmental reasons. Capacity for disposal of dredged materials is limited.

In 2010, dredging was a high priority for the Town of Westbrook in partnership with the Army Corp of Engineers. Funding for the dredging project was an important hurdle as the estimated cost to dredge was $1,500,000. The work consisted of dredging about 36,000 cubic yards of predominantly fine-grained silt and clay from the eight-foot channel and anchorage. The dredged material was removed using a mechanical dredge and scows. Disposal was located at the Cornfield Shoals Disposal Site in Long Island Sound, nine miles away.

Reflecting a shortage of disposal sites for dredged material, the Army Corps of Engineers issued a report in 2012 titled, "Long Island Sound Dredged Material Management Plan (LIS DMMP)-Investigation of Potential Containment Sites for Placement of Dredged Materials". The report identifies an area of Clinton Harbor as a potential site for dredge materials. The Clinton Harbor containment site alternative is a potential shoreline "Confined Disposal Facility" (CDF) that would create a salt marsh habitat adjacent to the Clinton Harbor federal navigation channel along the southern shoreline of Cedar Island and the eastern shoreline of Willard Island (Hammonasset Beach State Park).

WATERWAY SECURITY

Sector Long Island Sound, on the eastern side of New Haven Harbor, is the U.S. Coast Guard command center for Long Island Sound. Its jurisdiction covers the Connecticut River. Search and rescue and law enforcement response efforts are coordinated through the command center and respond to eight small boat stations. The stations are manned twenty-four hours a day to respond to marine distress calls and enforce federal laws and regulations. The Coast Guard inspects oil tankers, chemical barges, and cargo ships to ensure seaworthiness and compliance with federal and international laws. The Coast Guard works closely with federal, state, and local authorities to ensure the security and integrity of the maritime domain through awareness, prevention, response, and consequence management.

The State Environmental Conservation (EnCon) Police are responsible for patrolling all waters within the state and Long Island Sound, focusing on recreational boating enforcement issues. The EnCon Police investigate boating accidents occurring on Connecticut waters and engage in search and rescue activities. They also serve as the primary backup to the U.S. Coast Guard on homeland security issues.

The Middletown, Cromwell and Old Saybrook Police Departments all have specialized marine patrol units. These units typically enforce recreational boating violations, perform safety inspections, aid disabled boaters, and investigate boating accidents. They also perform search and recovery missions, investigate water related crimes, and provide emergency rescue services.

F. AIRPORTS

There are two public airports in operation in the LCRV region; both highlighted in Map 3.7. Goodspeed Airport in East Haddam is one of thirteen privately owned general aviation airports in Connecticut. The airport is located south of Route 82 and north of Chapman Pond near the Connecticut River. It is easily accessible from Route 9, (exit 7). There is a northwest to southeast orientated runway at 2,120 feet in length and fifty feet wide with an adjacent taxiway providing direct access. The runway is paved, lighted, and well maintained. Two hangar buildings provide thirty-one private hangar spaces, and six-

The Airline Trail Cranberry Bog entrance in East Hampton.

teen private tie-downs are found at the airport.

The Goodspeed Airport is the only sea plane training facility in Connecticut and has the largest public designated sea plane waterway in the state at 4,500 feet by 1,000 feet. Aviation use of the waterway is limited by extensive boat traffic in the summer months. There was an estimated 119 per week aircraft operations (take offs and landings) at the Goodspeed Airport for the twelve month period ending August 31, 2014. Thirty-three aircraft were based at the airport as of August 2014. Twenty-nine were single engine airplanes, one multi engine airplane, and three were ultralights. Approximately 80% of the operations were local general aviation, 19% transient general aviation, and 1% air taxi.

The Chester Airport is the other privately owned and publicly accessible airport in the region. The airport is located south of Route 148 and is also easily accessible from Route 9 (exit 6). There is a northwest to southeast orientated runway at 2,722 feet in length and fifty feet wide with an adjacent taxiway providing direct access. The runway is paved, lighted, and well maintained. There are hangars and tie downs as well as fuel service. Air frame and power plant services are also available.

There was an estimated thirty-three aircraft operations per day at the Chester Airport for the twelve month period ending August 31, 2014. One hundred five aircraft were based at the airport as of August 2014. One hundred were single engine airplanes and five were multi engine airplanes. Approximately 41% of the operations were transient general aviation, 41% were local general aviation, and 17% were air taxi. An aircraft that is temporarily on the ground at an airport other than its home base, and is not being used, is a transient aircraft. An aircraft is usually transient because it makes more financial sense to leave it at that airport until the return flight. Transient aircraft are typically away from home base for two to five days and can be available for charter services.

There are two private restricted landing areas (RLAs) in the region. One is at Devils Hopyard with a runway approximately 1,250 long and fifty feet wide, found in the southeast corner of East Haddam. It is located off Hopyard Road, just north of Route 82. The other is Maplewood Farm with a runway approximately 1,400x50 feet in length and found off Tuttle Road in Durham. Both have a turf runway surface and a hangar. Neither have tie-downs or runway lighting. Devils Hopyard has been in operation since the 1930's and is estimated to be one of the higher used RLA in the state. Maplewood farms has been in operation since the 1970s. There are a total of thirty-eight RLAs in the state consisting of thirty airports, six sea plane bases, and two military facilities.

Emergency medical service helicopters such as LifeStar, dispatched out of Hartford Hospital and Backus Hospital, are capable of landing at Middlesex Hospital and its shoreline emergency center on Flat Rock Place in Westbrook.

G. BICYCLE, PEDESTRIAN, TRAILS

COMPLETE STREETS

Connecticut has recently endorsed significant policy changes in providing enhanced bicycle and pedestrian infrastructure by implementing the Complete Streets initiative in accordance with Public Act 09-154. The Commissioner of CT DOT, James Redeker, took steps to promote Complete Streets in October 2014 by releasing a policy statement outlining objectives and procedures to encourage transportation improvements for non-motorized users. The Complete Streets policy requires 1% of all funds used for the construction or rehabilitation of roads and highways be used for the enhancement of bikeways and sidewalks.

Since then, in accordance with CGS Section 13a-153f and CTDOT's attention to accommodating non-motorized travel modes, accommodation of all users is now a routine part of the planning, design, construction and operating activities of all roadways. The need for inclusion of accommodations for bicyclists and pedestrians, including those with disabilities, must be reviewed for every project. The bicycle and pedestrian travel needs assessment form provides the documentation and information needed to make decisions on the need and extent of bicycle and pedestrian features. The form is not intended to dictate what features

should be included in a project design. The form is completed to the extent practical during the project scoping phase and fully completed no later than at the completion of the preliminary design of transportation projects funded under LOTCIP, STP, TA and other state and federal transportation programs.

BICYCLE

Support of bike-friendly shared roadways, bike lanes, wide shoulder lanes, shoulder bikeways, signed bicycle routes, off road multi-use trails, and greenway corridors for bicycle and pedestrian use should be a priority for recreational, personal business, and commuting purposes. Benefits from such projects include more than reduced roadway congestion, environmental, and personal user benefits. Several studies have shown an increase in property values near multi-use trails, which may in turn increase local tax revenues. Facility users patronize local businesses such as food, lodging, and other recreation-orientated establishments. Surveys also show that multi-use trails improve the quality of life in a region and quality of life factors are important in business and corporate relocation and retention decisions.

Designated bicycle lanes, along with the proper signage, should be added to roadways. Bicycle parking areas, racks, and lockers should be provided in shopping areas, downtowns, public buildings, train stations and transit centers, parks, and commuter lots, etc. to aid existing bicyclists and promote more bicycling.

PEDESTRIANS

Regional municipalities have a network of paved walkways and sidewalks. These walkways connect residential areas with town centers, shopping and services, schools, and recreational facilities. The existence and formality of walkways is usually indicative of the density of development. Past CTDOT policies have limited sidewalk construction along state highways and have left noticeable gaps in places where sidewalks would be merited. RiverCOG is embarking on an inventory and assessment of facilities for pedestrian access in the region to analyze safety and intermodal access for pedestrians. Special focus areas are highly travelled commercial areas on State highways such as Route 1, Route 17, Route 66 and Route 154. Outside of densely populated areas, pedestrian access is limited.

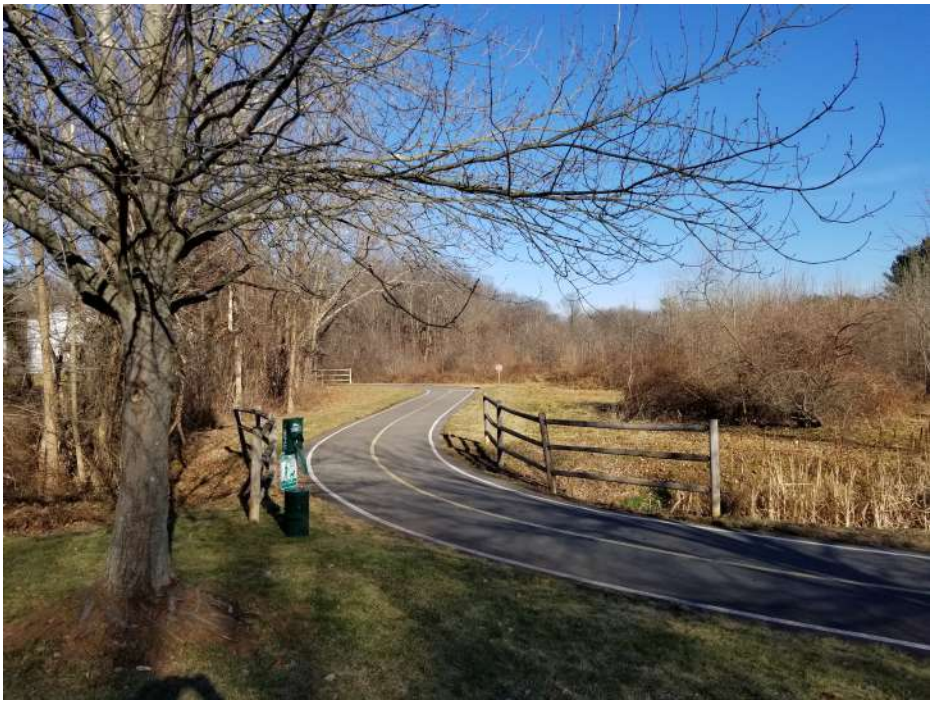
TRAILS

The region hosts a system of multi-use trails, many of which are in state parks and forests, town-owned lands, and land trust properties as well as extensive mountain biking trails. RiverCOG is presently working on a inventory of trail systems with the objective of integrating the existing trail systems (sidewalks, hiking trails, kayak trails, bike routes, etc.) with connections to the public transit system.

Two important multi-use trails in the region are located in Middletown and include the Westlake Area Bikeway and Mattabesett Trolley Trail. The Westlake Trail is 3.9 miles long and located in a residential/commercial area that links the FedEx building, a major regional employer, to a densely populated residential area. The trail is level, paved, lighted, eight feet wide, and separated from the road by a grassy buffer zone. The Mattabesett Trolley Trail was recently extended in 2014 and now spans 3.9 miles in length. It loops around a residential area and provides scenic views and access to the Mattabesett River.

The beginning of the Air Line State Park Trail is located in East Hampton. The gravel trail starts at Alden's Crossing and traverses about 4.7 miles before crossing into Colchester at

The Westlake Trail, Middletown



Bull Hill Road. There are plans for the trail to be connected to Portland in 2019. Portland is working to extend the Air Line Trail to the Connecticut River and the Brownstone Exploration & Discovery Park. Along the trail visitors pass an old cranberry bog (which has not been harvested since the 1930's), the 1,380 foot long Rapallo viaduct, and can access the Comstock covered bridge, about a mile south of the trail. It is one of three covered bridges remaining in Connecticut. The trail follows the former Airline Railroad that used to connect New York City to Boston and ends about fifty miles northeast in Thompson, CT.

There are also Connecticut Forest and Park Association (CFPA) blue-blazed trails in many parts of the region located on both state and private property. An interactive map can be viewed at https://www.ctwoodlands.org/ The New England Trail follows the ridgeline contours through Middletown, Middlefield, Durham, and Haddam. These trails are primarily designed for hiking and designated as non-motorized trails.

The New England Trail includes the former Metacomet and Mattabesett Trails in Connecticut and the Metacomet-Monadnock Trail in Massachusetts which made up the former MMM trail. The MMM Trail was officially designated as the New England National Scenic Trail when the New England National Scenic Trail Designation Act passed both chambers of the U.S. Congress on March 25, 2009 and was signed into law. This was the first new National Scenic Trail designation in 25 years. The New England Trail is over 200 miles long passing ridges, forests, and state, municipal, and private lands in 39 communities spanning central Connecticut, western Massachusetts, and southern New Hampshire. CFPA volunteers maintain the trail in Connecticut.

A greenway is a linear open space established at different scales along a natural corridor such as a river, forest, stream, ridgeline, rail-trail, canal, or other route for conservation, recreation, or multimodal transportation purposes. Greenways can connect parks, nature preserves, cultural facilities, and historic sites with business and residential areas. Examples of other types of trails include; access trails, backcountry trails, equestrian trails, interpretive trails, linear trails, long distance trails, multi-use trails, water trails, and many other types of trails

LCRV greenways include the Menunketesuck—Cockaponset Regional Greenway and the Quinimay Trail, Eight Mile River Greenway, Old Lyme Greenway, and the Connecticut River Gateway Conservation Zone Greenway. There is potential to extend the Shoreline Greenway Trail from its planned eastern terminus at Hammonasset Beach State Park in Madison into the LCRV Region.

H. AGRICULTURE

According to the UCONN's Economic Impacts of Connecticut's Agricultural Industry from 2017 the total impact of Connecticut's agricultural industry on the state economy was between $3.3 and $4.0 billion and employs between 21,007 and 21,696 residents in 2015. These numbers do not include ancillary support industries, producers and distributors that depend on the success of these agriculture producers. There has been discussion at the state level highlighting the need for more regional coordination of business support for agriculture since the passage of Public Act 11-188, An Act Authorizing Local and Regional Agricultural Councils and Concerning Consideration of Agriculture in Local Plans of Conservation and Development and Zoning Regulations in2011.

In 2013 RiverCOG formed the first regional agriculture council in Connecticut to support farming in the seventeen municipalities and promote agriculture friendly land use and municipal policies. The commission provides agricultural information and education, guidance and review of land use regulations and tax policies, as well as identifying economic opportunities. The council should continue to encourage expansion of agriculture planning in the MTP and also encourage further data collection and mapping to better understand product sourcing, farm worker and disadvantage population access via transit as well as freight planning for commodity movement.

The Connecticut Resource Conservation and Development Area CTRC&D is currently working with the Estuary Transit District on an Access to Agriculture project for incorporating transit information systems for transit dependent populations to inform them of sources for locally grown food, fresh produce vendors, farms, CSAs, as well as soup kitchens and pantries through smart phone and digital technology. Once complete, recommendations could be incorporated into the next MTP update. It is anticipated that this project may also expand to provide information via the regional transit system for information on basic needs, services, and emergency planning near transit routes. In addition CTRC&D is creating a Master Plan for the Air Line Trail State Park using a CTDEEP grant. The plan will incorporate maintenance, marketing, access and economic growth analysis in the town centers of the adjacent twelve towns. East Hampton and Portland are two of RiverCOG's towns that CTRC&D will be supporting in this process.

Middletown Area Transit (MAT) bus station located in Downtown Middletown

Chapter 4.

TRANSPORTATION PLANNING

A. CONTEXT
B. DEVELOPMENT PATTERNS
C. ENVIRONMENTAL NETWORK
D. TRANSPORTATION NETWORK & INTEGRATION

A. CONTEXT

The Lower Connecticut River Valley region is unique in character among Connecticut's MPO regions. Connecticut MPO regions generally contain one or more urban centers with large areas of adjacent densely populated suburban areas, connected by an extensive transportation grid of major highways and interstates. While the region has an extensive transportation grid, it is a connecting region that links the urban centers of Hartford to the north, New Haven area to the west, and New London area to the east. This chapter introduces the challenges and opportunities to improve and integrate the various modes of transportation within the region into a seamless, accessible, and cost-effective network.

Denser urban and suburban land use settlement patterns in the region are found in the northern 442 square miles near Middletown and Cromwell and along the Route 1 corridor parallel to the shoreline. Other areas of the region are rural in character with small compact town centers that could be described as villages. While 67% of the region's land area has a population density per square mile that can be characterized as rural, major expressways and rail corridors pass through the region connecting Connecticut to Boston and New York City.

The challenge of protecting the intrinsic economic and environmental value of the region's resources cannot be overstated. Balancing the region's growth and environmental assets with creative transportation engineering and operations will preserve the economic integrity of the region and facilitate the movement of people and goods through and around the region.

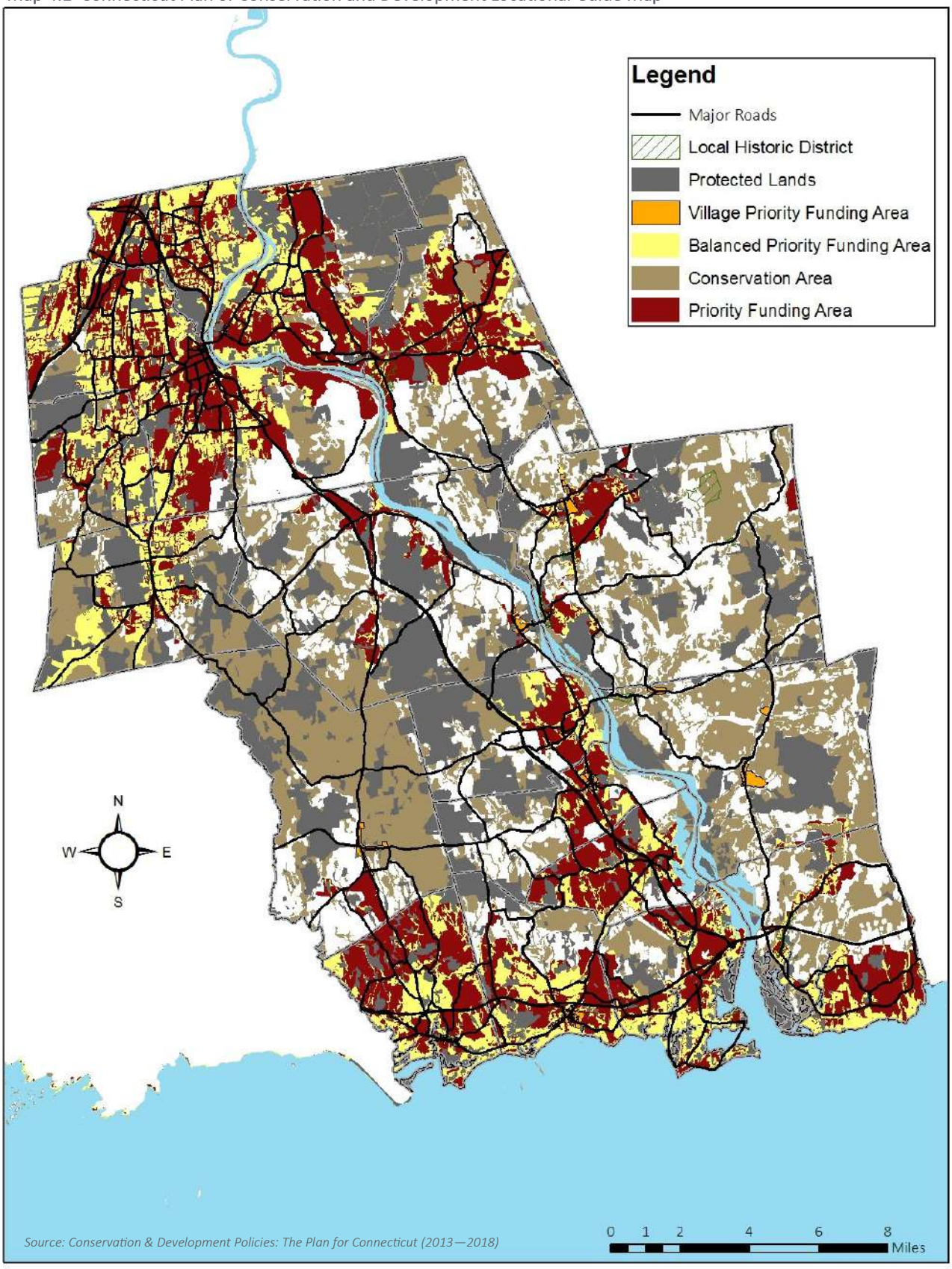
This plan is the second long range transportation plan developed for the merged LCRV region. RiverCOG assists member towns with long range planning including transportation planning for municipal Plans of Conservation and Development. The COG also assists with other municipal plans such as Safe Routes to School and Complete Streets plans. The region works to ensure that town plans are consistent with the State Plan of Conservation and Development. Ultimately, efficient and coordinated transportation planning is a consequence of visionary and technically competent land use planning on the local, regional, and state level. Similarly RiverCOG contributes in the development of state plans such as the bicycle and pedestrian plan, freight plan, highway safety improvement plan, and other CTDOT planning initiatives. Map 4.1 shows the LCRV region conservation and development areas from the CT Plan of Conservation and Development.

The LCRV region works closely with the State Department of Energy and Environmental Protection (CT DEEP) and Office of Policy and Management (OPM) to incorporate best management practices into local land use regulations and policies. The agency coordinates local, regional, and state land use plans to ensure continuity with other federal and state wide initiatives, plans, and programs. Coordinated transportation, housing, and commercial development gives people access to affordable and environmentally sustainable transportation. The six livability principles in Table 4.1 are recognized by the United States Department of Transportation to promote place-based policies and investments that ultimately increase transportation choices and access. RiverCOG

Table 4.1 Livability Principles

LIVABILITY PRINCIPLES
PROVIDE MORE TRANSPORTATION CHOICES: Develop safe and reliable transportation choices to decrease household transportation costs, reduce dependence on oil, improve air quality and promote public health.
PROVIDE EQUITABLE, AFFORDABLE, AND ENERGY-EFFICIENT HOUSING CHOICES: Expand housing choices for people of all ages, incomes, races, and ethnicities to increase mobility and lower the combined cost of housing and transportation.
IMPROVE ECONOMIC COMPETITIVENESS OF NEIGHBORHOODS: Enhance access to employment centers, educational opportunities, services, and various other basic needs.
TARGET FEDERAL FUNDING TOWARD EXISTING COMMUNITIES: Support existing communities through strategies like transit-oriented development and land recycling to revitalize communities, reduce public works costs, and safeguard rural landscapes.
LEVERAGE FEDERAL POLICIES AND FUNDING: Align federal policies and funding to eliminate barriers to collaboration, leverage funding, and increase the accountability and effectiveness of all levels of government to plan for future growth.
ENHANCE THE UNIQUE CHARACTERISTICS OF ALL COMMUNITIES: Value the unique characteristics of all communities by investing in healthy, safe, bikeable and walkable neighborhoods, whether rural, urban, or suburban.

Map 4.1 Connecticut Plan of Conservation and Development Locational Guide Map



has incorporated these livability principles into transportation planning to enhance the regional transit network and provide guidelines for better connectivity.

B. DEVELOPMENT PATTERNS

Map 4.2 shows that the LCRV region is predominately rural, covered by forest and woodlands, with large lot single family housing. More densely populated small historic town centers are common near the Connecticut River, while town centers toward the western area of the region are more rural in character. The shoreline supports higher residential densities, with beach communities, retail, and commercial developments oriented towards I-95.

The land area of the LCRV region encompasses about 420 square miles, or about 93.2% of the total area of the Region. In 2010, approximately 42,290 acres of the land area in the region was developed for a specific land use. Over the 20 year period between 1990 and 2010, a net increase of about 3.16%, or almost fourteen square miles of formerly uncommitted land, has been developed. About 2.85% of the region's newly developed land was formerly deciduous forests, totaling almost thirteen square miles.

Middletown is the region's urban center and home to an increasingly vibrant downtown. The region's hospital, court system, and higher education centers are located in Middletown. Middletown's proximity to the Connecticut River provides opportunity for a revitalization and reconnection to the waterfront. The access to the river is limited by the path of Route 9.

In the shoreline towns of Clinton, Westbrook, Old Saybrook, and Old Lyme, the attraction of the shore and the lack of undeveloped useable land in beach areas have created pressure for conversion of seasonal dwellings to year-round homes. Similar land use patterns have occurred near lakes in East Hampton, East Haddam, Chester, Old Lyme, and Middlefield. These seaside and lakeside communities are experiencing an increase in the conversion of dwelling units from seasonal to year-round habitation. However, the absence of water and sewer utilities limits the amount of conversion. As more and more seasonal dwellings are converted to year-round use, associated construction will aggravate daily traffic flows and emergency relief during storm events.

Continuing development along regional arterials is transforming rural landscapes and increasing traffic volumes. Current zoning regulations and development patterns trend toward isolated commercial strip development. As a result, lack of shared access to driveways and poor traffic flow create a challenge for safety and mobility along these corridors. In addition, the town boundaries and individuality of towns become less distinct as subdivision and chain-store commercial development erode the character of the village centers and venues for civic interactions.

Durham and Middlefield are rural agricultural communities with easy access to the larger town centers of Middletown, Meriden, North Haven and Wallingford. These larger towns are characterized by large lot development and rural town centers.

Cromwell is the most suburban municipality with higher density residential and strip mall development near Route 9 and Route 372. The other areas of town are primarily lower density residential units with a town government center that is rural in character. Cromwell also hosts a significant number of houses that front the Connecticut River.

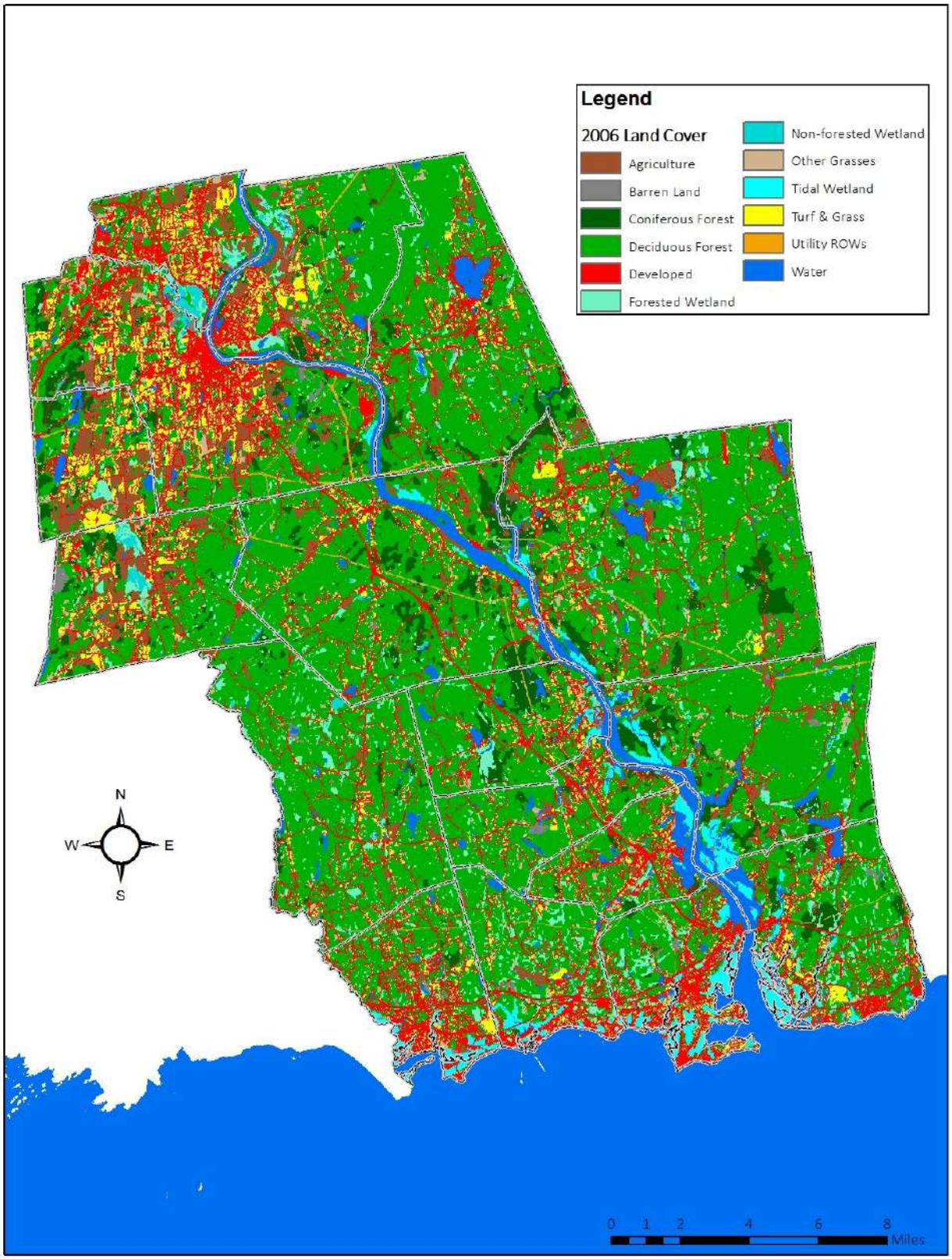
Chester, Deep River, East Haddam, Haddam, Killingworth, Lyme, Old Lyme, Portland, and Essex are characterized by their small village centers. All except Killingworth are located on the Connecticut River and contain marine facilities. The large tracts of forested open land between each town defines distinct village centers.

In the 19th century, East Hampton was a center for the manufacturing of bells, with residential, commercial, and industrial development historically located in the town center adjacent to Lake Pocotopaug. East Hampton is connected to Hartford and Norwich via the Route 2 expressway.

In general, the rural character of the region north of I-95 results from predominantly large unbroken tracts of privately-owned forestland, state forest and park lands, and public water supply land holdings. State parks and forests and wildlife management areas account for approximately 12.5% of the region's existing land use.

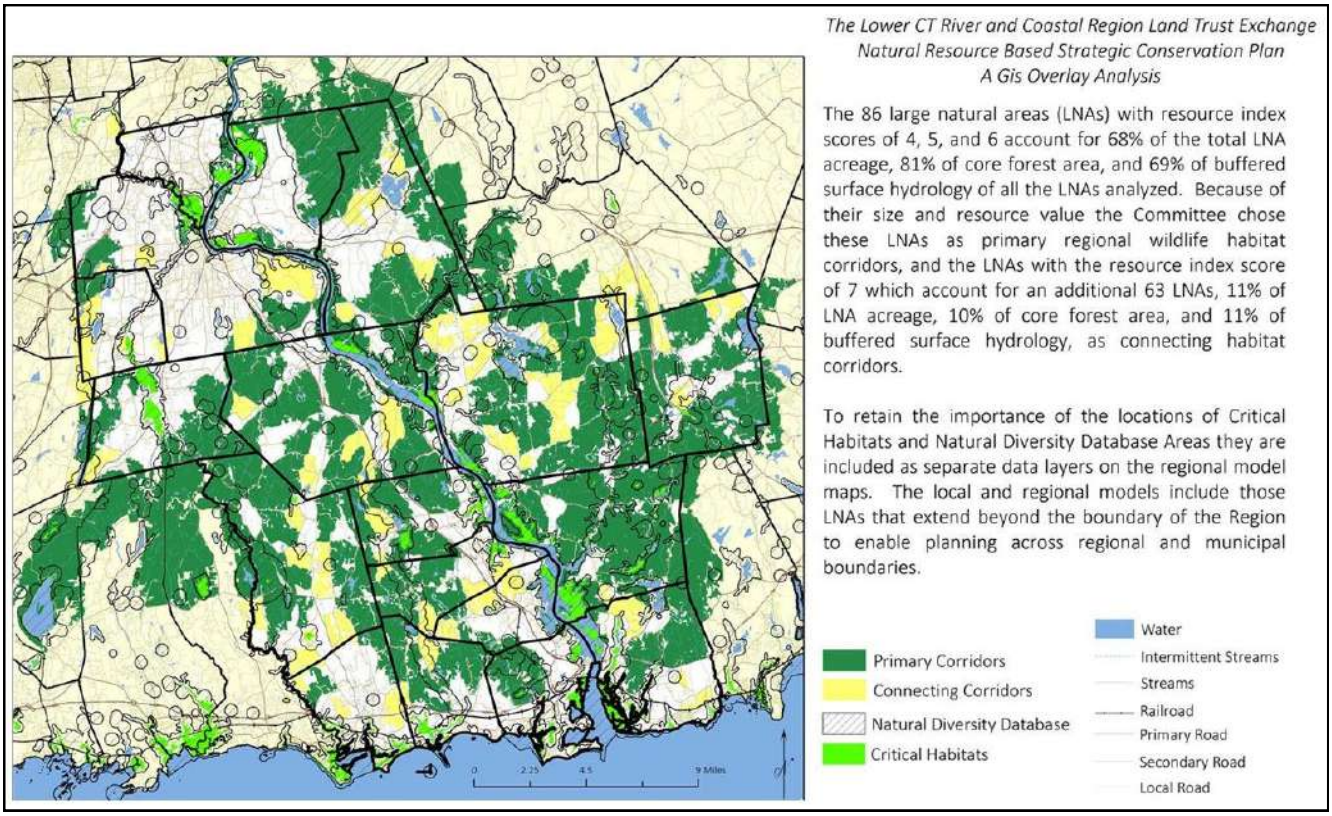
The dominant issue that confronts this region is whether it can maintain a high quality of life for residents and tourists without impairing economic vitality or intruding on the reasonable use of private property, while maintaining the region's rural and historical character and state ecological significance. Local sentiments seem to favor a policy of limiting growth; however, several issues confront the region which may cause this policy to be further examined or expanded. One important issue is transportation infrastructure and retail development which capitalizes on access to traffic volumes on state and interstate roadways. The other key issue is environmental quality and the availability of wastewater facilities. Sanitary sewers are a contentious and

Map 4.2 LCRV Region Land Cover (2006)



Source: UCONN Center for Land Use Education and Research, RiverCOG

Map 4.3 Large Natural Areas Primary & Connecting Corridors



Source: UCONN Center for Land Use Education and Research, CTDEEP, RiverCOG

politically-charged topic. The concern of residents in non-sewer areas is uncontrolled commercial and residential development if these facilities were available.

C. ENVIRONMENTAL NETWORK

FORESTATION

The Lower Connecticut River and Coastal Region Land Trust Exchange, a RiverCOG conservation cooperative, has created a prioritized strategic conservation plan which includes a natural resource based geographic information system (GIS) overlay for the region. The intent is to create large connected natural areas to provide wildlife habitat, protect water quality and quantity, and protect working and scenic lands. The Land Trust Exchange works in conjunction with the Natural Resource Conservation Service, US Fish and Wildlife Service, CT Department of Energy and Environmental Protection, the University of Connecticut, and various other agencies and organizations.

Map 4.3 shows the region's natural resource corridors as well as critical habitats and natural diversity locations. Natural resource corridors are locations that are resource rich natural areas. The overlay analysis helps to weigh the suitability of locations relative to each other based on specific criteria. Transportation infrastructure is a primary cause of forest fragmentation. It is critical that remaining unfragmented core forest areas are kept intact for reasons of biodiversity, water quality and quantity, and air quality. Core forest areas were calculated and developed using CLEAR's forest fragmentation model which is available online at http://clear.uconn.edu. For the purpose of this analysis, core forest is any point in the forest that is 300 feet from any type of human development. This dataset was chosen because of the region's large natural areas (LNAs) and the State's emphasis on the detrimental effects of fragmentation of the forest resources in *Connecticut's Forest Resource Assessment and Strategy: 2010.*

VIEWSHEDS

Viewsheds are visual perspectives of landscapes that are aesthetically enhanced by either natural or human built features. These views can be important in defining the character of a place. Examples of important viewsheds include ridgelines like the Metacomet Ridge, roads such as the Route 9 scenic corridor, and streams and rivers included in the Connecticut River Gateway zone. Viewshed protection is important to maintaining and enhancing the re-

gion's attractiveness, quality of life, wildlife, natural resources, and tourist economy.

Figure 4.1 Washed Out Bridge in Chester, After Storm of 10/22/18

WILDLIFE

The USDA Forest Service has an ecosystem-based approach called stream simulation that provides a method for designing and building stream crossings intended to permit unrestricted movements of any aquatic species. This method helps the Forest Service achieve its goals of maintaining the physical and biological integrity of water systems, including the existing fish and wildlife populations, by helping to reduce habitat fragmentation. Stream simulation provides continuity through crossing structures by providing water depths, flow velocities, and flow paths in the channel through the road-stream crossing similar to those encountered in a natural stream. The crossing, whether on a roadway, trail, rail, or other crossing type would provide unimpeded fish and other aquatic organism passage through the structure, restore natural channel characteristics and fluvial processes, and maximize the long-term stability of the structure. Transportation ecology will continue to be investigated in the LCRV region as a means to mitigate effects of its transportation infrastructure on wildlife and their habitats.

WETLANDS AND STORMWATER

Forests and wetlands regulate water flow, purify water, buffer the effects of storms, provide habitats for diverse flora and fauna, and supply drinking water. Stormwater running off impermeable road and paved surfaces washes automobile chemicals, rubber, litter, heat, salt, and sand into waterbodies and wetlands, impairing water quality and destroying natural habitats. Runoff flows into the Connecticut River's estuary, harming the river and Long Island Sound's fisheries.

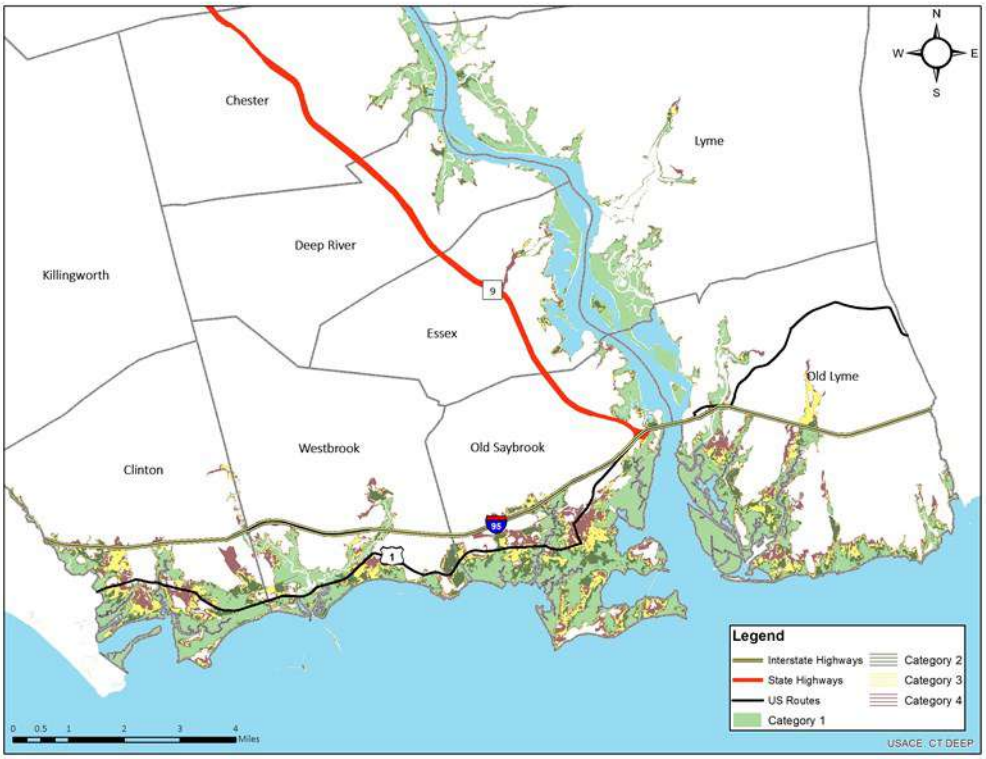
RiverCOG works with member municipalities and CTDOT, CT DEEP, and the Department of Public Health to mitigate the adverse impacts of transportation projects and new development on the region's water resources. Modern stormwater handling Best Management Practices (BMPs) can help mitigate the impact of roadway construction and drainage on wetlands and watersheds. CT DEEP outlines stormwater BMPs in the 2004 Connecticut Stormwater Quality Manual. BMPs that provide opportunities for stormwater to infiltrate into the soil can reduce flooding, recharge aquifers, and filter contaminates.

COASTAL AND RIVERINE FLOODING

Flooding from hurricanes, tropical and winter storms, and sea level rise all pose a challenge to transportation planning and the LCRV region's transportation network. Several major transportation corridors in the region are susceptible to flooding, including the Northeast Corridor railroad line along Long Island Sound. Although most of the railroad is elevated out of the flood zone, access to it can be cut off. The railroad has been shut down between New York and Boston several times in recent years due to coastal flooding. Events forcing closure of the railroad included Tropical Storms Irene and Sandy as well as the February 2013 Blizzard.

Riverine flooding and its effects on the region's transportation network is also of great concern in the region due to changing weather patterns that have brought increased heavy rain events. RiverCOG recently completed its *Long Term Recovery and Land Use Resiliency Through Community Flood Resilience Study, Flood Susceptibility Mapping for the Lower Connecticut River Valley*. The statistical geographic information system based study,

Map 4.4 LCRV Region Hurricane Surge Inundation



Source: U.S. Army Corps of Engineers, Federal Emergency Management Agency, National Oceanic and Atmospheric Administration, CT Department of Emergency Management and Homeland Security

funded through the Department of Housing, CT DEEP, and the University of Connecticut, has augmented the Federal Emergency Management Agency's existing flood mapping. In many cases the flood mapping is decades old and approximate in methodology due to the undeveloped nature of most of the Region. The study revealed an 8% increase in the amount of developed area in the region's 100 year flood plain that is highly or very highly susceptible to flooding. RiverCOG will seek to improve upon the modeling associated with the study as more accurate geospatial data becomes available through Federal and State Agencies. In addition, US Route 1 lies parallel to the Long Island Sound shoreline and is susceptible to flooding in many areas. Outside of Middletown and Cromwell, the shoreline of the LCRV region is the most densely developed area in the region. Thousands of properties and their street connections are susceptible to flooding and hurricane events. The area supports the local economies along the shoreline with significant commercial development and valuable properties. Large stretches of Route 1 through Old Saybrook, Westbrook, and Clinton are in hurricane inundation zones. The hurricane surge inundation zones (see Map 4.4) predict the inundation that can be expected to result from a worst case combination of hurricane landfall location, forward speed, and direction for each hurricane category. Category 1 areas inundated by a hurricane category 1 storm having a maximum sustained wind speed of 74-95 mph are shown in light green. Category 3 areas inundated by a hurricane category 3 storm (including categories 1 and 2) having a maximum sustained wind speed of 111 -130 mph are shown in yellow.

Many smaller local roads in the region's four coastal towns also face the threat of flooding. Much of the area south of the railroad is located in hurricane inundation zones. The region's 2014 Natural Hazard Mitigation Plans specify projects to lessen the impacts of storms.

RECOMMENDATIONS

- Study regional wildlife movement and design wildlife crossing infrastructure in future major transportation infrastructure projects
- Provide crosswalks near trail heads and trail parking, specifically near the region's state parks and forests, trails and publically accessible lands including the Quinimay Trail, the Airline trail in Portland, and between Blue Blazed hiking trails where they intersect roads
- Develop better strategies for management of vegetation along trails – including pruning, control of invasive species, and minimization of hazardous overgrowth
- Install signage on roads designating conservation land, wildlife refuges, public access to trail heads, street crossings, and parking
- Improve access to trail parking and federal, state, and privately held, publically accessible conservation land
- Implement trail stewardship to better manage trail maintenance
- Continue to improve regional flood susceptibility model
- Conduct night-time safety study on Route 9 south of Middletown

D. TRANSPORTATION NETWORK & INTEGRATION

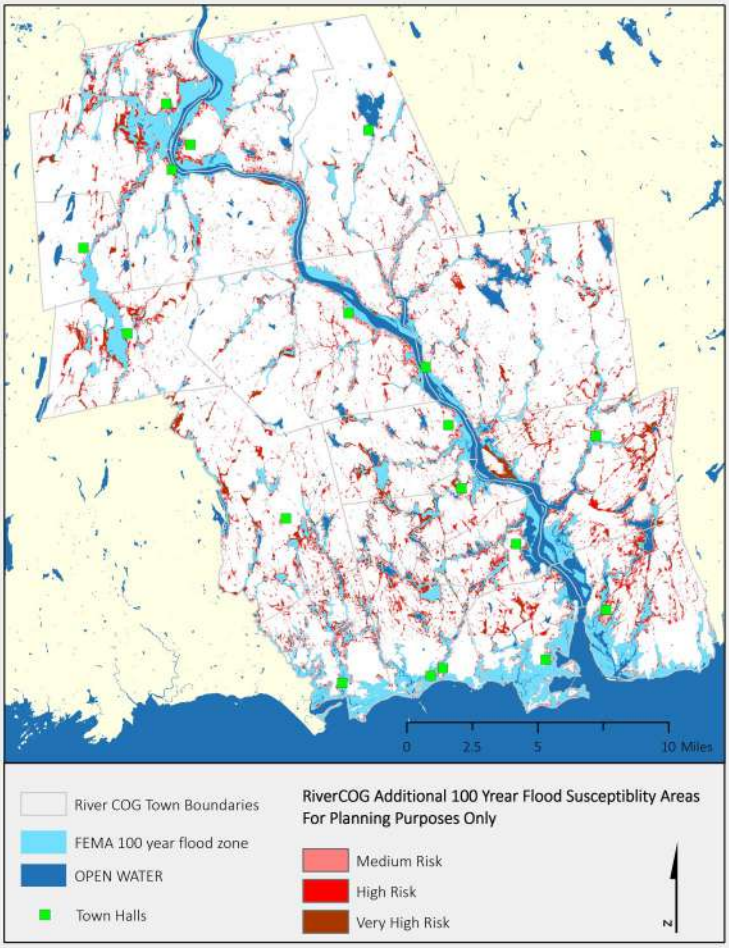
COMPLETE STREETS, SCENARIO PLANNING, AND INTEGRATED ACCESS

Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and cycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations. Scenario Planning is defined by FHWA as "a defining characteristic of successful public sector scenario planning in that it actively involves the public, the business community, and elected officials on a broad scale, educating them about growth trends and trade-offs and incorporating their values and feedback into future plans."

"Integrated Access" is defined by RiverCOG as a transportation planning method which incorporates the Complete Streets and Scenario Planning and also looks toward an ongoing process to promote collaboration and planning between state, regional and local governmental structures, and NGO's. Integrated Access has several goals:

- A larger spatial planning dynamic for future transportation improvements that identify outcomes for enhancing land use, economics, and environmental goals
- Work with CTDOT and its internal divisions to support transportation investments or maintenance which are constructed in coordination with regional and local transportation and land use projects.
- Promote communication with all involved organizations to increase collaboration and cost efficiency for transportation projects
- A transportation planning process that extends beyond capital infrastructure planning into a collaborative effort that involves local, regional, and state land use and conservation projects and goals. Transportation mode choice promotes tourism and more sustainable growth
- Educate local land use officials on methods to incorporate transportation planning into local land use and conservation plans and vice versa

Map 4.5 Flood Susceptibility Map for LCRVR for FEMA 100-Year Flood Event



By fostering an integrated transportation network that supports downtowns and village centers, residents and businesses in the region are offered more options. Encouraging walking, bicycling, and transit use reduces vehicle miles traveled, improves community interactions, and protects natural and ecological resources. A transportation network that provides transportation mode choice will strengthen the region and support socio-economic development.

The next step is to illustrate how these transportation and land use elements can be woven together to create a regional destination for business, tourists, and a dynamic workforce. The region is rich in heritage, scenic beauty, recreational opportunities, and local community charm.

The goals of integrated access are achieved through visionary thinking on the part of the municipal land use commissions and elected officials. While land use commissions have implemented planned programs in their individual towns, land use trends in the region have been predicated on parcel-by-parcel decisions within each of the towns. This results in an unplanned and scattered approach to transportation improvements including:

- Lack of access for transit riders, pedestrians and bicyclists;
- Further fragmentation of natural resource corridors;
- Increase in storm water quantity and decrease in storm water quality;
- Exponential growth of traffic congestion on the region's collector routes;
- Demands for costly improvements to post development commercial areas for transit access, sidewalks, bikeways and other amenities;
- Lack of inter-parcel access in commercial zones which would alleviate trip generation on highways
- Retail and office strip development patterns with multiple access points as a result of parcel by parcel planning or variance

Actions to improve integrated access include: revision of zoning and subdivision regulations, amendments to Plans of Conservation and Development, a local commitment to regional plans of integrated access, decisions on site plan or subdivision applications at the municipal land use meetings that promote complete streets.

RECOMMENDATIONS

- Continued coordination and outreach with local and state stakeholders
- Formation of a regional intermodal transportation committee to prioritize funding for regional transportation initiatives and projects
- A regional "Complete Street Plan and Policy"
- Scenario planning workshops which incorporate transportation, land use, and conservation for short range infrastructure planning
- Zoning and subdivision template for towns to promote regional and local complete streets policy
- Complete a "Transportation Tourism Plan" to design accessible, timely, and cost effective methods and improvements in the regional transportation system for visitors.
- Analysis and implementation of the transportation improvements outlined in the Route 1 Corridor Study, completed in 2015

TRANSIT DISTRICTS

The LCRV region's two transit districts, Middletown Area Transit (MAT) and Estuary Transit District (ETD), have partnered to provide connecting bus service from Middletown to Old Saybrook and beyond the LCRV region. Both transit districts provide access to jobs and services for all residents, particularly benefiting our aging population and the region's economic wellbeing. Optimization and improvement of transit connections between the two systems, town centers, commuter lots and CTTransit express services, and rail stations is an important regional transportation goal. Better coordination between Middletown Area Transit service and Estuary Transit Service will be dependent on finding creative and efficient use of new and existing funding.

Estuary Transit District is an independent public transit operation but expansion is still dependent on capital and operation funding from CTDOT. A primary challenge for the Estuary Transit District is increasing ridership and a lack of bus capacity and operating hours. ETD acquired gasoline-electric hybrid buses. As ridership grows, the current fleet of low-floor, 20 passenger buses will be inadequate. Planning for acquiring and garaging larger buses should be conducted.

Middletown Area Transit (MAT) is an urbanized direct recipient of Federal Transit Administration funds and works cooperatively with CTDOT. MAT opened a 19,000 square-foot bus maintenance facility on Pease Avenue and North Main Street in Middletown in 2014, replacing a small maintenance facility. The facility includes space to store the company's ten buses, ten vans, maintenance facilities, a wash bay and office space. The design included reshaping the intersection between the two streets making it easier for buses and trucks to make turns, and benefiting adjacent businesses in the surrounding industrial zone.

MAT fixed route bus service provides an average of 288,000 trips per year and perennially surpasses projected ridership figures. In fiscal year 2014, MAT recorded 255,000 miles of transportation services on the fixed routes over the span of 18,400 hours of operation.

CURRENT TRANSIT PROJECTS

ETD Maintenance and Operations Facility

From 2008 to 2015, ETD has approximately doubled its passenger trips, revenue hours, and revenue miles. In addition to forecasted continued growth, which includes the addition of fixed routes and coach buses to its fleet, ETD has outgrown its space in its current building and on the site. Interior space lacks storage and private offices. Exterior space is uncovered which creates hazardous conditions in inclement weather. The site is also constrained due to parking spots being shared with employee and other tenant vehicles. Lastly, having maintenance, automatic bus washing, and fueling off site not only creates operational inefficiencies, but has become cost prohibitive.

ETD issued a Request for Qualifications (RFQ) to explore the feasibility of constructing a new standalone Bus Maintenance and Operations Facility. Wedel Company completed the phase I Facility Needs Assessment and Program Report in March 2017 and the phase II Site Selection and Conceptual Design Report in July 2017. Phase I evaluated ETD's current and future functional space programming needs for the purpose of identifying and classifying the program, size, and needs of a new bus operations and maintenance facility. Phase II provides ETD the necessary information to determine the feasibility of constructing a new Bus Maintenance and Operation Facility.

RiverCOG Ridership Study and Integration Study

A recommendation of the 2015 RiverCOG RTP was to perform a Comprehensive Operations Analysis for improved individual district service for the two transit districts and recommendations for improved cooperative service between the two districts. A RFQ to conduct a comprehensive study of bus transit in the LCRV region, with a focus on integration scenarios for bus operations, administration, and governance of the Estuary and Middletown transit districts, was issued in August 2018.
This Lower Connecticut River Valley Regional Bus Integration Study expands on the Lower Connecticut River Valley Regional Bus Ridership Study from April to July 2017. RiverCOG, in cooperation with ETD and MTD, conducted bus passenger counts for the 9 Town Transit and MAT bus systems. The purpose of the counts was to track bus ridership trends and to inform recommendations for changes in bus services. This study marks the first time bus passenger counts have been conducted for the region. This study presents bus passenger count data, analyzes ridership trends, and makes recommendations for improvements to bus operations.

The goals of the subsequent Lower Connecticut River Valley Regional Bus Integration Study are to: 1) Evaluate opportunities in administration, operations, and policy-making to ensure improved regional transportation for Estuary Transit District and Middletown Transit District, 2) Identify a shared structure and locations of assets and facilities to provide future service in the Lower Connecticut River Valley Region, and 3) Develop recommendations for subsequent planning and integration steps. Nelson Nygaard has been selected to perform the study which will begin in early 2019.

ETD on-demand bus system pilot program

The Estuary Transit District will begin a pilot program offering point to point service in Old Saybrook, Westbrook, and Centerbrook in 2019.

The pilot will test an on-demand system inspired by services such as Uber and Lyft that will allow riders to book a ride using an app on their phones or computer. The system uses algorithms to plan rides for all those requesting them with the goal of creating the most efficient and quickest rides for everyone. The vehicles used will be small buses that can seat up to 12 people with additional room for a wheelchair. The service will be door-to-door, meaning that passengers will not necessarily have to wait at or be dropped off at bus stops.

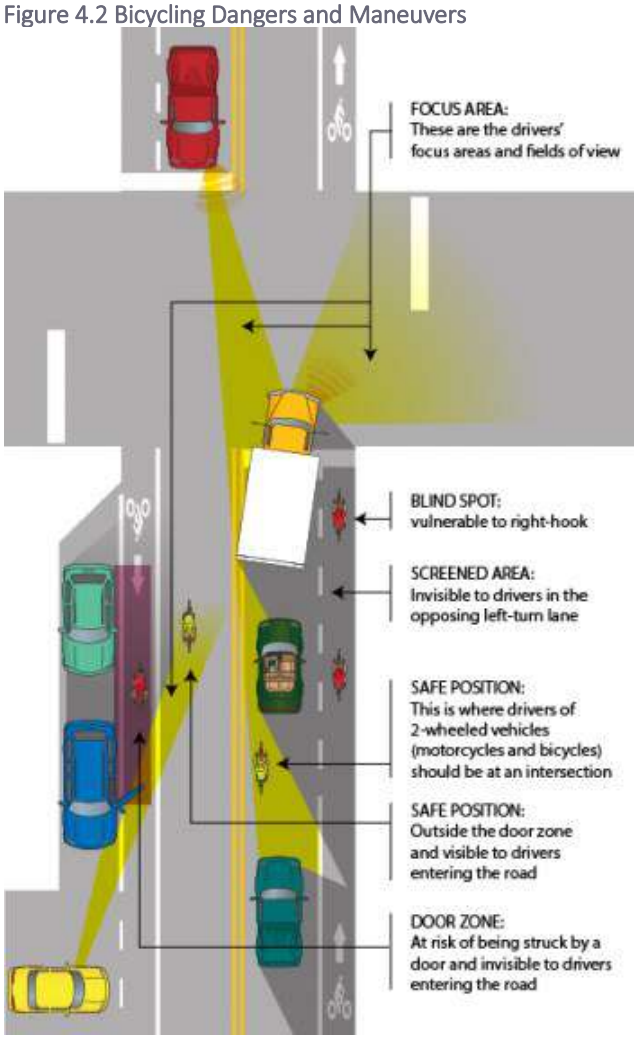
ETD is working with TransLoc to pilot the program using two buses running during peak times and one off-peak, with the support of CTDOT.

New Route 81 Service

Another recommendation of the 2015 RTP was to add service along Route 81 connecting Clinton to Middletown. This would service the Clinton Shoreline East train station and Middletown employment, higher education opportunities, and services and between Madison and Middletown with fixed stops in Higganum, Haddam-Killingworth High School and various employment centers.

As of August 27, 2018 a new bus route from Madison to Middletown along Routes 1, 81, and 154 became operational. The route begins in the center of Madison and travels along Routes 1 in Madison and Clinton, 81 in Clinton, Killingworth and Haddam and 154 to Middlesex Community college and downtown Middletown. Free connections are available to CT Transit New Haven, CT Transit Hartford and Middletown Area Transit bus services, as well as connections to the other 9 Town Transit routes. The route has specific time points along the way

Figure 4.2 Bicycling Dangers and Maneuvers



Source: Cycling Savvy (2014)

through the towns of Madison, Clinton, Killingworth and Haddam, but riders may flag the bus down from any safe location along the route. All buses are handicapped accessible.

RECOMMENDATIONS

Over the next ten years, anticipated projects and improvement include:

- Return MTD Night Owl Saturday Service
- Extend MTD Mlink Service to nightly hours during the week.
- Adding Saturday service in Middletown
- Providing microtransit on-demand in Portland and East Hampton
- MTD Terminal renovations
- Improved integration of bus service with Wesleyan University and Middlesex Community College, including options for partnering with CRCOG and SECCOG to promote student ridership
- Establish a Riverside Flyer service to Bradley International Airport through the Estuary Transit District for direct connection between the region and the airport
- Improved frequency of service on existing routes to enhance inter-connection between other transit modes and village service centers
- Express bus service from Middletown to CT Fastrack in New Britain
- Sunday service for both fixed and dial-a-ride programs
- Route 153 service from Essex to Westbrook to promote access to Shoreline East train station
- New and improved bus pull-outs and waiting areas at key locations, specifically at rail stations and roadway routes such as Route 1, Route 66, and Route 17.
- *Improved connections* – realign schedules to create a pulse system operating from the Old Saybrook train station to improve transfers and reduce travel time
- *Southeast Route* – earlier service times for commuters to New London/SEAT and Saturday service through Old Lyme, East Lyme and New London with access to the Crystal Mall
- *Midshore Route* – Saturday service to provide access to Haddam and Middletown with CT Transit Harford connection
- *Route 80 Service* – Old Saybrook to North Branford service through Ivoryton, Winthrop, Killingworth, Madison, and Guilford with CT Transit New Haven connections
- *Route 81 Service* – Add Saturday Service to provide access from Middletown to outlet mall
- *Sunday Service* – Study to implement Sunday service on the Shoreline Route, Riverside Route, and Southeast Route for riders in the service and retail industries which are open on Sundays
- *Increased frequency of the Southeast Route* - Add a second route opposite the existing route to cut headways in half to provide better connections and improved access along this growing route
- *Medical transportation trips* – Provide additional medical transportation to Middletown and provide service to New Haven
- *Westbrook Commuter Service* – Commuter route between Westbrook Station along Route 153 to Route 9 with stops serving the Essex and Chester park and ride lots, providing easy and timely transfers to Shoreline East

- *Old Saybrook Local Service* – Study a local route or micro-transit to serve RT 1, Main Street, Old Boston Post Road, Industrial parks, Maple Ave and Fenwick to reduce dial-a-ride trips, improve access to public transportation, and Shoreline East commuters
- *Summer Services* – Rubber tire trolley Service to beach communities/attractions in the summer tourism months, possibly branded separately to attract visitors to the region
- Support and enhance transit options and schedule through the New Haven TMA Mobility Manager – Explore mobility manager for Middlesex County
- Addition of year round stops along current and future routes to publically accessible lands for recreational purposes.

BICYCLE & PEDESTRIAN

Bicycling and walking are important components of the transportation system and have a unique ability to improve the quality of life and livability of a community. Non-motorized forms of transportation can reduce traffic congestion, parking needs, and help to improve air quality. Bicycling and walking are less expensive than driving, can aid in the economic development of town centers and downtowns, and improve public health.

The region has many public lands, rural roads, and neighborhood streets that do not have heavy traffic flows and are potentially well suited bike routes linked to employment and commercial centers. Bike lanes on these roads linking to commuter lots, bus, rail, and village centers can support bicycle access to work and shopping. An improved system of interconnected bike routes would advance bicycle travel throughout the region and support recreational tourism.

Most towns in the region have pedestrian facilities located in the downtown or village center areas as well as trails on public lands. These facilities include sidewalks, crosswalks, pedestrian push button signal phases, illumination, signage and other pedestrian amenities typically found in streetscape projects. Sidewalks are also located in many subdivisions throughout the region as are multi-use trails and paths.

The 2019 Connecticut Active Transportation Plan contains recommendations for goals and objectives, policy recommendations, tools for design, and other statewide initiatives. The Plan includes a roadway suitability map of state highways based upon shoulder width and average daily traffic volumes. Goals of the plan are to 1) improve bicyclist and pedestrian safety, 2) enhance mobility for bicyclists and pedestrians, and 3) maximize resources to achieve meaningful improvements. With improvements to roads and dedicated bike lanes between village economic centers and regional recreational centers, there is considerable potential for increased use of bicycles in the region.

Bicycle & Pedestrian Friendly Roadways

It is very important to consider all aspects of bicycling in the transportation system, not just specific bicycling facilities, since many bikeways are shared roadways. Roadway or intersection improvements should be designed for traffic control orientation and the elimination of design discontinuities such as those found in sidewalks, ramps/curbs, and pavement textures. Other design considerations for a bicycle friendly environment include the placement of signs, drainage grates, joints, grading (to prevent standing water or debris accumulation), pavement markings, and other factors that are often overlooked in roadway accommodations for bicyclists. Figure 4.1 shows common bicycling dangers and maneuvers.

Similarly, it is very important to consider all aspects for pedestrian users of the transportation system.

Sidewalks, shared use paths, street crossings, pedestrian signals, signs, street furniture, transit stops and facilities, and all connecting pathways shall be designed, constructed, operated and maintained so that pedestrians, including those with disabilities, can travel safely and independently.

Education and Awareness

Promoting bicycle and pedestrian access also involves education. Public schools, police departments, bicycle clubs, service organizations, and other local agencies should coordinate with each other to provide educational programs for bicyclists, pedestrians, and drivers of all ages. The State Department of Motor Vehicles could help educate drivers by providing additional bicycle and pedestrian curricula in driver's education programs. Information could be distributed by state departments such as education, transportation, or motor vehicles, and by nonprofit and public interest organizations. It is also important to promote bicycling and walking as a viable alternative transportation mode. Bike/Walk CT promotes annual Bike to Work, Bike to School, and Walk to School days which are also supported in the community by local

organizations.

Safety improves as bicyclists are educated on proper operation, equipment, helmets, and signaling and scanning. Pamphlets, brochures, videos, and other media pertaining to safe bicycling can be targeted to different bicyclist types such as children, basic bicyclists, and advanced bicyclists depending on needs. Figure 4.2 shows four common crash types involving bicycles and motorists.

Enforcement of traffic laws is also vital in ensuring the safety of bicyclists and pedestrians. Connecticut General Statute Section 14-232, effective since 2008, requires motorists to allow at least three feet of separation when overtaking and passing bicyclists. Failure to do so could cause motorists to receive a fine under the motor vehicle code "failure to grant the right of way to a bicycle" (14-242). Due to the large disparities in size, weight, and speed between bicycles and motor vehicles, bicyclists are at a tremendous disadvantage in the result of a collision with a car or truck. This law strives to increase motorist awareness of bicycles, and to make conditions safer by preventing collisions.

Planning for sidewalks and pedestrian accessibility is important to the economic success and quality of life of the city and town centers within the region. RiverCOG has consistently worked with member municipalities, businesses, state agencies, and transit districts to support facilities and development that includes pedestrians and bicyclists.

Bicycle and Pedestrian Programs

There are programs in the region and state to improve the environment for bicyclists and pedestrians. The state's Community Connectivity Program places an emphasis on bicyclists and pedestrians through road Safety Audits (RSAs) and funding for infrastructure improvements. The Safe Routes to School (SRTS) Program was designed to help communities to make walking and bicycling to school a safe and routine activity for children in Kindergarten through eighth grade. The state's Vendor-in- Place (VIP) Paving Program looks at whether it is appropriate to reduce lane width, allowing for wider shoulders during the routine repaving and restriping of roads. Since 2012, CTDOT has been reducing lane widths to 11 feet, where applicable, which has allowed for state roadways to become more bicycle and pedestrian friendly. The state's sidewalk and Complete Streets policies have also aided in sidewalk de-

Figure 4.3 Airline Trail to Farmington Canal Connector

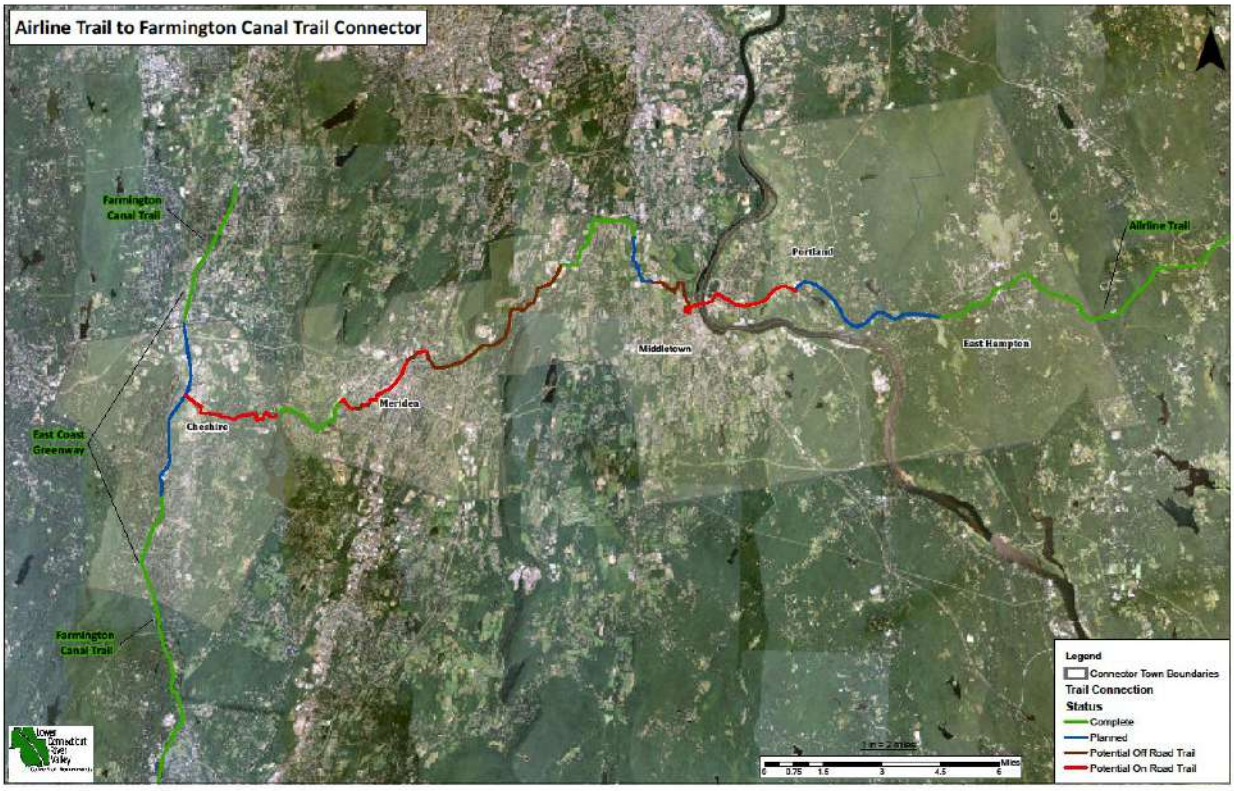


Figure 4.4 Valley Railroad State Park: Rail maintained south of Haddam

Source: VRR Tourism, Passenger, Freight Rail Economic and Structural Feasibility Study (2015)

velopment and accommodation of all users in the design of any transportation facilities.

Other programs include CTDOT's Give Respect, Get Respect, Share the Road Program in which "everyone should feel safe on Connecticut's roads" and workshops such as the Bi-annual Connecticut Bike Walk hosted by Bike Walk CT since 2013. In addition, advocacy groups, bike shops, and other organizations organize regularly scheduled group rides and annual events to help connect bicyclists of similar interests and abilities.

Airline Trail Extension

The Jonah Center for Earth and Art is promoting an 18-mile bike route that would allow cyclists on the Air Line Trail to reach the Farmington Canal Trail in Cheshire (part of the East Coast Greenway). The route would consist mostly of off-road trails traveling westward from the Arrigoni Bridge through Middletown, Meriden, and Cheshire. Of this 18-mile route, approximately 7 miles have already been built or planned in Meriden and Middletown. Navigating eastward from Cheshire, bicyclists could reach the scenic Air Line Trail in Portland and continue for 25 additional miles to reach Willimantic and reconnect with the East Coast Greenway.

The Jonah Center has been working with Middletown's Complete Streets Committee and Public Works Department to work on the Newfield Corridor Trail for which funds were allocated in the 1915 Parks Improvement Bond Referendum. This 3-mile segment would connect the existing Mattabesset Bike Trail with a point near downtown Middletown, either Veterans Park or the North End.

The Jonah Center has been coordinating with RiverCOG, the City of Meriden, the City of Middletown, the Town of Portland, and the Town of Cheshire to start cross-boundary communication, build support, and advance this idea. The project appears very promising not only because it complements the Connecticut section of the East Coast Greenway, but also because it would result in a 125 mile loop trail in central Connecticut, passing through Meriden, Middletown, Portland, East Hampton, Willimantic, Manchester, Hartford, Bloomfield, Simsbury, Avon Farmington, Plainville, Southington, and Cheshire.

An Air Line Trail – Farmington Canal Trail Connector Route would provide many benefits to the towns involved and to the state as a whole.

- It would enhance existing shorter walking and cycling trails by greatly increasing the accessible mileage of each. Bicycle travel for school children and bicycle commuters would be vastly improved.
- It would provide a bike route to the commuter rail hub in downtown Meriden which cyclists could use to travel to New Haven, Hartford, or Springfield and beyond.
- It would connect the Air Line Trail with the East Coast Greenway at two locations, Cheshire and Willimantic, thereby creating a 125 mile bike trail loop around the greater Hartford area. Such a facility would be sure to attract recreational bicyclists from a large surrounding area.

The Jonah Center will continue to partner with the RiverCOG, local officials, state legislators, and statewide bike/ped advocacy organizations to make this vision become a reality. The next steps forward are likely to be completion of the Newfield Corridor Trail in Middletown and the extension of the Airline trail from its terminus near Camp Ingersoll west to Middletown.

RECOMMENDATIONS

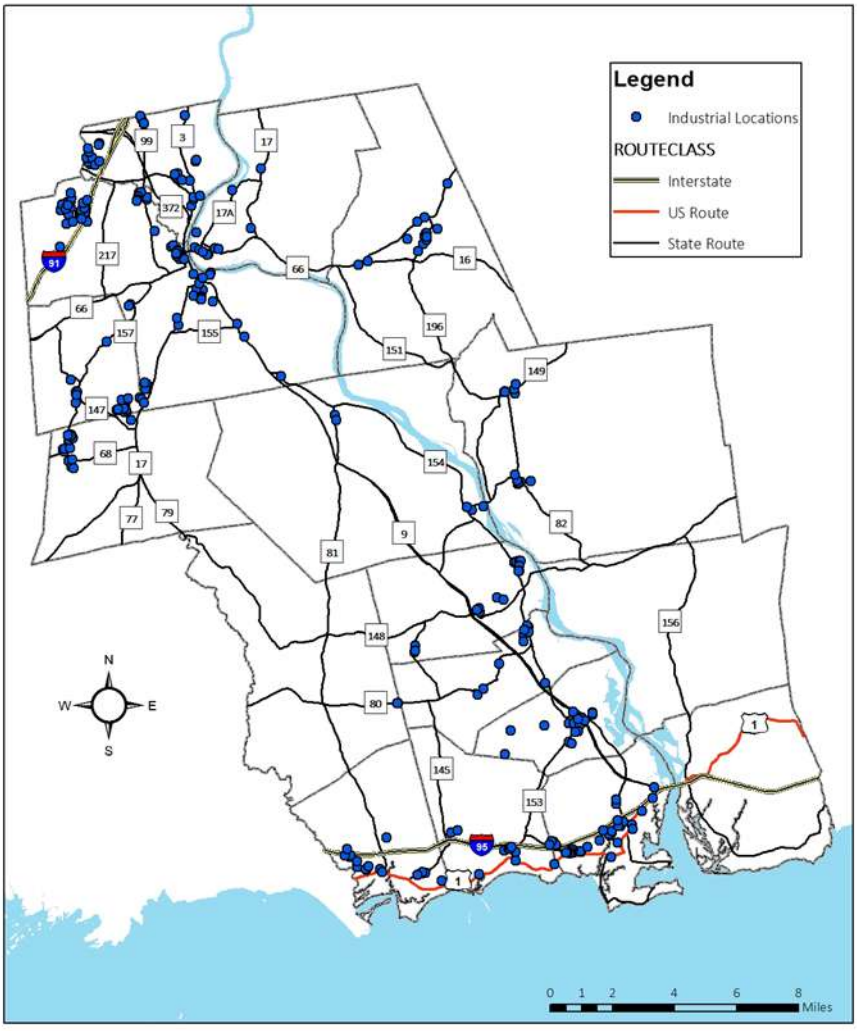
- Finalize and adopt a Regional Bicycle and Pedestrian Plan
- Obtain funding and assistance for Complete Streets planning for sidewalk planning and construction, with the regional goal of linking dense population clusters within the towns
- Establish a system of multi-us trails connecting open spaces while respecting landowner rights
- Map and promote various biking options for various users, specifically bike commuters
- Prioritize commuter bike facilities for funding and promote programs for advocating support by regional businesses
- Integrate bicycle and pedestrian facilities with other transportation modes, particularly transit
- Encourage bicycle links between neighborhoods, employment centers, schools, parks and other destinations
- Support and promote bicycle and pedestrian safety and education through coordination with CTDOT, school districts, colleges, traffic safety commissions, police departments, and businesses.
- Develop model zoning and subdivision regulations for complete streets that accommodate multiple transportation modes for potential town adoption
- Consider reducing traffic speeds and traffic calming techniques to provide bicyclists and pedestrians with safer routes
- encourage town to form complete streets committees

FREIGHT NETWORK

Efficient movement of freight within and through the region is important to industry, retail, agriculture, international trade, and freight terminal operators. Within the LCRV region, freight is transported primarily by truck, and a small portion of heavy material is transported by railroads. A small amount of petroleum products also travel on barges up the Connecticut River to Portland. RiverCOG has begun a regional freight analysis to better identify measures to improve freight movement within the region, in part by analyzing receiving and distribution points, shown in Map 4.6.

The CTCOGs and CTDOT worked in partnership to develop a statewide freight plan as Connecticut is small, therefore much of the freight is passing through not only regions but also the state. Goals of the 2017 Statewide Freight Plan are to 1) support economic competitiveness, efficiency, and development through investment in the

Map 4.6 LCRV Region Industrial Freight Locations



Source: RiverCOG Economic Data

Figure 4.5 Valley Railroad State Park: Deteriorating track and vegetation on Higganum Cove bridge

Source: RiverCOG (2014)

freight transportation system, 2) enhance the safety and security of the freight transportation system in all modes, 3) ensure adequate capacity and operational efficiency of the freight system, 4) proactively maintain freight system infrastructure to preserve capital investments and accommodate freight traffic and activity, and 5) ensure that improvements to the freight system do not negatively impact the environment and help improve the quality of life for residents and visitors.

Transearch data shows over 212.0 million tons of freight traversed the Connecticut transportation infrastructure network in 2014, valued at over $365.4 billion. Trucks carry the majority of both tonnage (93.7%) and value (92.4%). However, as values per ton vary significantly between modes, the non-truck statewide modal composition varies between tonnage and value.

• Truck: 198.7 million tons (93.7% of total) and $337.5 billion (92.4% of total)
• Port: 9.8 million tons (4.6%), valued at $9.2 billion (2.5%)
• Rail: 3.1 million tons (1.5%) and $2.2 billion (0.6%)
• Air: 0.1 million tons (0.1% total) and $16.5 billion (4.5%)
• Pipeline: relatively insignificant volumes and value compared to other modes

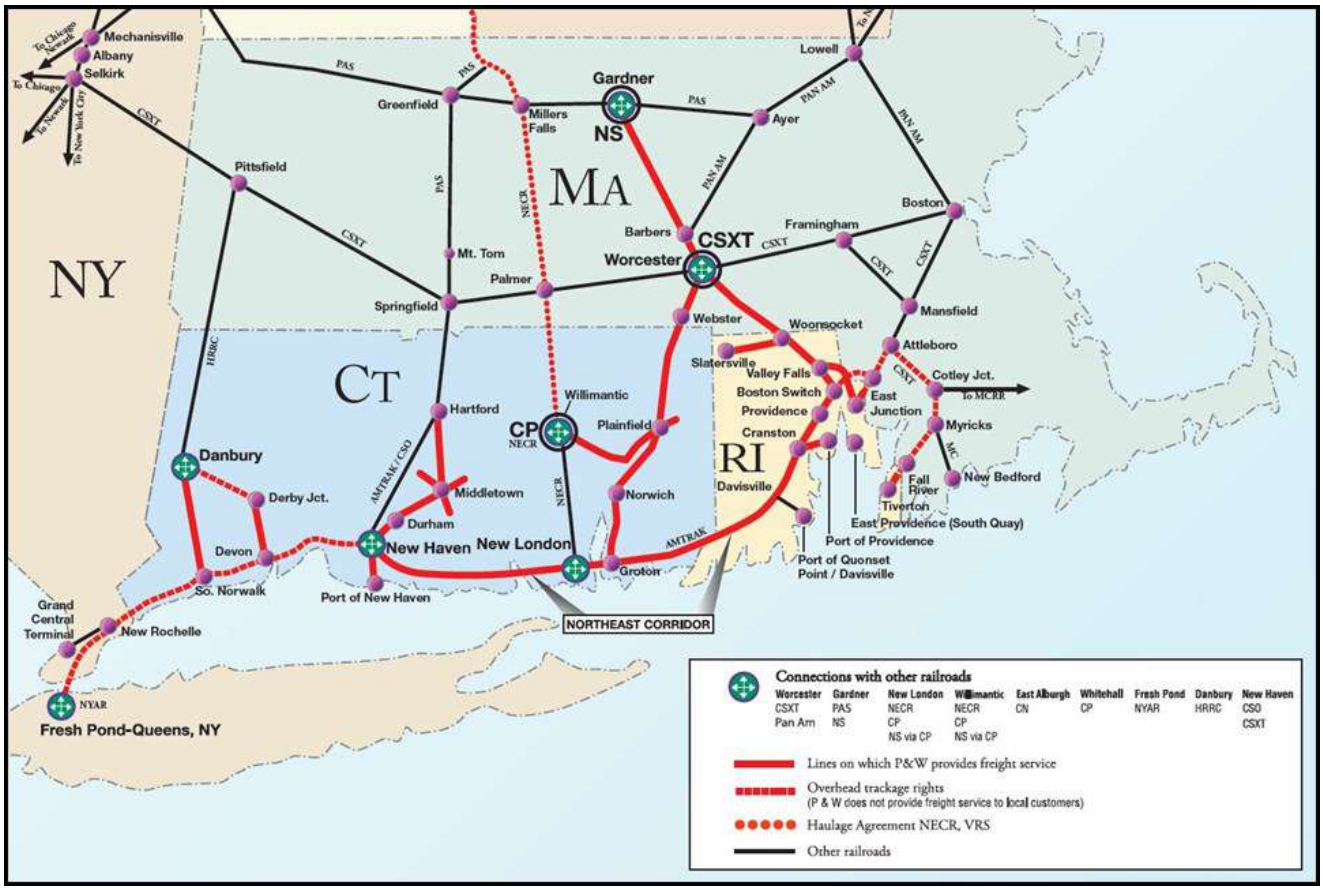
Disaggregation of the modal movements by direction reveals nuances. Through tonnage dominates directional movements, due almost entirely to trucking. Tonnage and value data tabulated by mode and direction are summarized below:

- Outbound: 36.1 million tons from Connecticut to out-of-state destinations represent 17.0% of directional volumes, with trucking as the dominate mode (33.6 million, 93.1%), followed by rail (1.8 million, 5.0%). Outbound value is $64.0 billion for 17.5% of directions.
- Inbound: 58.3 million tons from out of state destined to Connecticut (27.5% of directions) are mostly truck (48.6 million, 83.4%) and water (8.7 million, 15.0%). Inbound tonnage is valued at $92.8 billion for 25.4% of directional value.

• Intrastate: 23.3 million tons (11.0% of directions) and valued at $29.9 billion (8.2%), intrastate tonnage movements are the smallest proportion of directional movements. As with other directions, the movements are comprised mostly of truck (95.9% for tonnage and 99.7% for value).
• Through: A total of 94.3 million tons of through movements valued at $178.6 billion, almost entirely via truck (99.9% for both tonnage and value), comprise the largest relative share of the directional movements (44.5% of volumes and 48.9% of values), highlighting Connecticut's role as a "bridge" state.

By 2040, Transearch forecasts an increase in tonnage to 332.4 million, a 56.8% increase from the 212.0 million 2014 base tonnage. In value terms, the forecasted amount of $732.5 billion represents a 100.4% increase from the $365.4 billion 2014 base value. Compositionally, the directional movements remain relatively constant with through traffic continuing to amount to almost as much as the other directions combined. Additionally, the commodity mix is forecasted to remain similar to 2014 with the same top five commodities ((petroleum/coal, non-metallic minerals,

Map 4.7 Providence & Worcester Railroad Map



Source: Providence & Worcester Railroad (current as of 4/1/15)

food/kindred products, secondary traffic (freight flows to and from distribution centers or through intermodal facilities)) and clay/concrete/glass/stone) by tonnage but with a moderate re-ranking.

Regional Highway Freight Corridors

Connecticut Route 9 provides freight movement via truck in a north-to-south orientation through the middle of the LCRV region, parallel to the Connecticut River to the east, and connects I-95 in Old Saybrook with I-91 in Cromwell and the Hartford metro region. Route 9 is a limited access expressway except for a short stretch in Middletown where two traffic lights exist at signalized intersections. The highway is typically four lanes divided with climbing lanes provided as necessary. Congestion occurs in the northbound direction in Middletown during the normal morning rush hours and in the southbound direction in the evening during normal evening rush hours. Outside of the vicinity of the traffic lights, congestion is almost non-existent along the portion of Route 9 within the region. Single unit trucks (type 4-7) account for only 1.9% of volume on Route 9 during rush hour and 2.6% of annual average daily traffic (AADT) between exits 9 and 10. Combination trucks (type 8-13) are less prevalent than single unit trucks and account for only 1.1% of traffic during rush hour, and 2.0% of AADT, according to CTDOT's Traffic Report conducted in June 2012.

I-95 runs along the Southern edge of the LCRV region parallel to the Long Island Sound in an east-to-west orientation. The stretch of I-95 in the region is four lanes wide, except on the Raymond E. Baldwin Bridge, where it becomes six lanes wide. Climbing lanes are limited and travel is affected by tourist traffic congestion in the summer months. I-95 is the busiest interstate in the country and connects major metropolitan regions along the east coast. I-95, along with I-84, is the main trucking route between New York and Boston. International shipments arriving at the major ports in New York and New Jersey are often off-loaded and trucked into New England via I-95. Accidents, road work, and other issues along the interstate also lead to stopped traffic and delayed shipments.

The third major freight corridor lies in the northwest cor-

ner of the region. I-91 travels through the western portion of Cromwell and Middletown and, in addition to I-95, carries freight shipments between New York and Boston, as well as the Hartford metro-region. I-91 is a six to eight lane wide divided limited-access highway for most of its length through Connecticut, including the LCRV region. Congestion on I-91 is minimal in the region but is typical in and around Hartford.

Other corridors used for the transport of freight include Routes 154, 156, 66, 68, 17, 82, and 1. These are two lane undivided roads which run through the region providing access to homes and businesses.

Regional Freight Rail Corridors

A small percentage of freight is moved on rail. The primary operator of freight rail in the LCRV region is the Providence and Worcester Railroad (P&W). P&W is a short-line freight carrier based in Worcester, Massachusetts and operating in Massachusetts, Rhode Island, and Connecticut. According to the company website, P&W "transports a wide variety of commodities for its approximately 140 customers, including automobiles, construction aggregates, iron and steel products, chemicals and plastics (including ethanol), lumber, scrap metals, plastic resins, cement, coal, construction and demolition debris, and processed foods and edible foodstuffs, such as corn syrup and vegetable oils".

The LCRV region is home to two rail corridors which are used for freight service. The Northeast Corridor, owned by Amtrak, is the main rail route along the shoreline in Connecticut and the northeastern United States. The section in the region runs in an east-to-west direction parallel to Interstate 95 and Long Island Sound. The route is electrified and used for passenger service.

P&W operates freight service along the Northeast Corridor throughout the region to several customers. Their operations extend along the corridor from New Haven to Providence. P&W also holds overhead trackage rights along the Northeast Corridor between New Haven and New Rochelle, New York, but does not currently provide service to that area. Map 4.6 shows the P&W Railroad corridors.

The bulk of regional rail freight operations are currently in and around Middletown. P&W Railroad currently operates freight movements throughout the Middletown Cluster which includes shipments between Middletown and New Haven.

The Valley Railroad Corridor runs from a wye at Old Saybrook Junction with the Northeast Corridor, to the northwest Plant in the Maromas section of Middletown. Currently, about thirteen miles of track from the wye up to Route 82 in the Tylerville section of Haddam are used for the Valley Railroad Company's tourism steam train operations. A nine mile section from Route 82 up to Maromas is currently not usable by trains but is maintained free of vegetation and is passable, in parts, by a high-rail vehicle. The Valley Railroad has exclusive rights to the railroad at present with the right to operate freight service. To date, Valley Railroad has not operated any freight service and focuses solely on tourism operations. Figures 4.4 and 4.5 show the current state of two areas on the Valley Railroad Corridor.

Constraints for Freight Movement

The majority of constraints on the freight network lie with expressway corridors, particularly I-95. The Connecticut Department of Transportation has made it a priority in long-range plans to increase the width of I-95 from four lanes to six between Branford and the Rhode Island State line. Widening I-95 would relieve congestion; however, funding for this project is not yet in place. Other notable choke points within the region's roads network include the traffic lights on Route 9 in Middletown, the East Haddam Swing Bridge, and rail bridge underpasses. The moveable rail bridge crossing the Connecticut River from Old Saybrook to Old Lyme limits freight and commuter service due to required bridge openings for boat traffic.

Along the Northeast Corridor Railroad, the 112-year-old bridge crossing the Connecticut River is nearing the end of its useful life and is plagued by opening and closing failures causing cascading delays on Amtrak service between Boston, New York, and Washington. The bridge's movable span is a Bascule design in which one end is raised up to allow boats to pass. By law, the bridge must remain open from May through September for recreational boats to pass and closes only when trains approach. Over a century of operation in a marine environment, coupled with age of the structure, has taken its toll and speeds are restricted to 45 mph. The frequent opening and closing of the bridge, over 3,000 times per year , puts high demands on its aging components, increasing maintenance costs for Amtrak, and reducing reliability for both railway and marine traffic.

Amtrak currently plans to replace the Connecticut River Bridge. An Environmental Assessment (EA) and Preliminary Design has been completed, and is awaiting Federal Railroad Administration approval. The new design and configuration of a replacement bridge would aim to improve reliability and offer higher speeds for Amtrak and Shore Line East trains. Amtrak hopes to progress final design over the next few years, however, there are no identified funding sources for construction.

In addition, the lack of a freight rail bridge south of Selkirk, NY (about 140 miles north of New York City) over the Hudson River forces rail freight shipments north and therefore away from Connecticut. Freight coming up from the ports of New

York and New Jersey must either be trucked or brought north on railcars to Selkirk to cross the Hudson, then interchanged at Springfield with other freight operators in order to reach Connecticut markets, adding considerable mileage to Connecticut-bound rail freight.

RECOMMENDATIONS

- Improvement to Route 9 at the two traffic lights in Middletown is a high priority. The highway's proximity to the Connecticut River and the railroad are the primary reasons no solution has been implemented. Accidents or other incidents can create and exacerbate congestion. Rebuilding Route 9 in this area will be costly and, for this reason, a recommended action is a comprehensive analysis of freight movement and options for bypass routes.
- The East Haddam Swing Bridge is a 106-year-old movable bridge which crosses the Connecticut River between Haddam and East Haddam. Average daily traffic on this stretch of Route 82 is 10,700. Openings occur frequently for river traffic, causing traffic to back up considerably on both sides of the river. Mechanical failures in the past have caused complete closures for long periods of time, severely crippling traffic in the area. Recommended actions include advocacy for yearly bridge maintenance and extension of Chester-Hadlyme Ferry hours of daily operation to provide relief during seasonal congestion.
- Analysis of economic conditions and constraints outlined in the Valley Railroad Study, completed in 2015, and recommendations by RiverCOG for optimal use of the Valley Railroad State Park.
- Investigate solutions to benefit freight movements such as lane widths, turning radii, bridge widths, and shoulder widths. Freight mobility planning should be integrated into all future transportation planning, maintenance, and transportation improvements. RiverCOG should develop a freight inventory to help identify infrastructure improvements to improve freight mobility within the region.

AIRPORTS

Within an hour's drive of the LCRV Region residents can access three airports with commercial passenger service. Bradley International Airport in Windsor Locks, Tweed Airport in New Haven, and T.F. Green Airport in Warwick, RI offer direct flights to airports across North America, including airline hubs, where connections can be made to major international destinations. Neither Bradley International Airport nor Tweed New Haven is easily accessible to people lacking access to an automobile. T.F. Green Airport has a train station with commuter rail service provided from Providence, Boston and Wickford Junction in Southern Rhode Island. Long range plans to connect the Connecticut shoreline to T.F. Green via commuter rail are being advocated by state representatives. This link would be a valuable boost to the LCRV region's economy, especially as German airline Condor initiated seasonal transatlantic service from Frankfurt, Germany to T.F. Green in the summer of 2015.

Other nearby major airports include Logan International Airport in Boston, Newark Liberty International Airport in New Jersey, John F. Kennedy International Airport, and LaGuardia Airport in New York. These airports can be accessed by Amtrak or commuter rail from the LCRV region.

The LCRV region is home to two general aviation airports in Chester and East Haddam. Municipal comprehensive plans should acknowledge airports and consider their existing and futures roles in relation to zoning, transportation, economic development, and other planning factors. For example, commercial and certain industrial land uses are more compatible near airports than residential and noise-sensitive land uses. Similarly, land uses that are attractive to birds should be discouraged near airports as birds are a potential hazard to aircraft, just as smoke from industrial and manufacturing facilities can cause visibility problems. Figure 4.6 shows several types of airports and their associated roles.

RECOMMENDATIONS

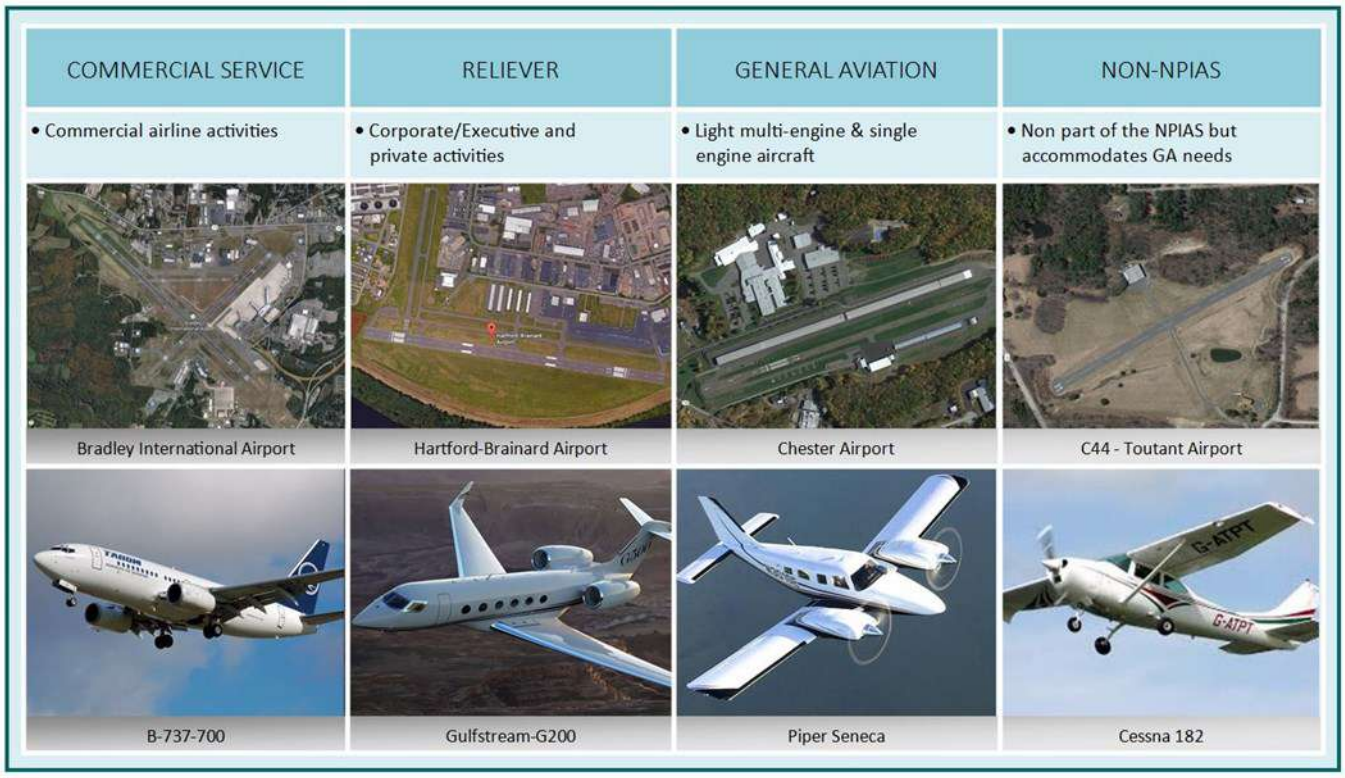
- Continued RiverCOG coordination with Connecticut Airport Authority for long range planning
- Establish a Riverside Flyer – Airport Public Shuttle Service through the Estuary Transit District with direct daily connections to Bradley International Airport
- Actively support passenger rail connections to T.F. Green Airport
- Work with East Haddam and Chester, as needed, to enhance land use regulations to promote use of the Chester and East Haddam airports

INTERCITY BUS, TAXIS, LIVERY, SHUTTLES & RENTALS

Peter Pan Bus Lines, Inc. primarily serves intercity routes in the Northeast. Peter Pan's Hartford to New Haven route stops at the commuter lot on Country Club Road in Middletown near the CT Department of Public Safety.

A few limousine and taxi companies service the region.

Figure 4.6 Airport Roles in Connecticut



Source: CAA

These include Hunter Limousine, Executive 2000 Transportation, Liberty Limousine, Premier Limousine, and CT Limo. All provide local and long distance trips in a variety of vehicles including sedans, limousines, vans and mini-

coaches. Arrow Cab, Yellow Cab, and Essex taxi are a few of the taxi operators in the area. Additionally, Enterprise, Hertz, Rent-a-Wreck and other car rental companies have locations the region.

RECOMMENDATIONS

- Accommodate intercity bus, taxi/livery, and automobile rental companies at important intermodal locations such as rail stations, large commuter lots, and town centers. Options include: ZipCar Locations, Uber/Lyft Ride Sharing, or Relay Rides.
- Perform analysis of regional market for rental cars and taxis optimizing fleets, schedules, and locations near transit-oriented centers.

FUELING & DISTRIBUTION

Electric Vehicles

CTDEEP operates the EVConnecticut program which provides funding to municipalities to subsidize the installation of charging station at major traffic generators such as town halls, downtowns, and other areas. The goal of the program is to support efforts to have 3.3 million EV's on the road by 2025. CTDEEP operates a similar program for private companies. Governor Dannel P. Malloy announced on April 22, 2014 that, with a growing network of publicly available charging stations for electric vehicles, Connecticut can now be considered a "range confident" state, giving drivers more confidence than ever before that they can recharge their batteries when needed. Governor Malloy stated, "For well over 90% of Connecticut residents, there is now a publicly-accessible electric vehicle charging station within twenty miles that drivers can use to power up the battery on electric vehicles."

There are seventeen charging stations in seven municipalities in the region, listed in Table 4.2. The electric vehicle chargers are either 50kW/480V or 150kW/480V and can fully charge a typical vehicle between 10 and 30 minutes. Level one chargers (1.4kW/120V) can fully charge a vehicle in eight to twelve hours and level two chargers (7.5kW/240V) in about three to six hours. The table shows the location and type of chargers located within the region. DC fast charging, sometimes known as Level three charging (or in the case of Tesla's own charging stations, the Tesla Supercharger), requires dedicated equipment which uses 480 volt direct current. DC fast

Table 4.2 Electric Vehicle Charging Stations in the LCRV Region

Town	Location	Address	Open	Level
Deep River	Deep River Library	150 Main St	24 hours	1 and 2
East Haddam	Shagbark Lumber and Farm Supply	RT 82 and Mt Parnassus	Business hours	2
East Hampton	Village Center	87 Main St	24 hours	2
Middletown	Lawrence School	Kaplan Dr	24 hours	2
Middletown	Mellili Plaza	245 DeKoven Dr	24 hours	2
Middletown	Middletown High School	200 LaRosa Ln	24 hours	2
Middletown	Middletown Nissan	1153 Newfield St	Business hours	2 and DC
Middletown	Middletown Public Schools Annex	310 Hunting hill Ave	24 hours	2
Middletown	Moody School	300 Country Club Rd	24 hours	2
Middletown	Wesleyan University	161 Cross St	24 hours	2
Old Lyme	DEEP Marine HQ	333 Ferry Road	24 hours	2
Old Saybrook	Big Y	28 Spencer Plains Rd	24 hours	2
Old Saybrook	Grossman Nissan	295 Middlesex Tpke	Business hours	2 and DC
Old Saybrook	Old Saybrook Inn	2 Bridge St	24 hours/guests only	2 and Tesla
Old Saybrook	Saybrook Point Marina	21 Bridge St	24 hours	2
Old Saybrook	VW of Old Saybrook	319 Middlesex Tpke	24 hours	2
Westbrook	Waters Edge Spa and Resort	1525 Boston Post Road	24 hours/guests only	1 and Tesla

Source: CT DEEP and CT DOE (2018)

charging can provide a 50-80% charge in thirty minutes or less. Unfortunately, not all EVs can support DC fast charging.

COMING CHANGES

There are a number of emerging technologies and initiatives that have the potential to impact how the LCRV travels in coming years. It is beyond the scope of this plan to speculate on adoption rates, technological breakthroughs, and similar matters out to 2045. However, it is worthwhile to note what changes are already occurring or being discussed so they can be proactively planned for and anticipated.

Connecticut Tolls and Congestion Pricing

For several years, Connecticut has been considering tolling as a potential new source of revenue to support its transportation programs. CTDOT has conducted studies to gain insight into how much revenue tolls might raise and how tolling can help manage congestion on busy highways. CDM Smith prepared the *Connecticut Tolling Options and Evaluation Study* in November 2018 to provide detailed answers to questions raised during recent tolling discussions among the governor, the legislature, state agencies, COGs and the public. The study provides estimates of revenue, cost, and congestion reduction benefits that could result from tolling. It is based on a statewide system and includes specific routes, toll locations, toll rates, discounts, costs, and revenue estimates to inform the on-going discussion on tolling, rather than providing specific recommendations.

The system, as detailed in CDM Smith's study, is a statewide, electronic tolling system inclusive of all interstate highways and four other major expressways and parkways. According to their analysis, CDM Smith projects this system would yield $950 million in annual net revenue in 2023 and is based on some of the lowest toll

rates in the country. Different scenarios were evaluated, but the scenario presented was selected for discussion because it met four criteria including 1) fairness, 2) equity, 3) flexibility, and 4) revenue efficiency.

All-electronic tolling (AET) systems, like that under consideration for Connecticut tolling, use electronic toll readers and cameras mounted overhead to read transponders and license plates of vehicles at normal highway speeds. Connecticut would join the existing E-ZPass system that is in use from Maine to Virginia as its payment and collection method.

The addition of new tolling systems on existing toll-free interstate highways is generally prohibited by federal law. However, the reinstitution of tolls, if ultimately approved by the State Legislature, would be enabled by the state's current designation as one of thirteen states in the Federal Highway Administration's (FHWA) Value Pricing Pilot Program (VPPP). This program requires the use of variable tolls by time of day, basically meaning higher rates during morning and evening peak hours to mitigate traffic congestion by: 1) encouraging drivers who do not need to travel during rush hours to shift to off-peak periods, 2) encouraging commuters to shift to alternate modes of travel such as car pools or transit, 3) encouraging drivers to combine or consolidate trips, which reduces traffic, and 4) encouraging drivers to choose alternative routes or alternate destinations.

One objective of tolling/congestion pricing on highways is the reduction of congestion, creating travel time savings along congested routes. Similarly, revenue would be dedicated to highway maintenance and improvements aimed at reducing congestion on the state's highway system.

Corridors evaluated in the region include I-95, I-91, and Route 9. Additional statewide corridors that were evaluated in the study include: I-84, I-395, I-291, I-691, Route 15, Route 8, and Route 2.

Concerns with regards to tolling in Connecticut include the potential loss of federal funds if state funds are collected, regressive taxation, and moving traffic to local roads as drivers attempt to bypass toll roads.

Modern Ridesharing

Ridesharing dates back to World War 2 when there was a shortage of gas resulting in shared rides, and later in the 1970s during both the oil and energy crises. Modern ridesharing works on a peer-to-peer driver-partner concept where drivers partner with a particular car sharing company like Uber and Lyft to provide rides to potential customers using technology based on smart phones, GPS and online services. Modern ridesharing services help to save money, reduce pollution, and conserve resources. Future advances in the ridesharing industry may include the use of autonomous vehicles, greater employer incentives for ridesharing, more predictive navigation software, and the potential for infrastructure transformation to accommodate the modern ridesharing trend.

Autonomous Cars

Autonomous cars—also known as driverless cars, self-driving cars or robot cars—are vehicles that can pilot themselves without human intervention. These vehicles are now a reality, though not yet commercially available to consumers. However, many vehicles now come with lower levels of automation, including self-braking cars that can engage the brakes many times faster than a human driver can react to avoid accidents. Another increasing common feature in modern vehicles is lane departure assist, which can sense if the car is drifting into another lane and either provide a warning to the driver or even steer the car back into the proper lane. While fully autonomous cars are several years from commercial availability, they have the potential to one day greatly reduce accidents and congestion by continually sensing and communicating with the other vehicles on the road and even new "smart" road surfaces.

Automated vehicles have the potential to significantly transform the nation's roadways. They offer potential safety benefits but also introduce uncertainty for the agencies responsible for the planning, design, construction, operation, and maintenance of the roadway infrastructure. In 2018, FHWA initiated a national conversation with partners and stakeholders, as well as the public at-large, to receive input on key areas of interest and to prepare FHWA programs and policies to incorporate automation considerations. Meetings have been held across the country to facilitate information sharing, identify key issues, and support the transportation community to safely and efficiently integrate automated vehicles into the road network. The input received will help inform FHWA research, policies, and programs.

In Connecticut, pursuant to Public Act 17-69, a Fully Autonomous Vehicle Testing Pilot Program (FAVTPP) has been established by OPM, in consultation with DMV, DOT, DESPP, and the Connecticut Insurance Department (CID). This program encourages and allows for the testing of fully autonomous vehicles (FAV) on local highways in Connecticut. It allows for a variety of FAV testing in four municipalities throughout the state and brings Connecticut to the forefront of the innovative and burgeoning autonomous vehicle industry.

As autonomous car technology continues to evolve so do the potential benefits and costs. Some potential benefits include: 1) a reduction in crashes, 2) a reduction in travel time, 3) an increase in speed limits, 4) better parking in less space, 5) bet-

ter perception of the environment, 6) lower cost of insurance, 7) reduced theft, and 8) greater access to vehicles for the young, old, disabled and others who currently cannot drive. Some potential costs include: 1) high vehicle expense, 2) high infrastructure expense, 3) loss of jobs/employment, 4) artificial intelligence (AI) malfunction and/or hacks, 5) criminal/terrorist misuse or attacks, 6) and the need to settle matters of liability following accidents – is it the fault of the AI engineer, vehicle owner, people in vehicle, etc.?

Driverless cars represent the future of transportation. There has been a great deal of investment in driverless technology, but vehicle manufacturers still have technical and ethical challenges that will have to be addressed before autonomous and human driven vehicles can interact without great risks to one another. Until then, people will benefit from partial autonomous technology such as lane-changing systems, crash-avoidance, and post-accident braking systems.

WATERWAYS

The LCRV region's location on the Connecticut River and Long Island Sound makes water access important to the regional transportation system. There are two major transportation objectives for the regional marine resources, with recreational access being the primary objective. Alternative transportation and business support is a secondary objective. Access to recreational marine sites through sidewalk, bus, trail, and bicycle is important to the region's tourist economy and marine industry.

RECOMMENDATIONS

- Improved transit access to waterfront business areas
- Mapping and promotion of intermodal access to waterfront recreational and business areas

The East Haddam Swing Bridge decorated for the 4th of July.

Chapter 5.

SPECIALIZED PLANNING

A. INTELLIGENT TRANSPORATION SYSTEMS
B. TMA & UZA COORDINATION
C. CONGESTION MANAGEMENT & AIR QUALITY
D. TRANSPORTATION DEMAND MANAGEMENT
E. FAST ACT COMPLIANCE
F. INCIDENT MANAGEMENT
G. SECURITY
H. SAFETY
I. PERFORMANCE BASED PLANNING AND PROGRAMMING

A . INTELLIGENT TRANSPORATION SYSTEMS

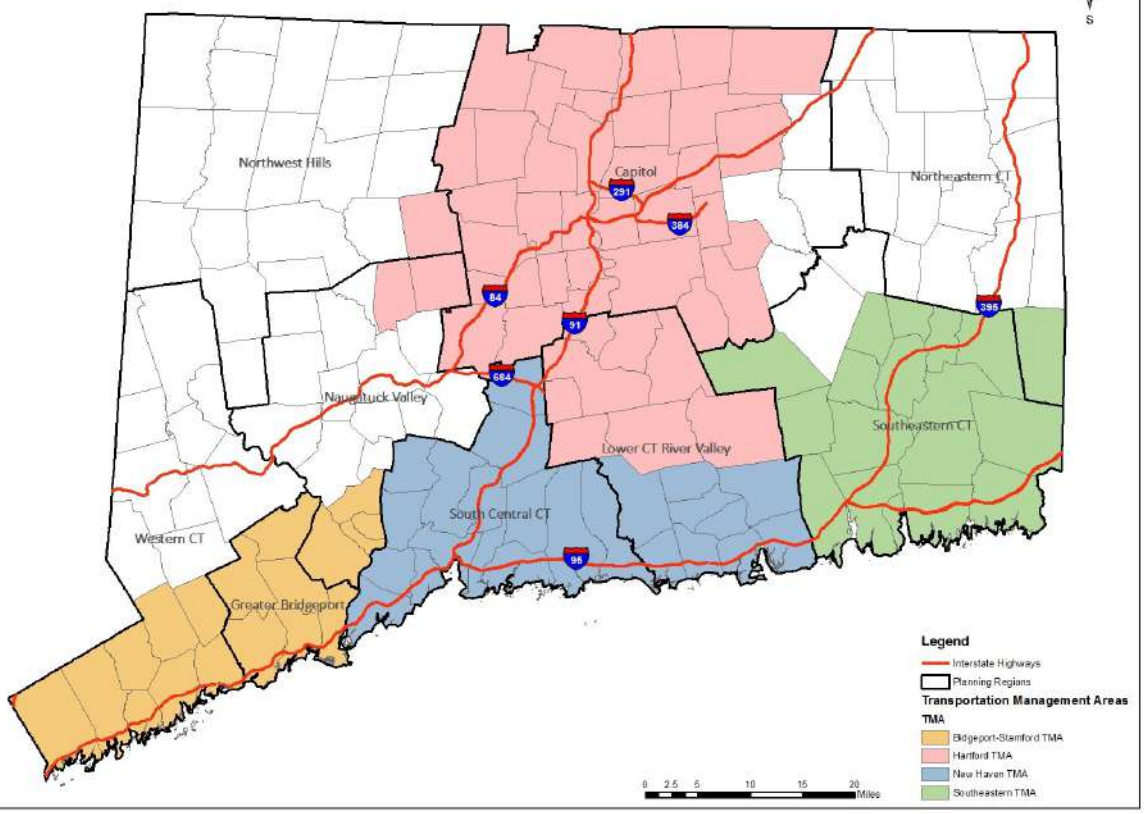
Intelligent Transportation Systems (ITS) can be defined as the application of advanced information and communications technology to surface transportation in order to achieve enhanced safety and mobility while reducing the environmental impact of transportation. ITS encompasses a broad range of wireless and wire line communications based information and electronics technologies. Applications focus on both the infrastructure and vehicle as well as integrated applications between the two. Familiar ITS technologies include electronic toll collection, in-vehicle navigation systems, rear-end collision avoidance systems, and dynamic message signs.

Prior federal transportation legislation required ITS projects to conform to national ITS Architecture and standards. The Federal Highway Administration's (FHWA) Final Rule and FTA's Policy on the national ITS Architecture were published in 2001 to foster the integration and deployment of regional ITS systems. CTDOT, in association with the three former MPOs in the Hartford Urbanized Area, had developed a Regional ITS Architecture for the Hartford Area in conjunction with the IBI Group. The final architecture was completed in August of 2004, and this was expanded to a statewide architecture in 2006. An ITS strategic plan was developed for the Hartford Urbanized Area in 1997 and updated in 2015. The plan lists ITS needs and costs of implementation.

Users of ITS in the region include AMTRAK, CTDEEP, CTDESPP, CTDOT, CT Transit, MTD, ETD, municipal public safety and public works departments, local media, citizens and many others. ITS are incorporated into programs such as traffic incident management systems, traffic information dissemination, roadway closure management, emergency routing, wide area alerts, network surveillance, work zone management, demand responsive transit, transit fare collection, transit operations and security, emergency dispatch, disaster response and recovery, and many additional activities. The driving public can notice featuress such as traffic cameras, variable message signs and highway advisory radio on major highways such as I-95, I-91, and RT 9.

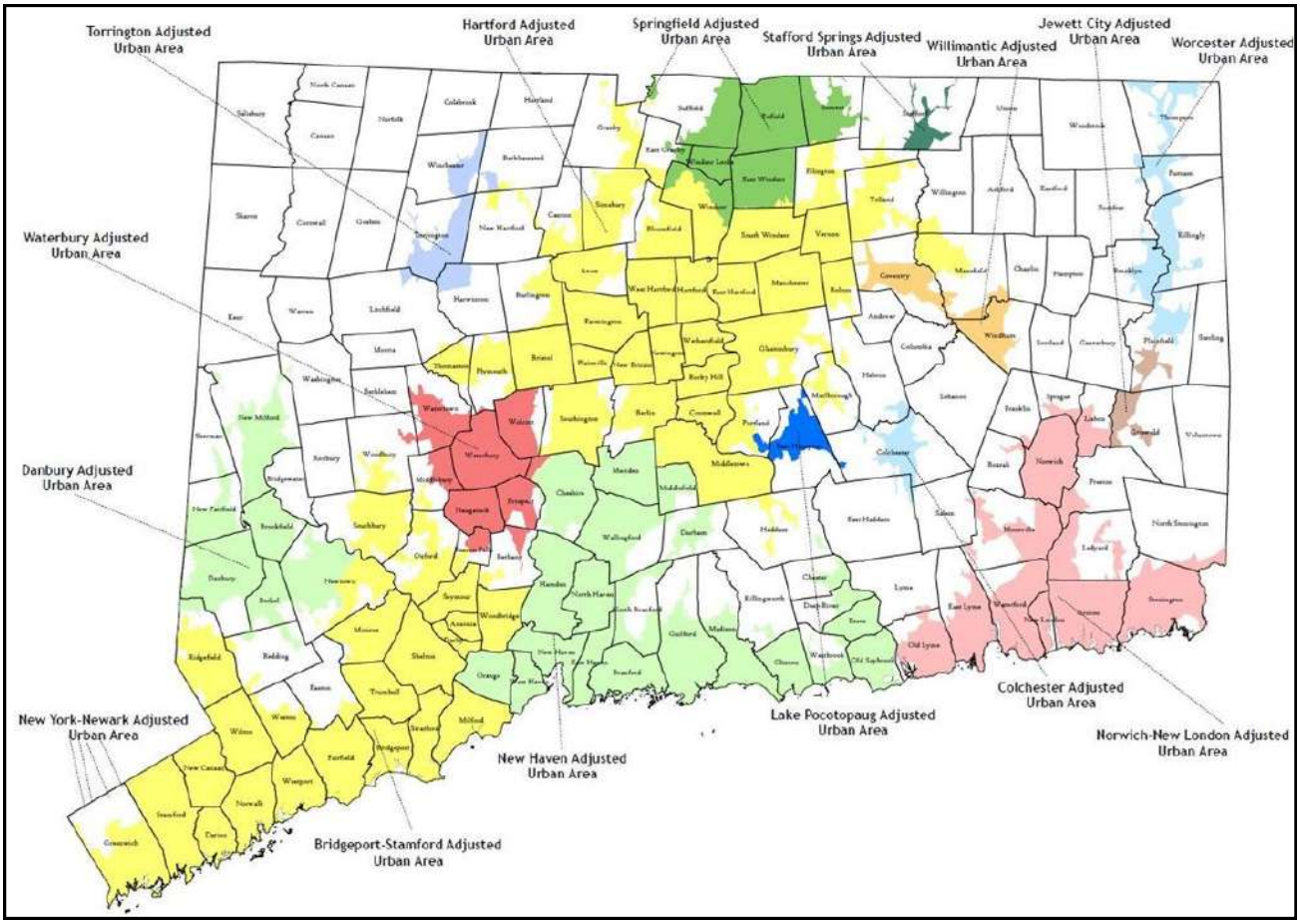
Technologies from the USDOT 2012 ITS Strategic Re-

Map 5.1 Connecticut Transportation Management Areas



Source: CT Department of Transportation, RiverCOG

Map 5.2 Adjusted Federal Aid Urban Boundaries (2010)



Source: RiverCOG

search Plan update include: vehicle to vehicle (V2V) communication for safety, vehicle to infrastructure (V2I) communication for safety, real time data capture and management, dynamic mobility applications, road weather management, application for environmental real time information synthesis (AERIS), human factors, mode specific research, and exploratory and cross cutting research and activities.

Systems Engineering is required for all federal-aid ITS projects per federal code 23 CFR 940, regardless of size or complexity. This process covers the entire life cycle of a project from planning (concept of operations, stakeholder and user needs identification) to design, operations, and maintenance. The Systems Engineering Analysis Form (SEAFORM) is submitted to FHWA for concurrence and oversight level. CTDOT and FHWA determine if the project is a major or minor ITS project and follow design procedures based on that determination.

B. TMA & UZA COORDINATION

RiverCOG is a Metropolitan Planning Organization (MPO) responsible for transportation planning for the LCRV region. An MPO must be designated for each urbanized area defined in the most recent decennial Census with a population of more than 50,000 people. RiverCOG hosted MPOs for the former Midstate and Connecticut River Estuary MPOs. The MPOs were officially merged into a single entity and board on April 3, 2014, creating the Lower Connecticut River Valley MPO.

A Transportation Management Area (TMA) is designated by the Secretary of Transportation when an urbanized area (UZA) has a population of over 200,000. TMA coordination is essential in the administration of the federal surface transportation program. RiverCOG shares transportation planning responsibility for portions of the Hartford, New Haven, and New London TMAs and UZAs. RiverCOG coordinates with the other COGs in the TMAs / UZAs, including Capitol Region COG, South Central Region

COG, and Southeastern Connecticut COG. The LCRV region's eight northern towns are in the Hartford TMA while the seven southern towns are in the New Haven TMA. The towns of Lyme and Old Lyme are in the Southeastern TMA on the eastern side of the Connecticut River. See Map 5.1 for a visual depiction of the TMAs and Map 5.2 for UZA boundaries within the state.

River MPO documents such as the Unified Planning Work Program (UPWP), Transportation Improvement Program (TIP) and Metroplitan Transportation Plan (MTP) are reviewed by the other neighboring MPOs for consistency. Federal funding programs such as the Surface Transportation Program (STP), Congestion Mitigation and Air Quality Program (CMAQ), Transportation Alternatives program (TA), FTA Section 5310 program and others are also reviewed in a coordinated process between MPOs. Many transportation planning programs are performed at the TMA or UZA level including the Locally Coordinated Human Services Transportation Program (LOCHSTP), Congestion Management Process (CMP), Intelligent Transportation Systems (ITS), incident management, mobility management and other programs.

RECOMMENDATIONS

- Enhance coordination on larger TMA planning issues with CRCOG, SCRCOG and SECOG
- Finalize memorandums of understanding with CRCOG, SCRCOG, and SECOG once new Connecticut MPO boundaries have been finalized

C. CONGESTION MANAGEMENT & AIR QUALITY

CONEGESTION MANAGEMENT

Development patterns of the LCRV region have fostered a near universal dependency on the automobile. Automobile transportation and land use patterns over the last 60 years have been mutually self-supporting. If roads were improved or widened, then new commercial and residential developments would take advantage of the expanded traffic capacity until new traffic generated by more intense land uses would again exceed the road capacity. This leads to a cycle of more corridor improvements and ultimately road widening or highway or bypass construction to accommodate the congestion, induced by greater traffic carrying capacity.

As a response to the unsustainable cycle of road building and the unattractive sprawl-type development that this cycle promotes, as well as increasingly limited resources and environmental concerns, other approaches to addressing road congestion are being implemented. The focus is shifting from the singular goal of moving automobile traffic to a more comprehensive focus on community livability. Concepts such as complete streets, transit oriented development, traffic calming, and share the road are being implemented, along with other efforts to improve the economic vitality of a town or neighborhood, but accommodate all modes of transportation.

The aging population will have different transportation needs including transit and more walkable neighborhoods. Younger generations are less interested in automobile ownership and also have a greater preference for denser, less car-based communities focused around mass transit. The challenge for the region and Connecticut as a whole is to get ahead of these trends by proactively investing in more complete transportation networks and implementing land use policies that are less auto-centric.

RiverCOG is partnering with both Capital Region Council of Governments (CRCOG) and South Central Regional Council of Governments (SCRCOG) in planning for congestion mitigation and reduction. CRCOG has taken the lead managing role in the congestion management process (CMP) in the Hartford Urbanized Area, and SCRCOG is the lead organization in the New Haven Urbanized Area. The Hartford Area CMP was updated in 2017 using NPMRDS data. The New Haven area CMP was updated in 2015 by VN Engineers. CMP data collected from the LCRV region is included in the CMP reports for both urbanized and non-urbanized areas.

There are several general categories of congestion mitigation strategies that have the potential to be implemented at the regional or roadway level. These strategies include:

- Transportation demand management strategies (TDM's)
- Traffic operational improvements
- Measures to encourage high occupancy vehicle (HOV) usage
- Public transit capital improvements
- Public transit operational improvements
- Measures to encourage non-motorized modes of transportation
- Congestion pricing
- Growth management
- Access management
- Incident management
- Intelligent transportation systems (ITS)

- Increased roadway capacity

Some of these strategies may be more viable than others. Traffic operational improvements such as signalization operational improvements, enforcement, and management will likely be the most common strategies based on the region's roadway network and patterns of congestion.

Table 5.1 Ozone Conformity
VOC and NOx Emissions Budget Test Results

Year	Ozone Area	Series 31G		Budgets		Difference	
		VOC	NOx	VOC	NOx	VOC	NOx
2018	CT Portion NY/NJ-LI	16.61	23.74	17.6	24.6	-0.99	-0.86
	Greater CT	14.96	21.18	15.9	22.2	-0.94	-1.02
2025	CT Portion NY/NJ-LI	12.39	13.94	17.6	24.6	-5.21	-10.66
	Greater CT	11.18	12.53	15.9	22.2	-4.72	-9.67
2035	CT Portion NY/NJ-LI	7.27	8.45	17.6	24.6	-10.33	-16.15
	Greater CT	6.49	7.53	15.0	22.2	-9.41	-14.67
2040	CT Portion NY/NJ-LI	6.41	7.85	17.6	24.6	-11.19	-16.75
	Greater CT	5.76	7.01	15.9	22.2	-10.14	-15.19

Source: CTDOT Ozone AQC Determination, March 2015

AIR QUALITY

A conformity report is required by the federal Clean Air Act Amendments of 1990 (CAAA). The MPOs and CTDOT work cooperatively to develop and endorse the Air Quality Conformity Statement which demonstrates that each TIP, STIP, MTP, and "regionally significant" project conform to the requirements of the CAAA. CTDOT analyzes all regionally significant projects identified in the draft MTPs and the TIPs prepared by the MPOs. The conformity statement certifies to the federal government that the projects in the STIP and LRP will "conform" to the State Air Quality Implementation Plan (SIP). The SIP, required for "non-attainment areas" where certain types of pollutants do not meet federal standards, is a plan to reduce the emissions of volatile organic compounds, nitrogen oxides, and carbon monoxide to meet the federally mandated air quality standards.

Air Quality Conformity

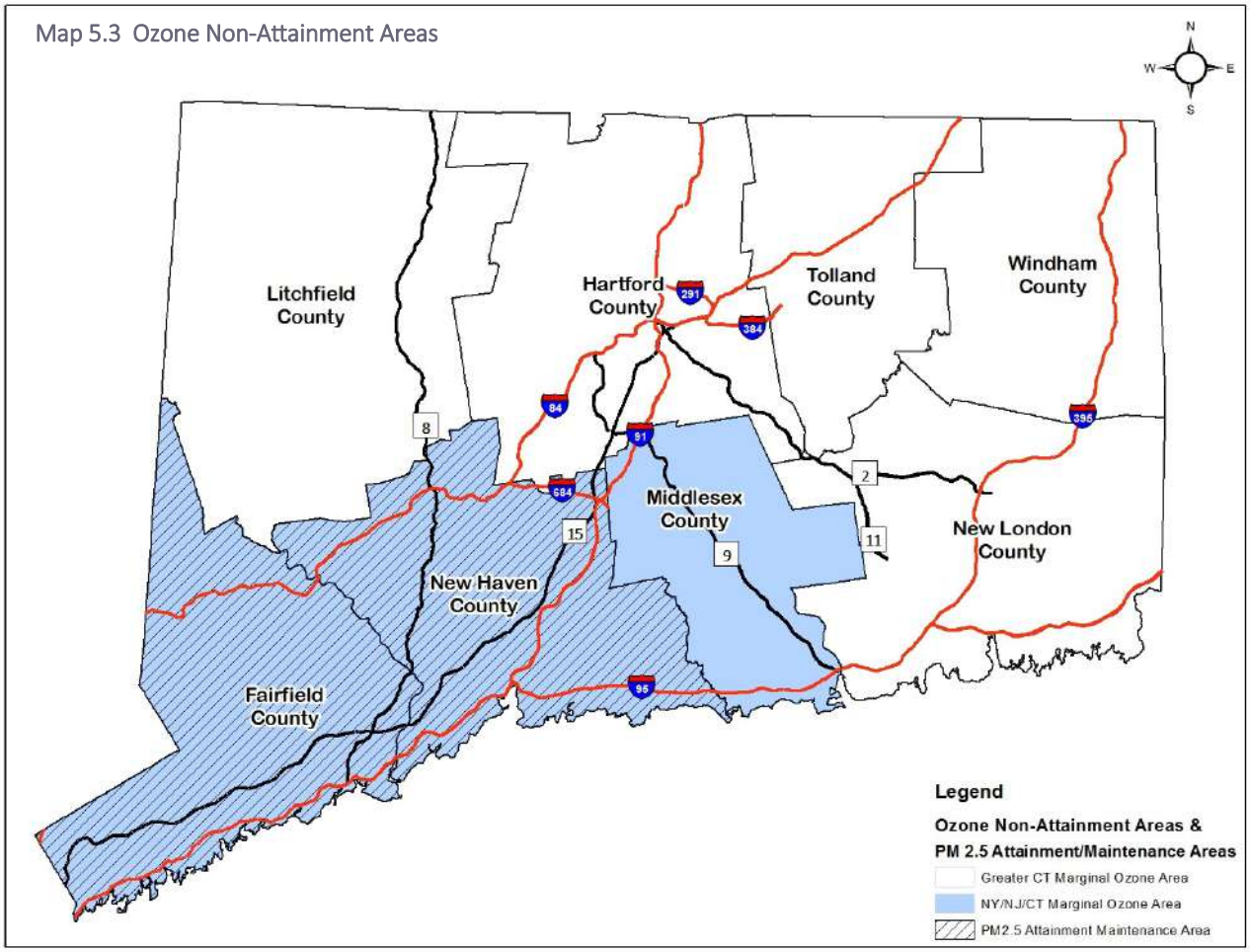
The Clean Air Act and Amendments of 1990 define a "nonattainment area" as a locality where air pollution levels persistently exceed the National Ambient Air Quality Standards (NAAQS). Nonattainment areas are reviewed by the EPA every five years. The LCRV region is in an eight-hour ozone non-attainment area. Therefore, projects in the TIP, MTP, and regionally significant projects cannot create new violations to the NAAQS. A regionally significant project is defined as a transportation project (other than an exempt project) that is on a facility serving regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sports complexes, etc., or transportation terminals as well as most terminals themselves). The project would normally be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel.

CTDOT performs the air quality conformity (AQC) analysis determination when TIPs are updated, metropolitan transportation plans are updated, and when a project deemed regionally significant is added to a TIP or MTP. The AQC Determination is a coordinated effort with CTDOT, CTDEEP, EPA, FHWA, and regional planning organizations. The determination document shows the relationship between the state travel demand models and the EPA approved MOVES2014b emissions model to determine if the transportation system build out creates new violations to the NAAQS or not. New violations result in nonconformity with the Clean Air Act.

Regional planning organizations in nonattainment areas are required to have a thirty-day public comment period on the determination. This is included with the TIP and MTP updates. Regionally significant projects in the past were only acted upon by the regional planning organization in which they were located. Recently, FHWA decided that all the regional planning organizations within the nonattainment area have to act upon the AQC determination except beyond state boarders.

In relation to the TIP, the future transportation system as a result of fully implemented TIPs and MTPs must pass a series of tests. For ozone non-attainment areas VOC and NOx emissions from the action scenario must be lass than the 2017 transportation emission budgets if the analysis year is 2017 or later. The action scenario is the future transportation system that will result from full implementation of the TIP and MTP. VOC and NOx emission analy-

Map 5.3 Ozone Non-Attainment Areas



Source: CT Department of Energy and Environmental Protection, RiverCOG

sis was conducted for summer conditions and 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)

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.

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.

Transportation Control Measures (TCMs)

Under the Transportation Conformity Rule, Transportation Control Measures (TCMs) are strategies that are specifically identified and committed to in State Implementation Plans (SIPs); and are either listed in Section 108 of the Clean Air Act or will reduce transportation-related emissions by reducing vehicle use or improving traffic flow.

Measures that reduce emissions by improving vehicle technologies, fuels, or maintenance practices are not TCMs. Section 108 of the CAA provides examples of

TCMs including, but not limited to improved public transit, traffic flow improvements and high-occupancy vehicle lanes, shared ride services, pedestrian/bicycle facilities, and flexible work schedules.

Implementation of TCMs criteria must be satisfied before conformity determinations can be made. Consequently, TCMs receive the highest priority for funding under the Congestion Mitigation and Air Quality Improvement (CMAQ) Program .

Many other measures, similar to the TCMs listed in the CAA, are being used throughout the country to manage traffic congestion on streets and highways and to reduce vehicle emissions. Increasingly they are being recognized for their benefits to improve an area's livability. These TCM type activities may be eligible for CMAQ funding, whether or not they are in approved SIPs, if they are documented to have emission reduction benefits in non-attainment and maintenance areas. These activities have been employed throughout the country for many years and include many travel demand management strategies.

D. TRANSPORATION DEMAND MANAGEMENT

Transportation Demand Management (TDM) is a general term for strategies that result in more efficient use of transportation resources. Some TDM strategies are designed to achieve specific objectives such as congestion reduction, emissions reduction, improving equity, improving livability, parking solutions, safety strategies and others. They can be implemented by individuals, community organizations, institutions, businesses and municipal, regional, state, and federal governments. The tables in Appendix C show examples of specific TDM strategies by categories.

Various existing programs can be used to support TDM initiatives and are noted above. Transportation data collection and surveys can be used in the TDM program planning and evaluation process. Access management can be used to facilitate livable communities plans. ITS can be used to improve transportation system performance and efficiency. Marketing schemes can be used to encourage programs that promote TDMs, and other programs can be used to incorporate TDM into the transportation planning process.

E. FAST ACT COMPLIANCE

The FAST Act, Fixing America's Surface Transportation Act, (P.L. 114-94) has transformed the policy and programmatic framework for transportation investments to guide the transportation system's growth and development. The FAST Act funds surface transportation programs include, but are not limited to, Federal-aid highways at over $305 billion for fiscal years (FY) 2016 through 2020. It creates a more streamlined and performance based surface transportation program and builds on many of the highway, transit, bike, and pedestrian programs and policies established since 1991. The act establishes a cooperative, continuous, and comprehensive framework for making transportation investment decisions in metropolitan areas. Program oversight is a joint Federal Highway Administration/Federal Transit Administration responsibility.

The FAST Act continues the MAP-21 approach to formula program funding, authorizing a lump sum total instead of individual authorizations for each program. Once each State's combined total apportionment is calculated, funding is set aside for the State's Metropolitan Planning program from the State's base apportionment [23 U.S.C. 104 (b)(6)] and the State's apportionment for the National Highway Freight Program [23 U.S.C. 104(b)(5)(D)]. The Fast Act continues to prohibit transfer of Metropolitan Planning Program funds to other apportioned programs. [23 U.S.C. 126(b)(1)]

The prior Moving Ahead for Progress in the 21st Century Act (MAP-21), enacted in 2012, included provisions to make the Federal surface transportation more streamlined, performance based, and multimodal, and to address challenges facing the U.S. transportation system, including improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

The FAST Act builds on the changes made by MAP-21 by including new goals to:

- *Improve mobility on America's highways*

The FAST Act establishes and funds new programs to support critical transportation projects to ease congestion and facilitate the movement of freight on the Interstate System and other major roads. Examples include developing a new National Multimodal Freight Policy, apportioning funding through a new National Highway Freight Program, and authorizing a new discretionary grant program for Nationally Significant Freight and Highway Projects (FASTLANE Grants).

- *Create jobs and support economic growth*

The FAST Act authorizes $226.3 billion in Federal funding for FY 2016 through 2020 for road, bridge, bicycling, and walking improvements. In addition, the FAST Act includes a number of provisions designed to improve freight movement in support of national goals.

- *Accelerate project delivery and promote innovation*

Building on the reforms of MAP-21 and FHWA's Every Day Counts initiative, the FAST Act incorporates changes aimed at ensuring the timely delivery of transportation projects. These changes will improve innovation and efficiency in the development of projects, through the planning and environmental review process, to project delivery.

The FAST Act continues most of the metropolitan planning requirements that were in effect under MAP-21. Minor revisions were made in areas regarding 1) support for intercity bus and commuter vanpools, 2) selection of MPO officials, 3) consultation with other planning officials, 4) scope of planning process, 5) capital investment and other strategies, 6) resilience and environmental mitigation activities, 7) transportation and transit enhancement activities, 8) participation by interested parties in the planning process, and 9) congestion management activities.

F. INCIDENT MANAGEMENT

The Connecticut Department of Emergency Services and Public Protection's (CTDESPP) division of Emergency Management and Homeland Security (DEMHS) encompasses five emergency planning regions and works with COGs and municipalities within these regions to develop emergency response plans. All plans in the state are NIMS (National Incident Management System) compliant as required by gubernatorial executive order thirty-four, dated June 12, 2013. CTDESPP is also working in conjunction with other agencies to update various emergency response planning documents.

Non-recurring incidents such as accidents and vehicle breakdowns are responsible for approximately 50% of all highway congestion. Incident management helps to manage highway congestion by providing quicker response time for accident clearance and safer traffic management in the vicinity of the incident. The region currently cooperates and plans with the Capital Region Council of Governments (CRCOG), Southeast Connecticut Council of Governments (SCCOG), South Central Connecticut Council of Governments (SCRCOG), and Connecticut DOT to address planning for incident management. Incident management is typically performed at the DESPP/DEMHS emergency planning region level. These DEMHS regions are shown in Map 5.4.

RiverCOG towns are members of CTDESPP/DEMHS Regions 2, 3 and 4, and RiverCOG has worked collaboratively with CRCOG, SCRCOG and SCCOG to create and implement traffic diversion plans and a regional radio system. The planning process has identified stand pipe, noise barrier doors to hydrants, and median break location improvements on limited access highways that can be added to highway construction projects where appropriate to improve emergency response operations. Many additional training and operational programs have been implemented for timely communications and response. For example, a program was started to train and equip wrecker services in emptying unbreached saddle tanks of commercial vehicles and tractor trailers under specific conditions to help increase the clearance time of major incidents.

Emergency support functions (ESF) were designated, one of which was ESF-1 (Transportation). The fifteen ESF's provide the structure for coordinating Federal interagency support for a Federal response to an incident. They are mechanisms for grouping functions most frequently used to provide Federal support to states and Federal-to-Federal support, both for declared disasters and emergencies under the Stafford Act and for non-Stafford Act incidents. The purpose of ESF-1 is to facilitate communication and coordination among regional jurisdictions and agencies concerning transportation issues and activities during a major disaster. Many of the incident management concerns facing the region have been determined to be statewide issues through statewide exercises and training.

Programs that have been implemented statewide include DMV recommendations regarding towing, recovery professionals certification and training, DESPP recommendations regarding tower equipment, and the use of GPS to determine origination of 911 calls. Funding has been provided or identified for additional diversion plans, additional Connecticut Highway Assistance Motorist Patrol (CHAMP) services, installation of push bumpers on state police vehicles, photogrammetric equipment for state police accident investigation units, and to write a statewide Unified Response Manual (URM) intended to be compliant with the National Incident Management System. The URM will be adopted as a standard operating procedure by all agencies responding to highway inci-

dents.

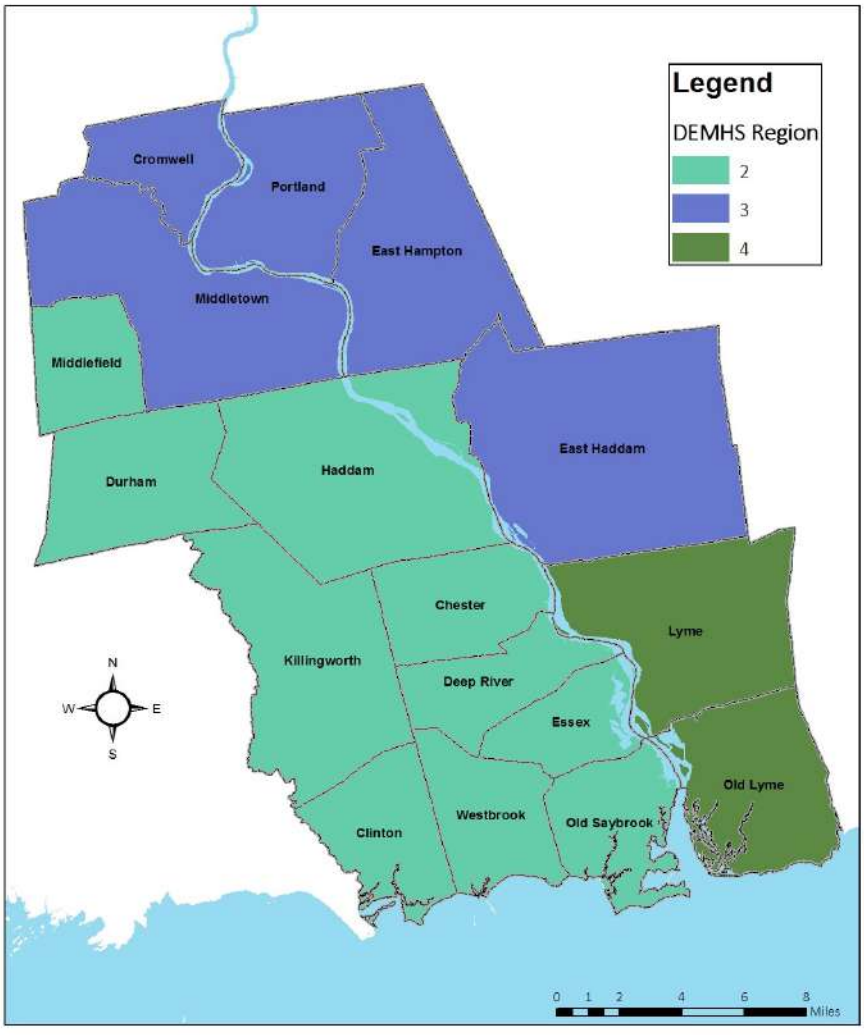
A revitalized regional Traffic Incident Management (TIM) Coalition is organized through Region 3. CRCOGs RESF 1 – Transportation is part of the Capital Region Emergency Planning Council (CREPC) that works with the municipalities located in the Department of Emergency Management and Homeland Security DEMHS Region 3.

Additionally, the Region 2 Incident Management Team is one of several teams operating in the state. It was recently recognized by several Region 2 Fire Chiefs under Regional Emergency Planning Team (REPT) ESF4 that there was a need for a regional Incident Management Team (IMT). Typically the highest ranking firefighter on the scene is the incident commander, therefore incident management tends to fall under ESF 4 (Firefighting) rather than ESF 1 Transportation. This need was brought forward to the REPT and, with state guidance, through DEMHS. The team was organized and is fully operational. The chairperson gave several informal presentations to fire chiefs and others including CEOs, police chiefs and emergency management directors to educate them on the value of a regional team as well as to receive the full support of public safety entities within the region. The Region 2 IMT is managed through an executive committee overseen by its REPT chairman, meeting regularly to approve new members and plan training.

Traffic Incident Management (TIM) is one of the emphasis areas within the Connecticut Strategic Highway Safety Plan (SHSP). The plan is a statewide, data driven traffic safety plan that coordinates the efforts of a wide range of organizations to reduce traffic accident fatalities and serious injuries on all public roads. In coordination with federal, state, local and private sector safety stakeholders, the SHSP establishes goals, objectives, and emphasis areas. Other areas include critical roadway locations, driver behavior, motorcyclists, non-motorized users, and young drivers. Statewide incident management strategies identified in the prior SHSP include interagency cooperation, training, and quick clearance. Statewide incident management strategies identified in the 2017 SHSP include:

- Establish a statewide TIM program with a lead agency to administer clearly defined responsibilities that meet the requirements of the National Incident Management System (NIMS)
- Implement a statewide NIMS-based Unified Response Manual (URM)
- Reduce incident duration, which is achieved through (a) reducing the time to detect incidents, (b) initiating an expedient and appropriate response, and (c) clearing the incident as quickly as possible
- Improve traveler Information to the media and public
- Continue to conduct public awareness programs to support effective on-scene traffic incident management by road users

Map 5.4 RiverCOG Region DEMHS Emergency Planning & Preparedness Regions



Source: Connecticut Department of Emergency Management & Homeland Security, RiverCOG

- Promote best practices for traffic incident management and provide accessibility to intelligent transportation systems (ITS) tools
- Support regular multi-disciplinary TIM training and exercises
- Conduct after-action reviews to improve response and scene management
- Identify staffing needs and training resources for CTDOT staff and emergency responders
- Evaluate expansion of ITS infrastructure to additional regional corridors based on prioritized need
- Include Weather Responsive Traffic Management (WRTM) strategies, such as Road Weather Information Systems (RWIS)
- Support the development and tracking of TIM performance metrics following national standards and definitions
- Continue collaboration with partnered MPOs within the Hartford, New Haven, and New London TMAs to promote planning and infrastructure that improves congestion in critical areas
- Incorporate congestion management goals into integrated access planning
- Recommend funding for updated plan for evacuation route for DEMHS Region 2.
- Implement recommendations from Route 1 Corridor Study to optimize incident management on I-95

G. SECURITY

The state's Natural Disaster Plan establishes the roles of all state agencies responding to natural disasters. When implemented by the governor, DEMHS activates the state emergency operations center (EOC) and requests representation by the appropriate responding agencies. CTDOT is responsible for activities relating to state roadways. These activities include: signing/barricading unsafe highways, closing unsafe airports and rail lines, providing buses and drivers for evacuations, providing public information regarding conditions and closures, cleaning debris and removing snow and ice from state maintained roadways, providing municipal assistance after state priorities have been met, requesting federal financial assistance, and other natural disaster related missions. The DPS also has responsibilities on state roadways. Their activities include: controlling access to dangerous or impassible roadways, providing assistance to civil preparedness forces for traffic control, providing emergency transportation for federal and state officials, and coordinating response with local police authorities. The DMV is responsible for assisting the DPS in traffic control, and the National Guard is responsible for road and bridge repairs, clearance of debris, and transportation for federal and state officials.

The U.S. Department of Homeland Security's National Infrastructure Protection Plan (NIPP) was developed as an outcome of the Homeland Security Act of 2002 and HSPD-7, Critical Infrastructure Identification, Prioritization, and Protection. The purpose of NIPP is to establish a framework to develop, implement, and maintain a coordinated effort to protect the nation's critical infrastructure and key resources. The NIPP describes the roles and responsibilities of agencies: managing risk, organizing and partnering, integrating the protection of critical infrastructure and key resources into homeland security, and developing a long term protection program. It is important to be familiar with this plan since the transportation network is an important component of the nation's infrastructure.

There are many additional federal statutes, national strategies, HSPDs, and authorities related to homeland security, but the two mentioned above have a direct focus relating to transportation planning in our region. Other federal statutes such as the Disaster Mitigation Act of 2000, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, the Maritime Transportation Security Act of 2002 and other legislation, include information and initiatives related to security and transportation.

RECOMMENDATIONS

- Continue to support ESF1 activities through DEMHS Region 2,3, and 4
- Promote transit operator training for security and crisis management
- Improve security at park and ride lots throughout the region

H. SAFETY

The region's transportation network emphasizes safety for all users of the region's transportation system. Safety is an ongoing concern for RiverCOG with an emphasis on safety for users of non-motorized transportation modes within the region.

The 4E process *(Engineering, Education, Emergency and Enforcement)* makes important and overlapping contribu-

tions to increase safety on the region's highway network. It is vital to consider safety engineering in the project development process. Some broad examples of safety engineering include access management to reduce points of conflict, geometrics to increase sight distances and promote proper speeds, lighting to improve nighttime visibility, safe roadside design to minimize the impacts of run-off-road collisions, and bicycle and pedestrian friendly design. More specific examples include safety engineering for highway signs, pavement markings, and traffic control devises, where standards can be found in the "Manual on Uniform Traffic Control Devises 2009" as revised in 2012 (MUTCD) from the U.S. DOT. Creative use of the MUTCD can also enhance safety engineering for site specifics such as in the design for at-grade rail crossings, school zones, work zones, and any zones where travel mode conflicts occur, for example.

Education is another vital part of safety planning. RiverCOG encourages bicycle and pedestrian safety programs, seat belt awareness programs, rail safety programs, and driver education programs. The UConn Transportation Institute Technology Transfer Center has a valuable resource in its "Connecticut Road Master Program" initiated in 1993. The program is designed to provide highway agency personnel with knowledge of road maintenance management procedures and techniques such as public relations, winter operations, vegetation control, equipment management, pavement preservation, and a variety of other factors that affect roadway safety.

Emergency response is improved through incident and highway management techniques. ITS will similarly aid in decreasing response times throughout the region and state, as will proper roadway maintenance. Enforcement is an important tool using speed management to promote a safer roadway network. Deterring drivers from exceeding the posted speed limit creates a safer driving environment. Likewise, enforcing the consequences of other driving infractions such as failure to stop at signs, traffic lights, or school busses, and enforcing DWI/DUI laws, also promotes a safer driving environment.

Another particular safety focus is transition points between transportation modes and the intersection of two or more modes. Several important transition points are identified as: 1) pedestrian to transit (bus and rail connections), 2) vehicle operator to pedestrian (sidewalks, trails, parking lots), and, 3) vehicle operator to bicyclist (parking and road intersections with safe bicycle corridors). This plan emphasizes components of the State Strategic Highway Safety Plan and recommends the following:

2019 RECOMMENDATIONS

- Critical Roadway Locations - Critical roadway locations include intersection and roadway departure crashes which contribute to large number of fatal and serious injury crashes involving either an intersection or a roadway departure. RiverCOG coordinates with CTDOT to program projects that: 1) decrease fatalities and serious injuries by 20% over the 5-year period of the SHSP ending in 2021 which will result in preventing 209 combined fatalities and serious injuries per year, and 2) decrease fatalities and serious injuries 20% over the 5-year period of the SHSP, which will result in preventing 126 combined fatalities and serious injuries per year.

  Strategies used to decrease fatalities and serious injuries at critical roadway location include: 1) identify and implement spot location-based safety countermeasures on roadways using the Suggested List of Surveillance Study Sites (SLOSSS) process, 2) identify and implement low cost, systemic safety countermeasures, and implement location specific and proven safety countermeasures on roadways, 3) incorporate safety elements and countermeasures into all roadway and intersection project designs and maintenance improvements, 4) support and strengthen engineering solutions that can affect driver behaviors that contribute to roadway departure and intersection crashes 5) provide education, training, and outreach to safety stakeholders and the public about roadway departure and intersection safety through the Safety Circuit Rider and other similar programs, and 6) improve driver awareness and compliance with traffic control devices.

- Driver Behavior – Unsafe driving habits or behaviors increase the chance of a driver being injured or killed in a traffic crash. Unsafe driver behaviors identified in the SHSP as areas of concern include the lack of seat belt use, driving while impaired by alcohol or drugs, driving aggressively or speeding, and driving without complete attention to the driving task.

  RiverCOG supports the statewide efforts to: 1) reduce the number of unrestrained occupants in fatal crashes from the five-year moving average of sixty-four in 2014 by 10% to a five-year moving average

of fifty-eight in 2018, and 2) increase the statewide observed seat belt use rate from 85.4% in 2015 to 88% or above in 2018. Strategies to counter unrestrained occupants include: 1) participate in the National High Visibility Enforcement of safety belt and child safety seat enforcement mobilization: "Click It or Ticket" and sustained seat belt enforcement using statewide safety belt enforcement checkpoints and roving/saturation patrols during both day and night-time hours, 2) coordinate a comprehensive media campaign targeting high risk groups with safety belt messages including "Buckle Up CT" and "Click It or Ticket.", 3) communicate the importance and correct use of child restraint systems through educational programs, outreach events, and public information campaigns, 4) conduct seat belt observation surveys before and after enforcement waves to measure the enforcement effects and to determine the statewide safety belt use rate, and 5) support the Highway Safety Office's Seatbelt Initiatives Working Group Committee to help increase Connecticut's belt use rate.

RiverCOG supports statewide efforts to: 1) decrease alcohol impaired driving fatalities from the five-year moving average of 107 in 2014 by 5% to a five-year moving average of 102 in 2018, and 2) decrease alcohol-related driving serious injuries from the five-year moving average of 130 in 2014 by 5% to a five-year moving average of 124 in 2018, and 3) increase the number of Drug Recognition Expert (DRE) practitioners in the state from thirty-one in 2016 to forty-five in 2018. Strategies used for substance-involved driving include: 1) increase the number of law enforcement agencies receiving impaired driving enforcement grants beyond the seventy-six that participated in 2016, 2) increase the number of cooperating law enforcement agencies participating in high visibility regional driving under the influence (DUI) enforcement, 3) increase the number of certified Standardized Field Sobriety Test (SFST) Practitioners and Instructors, 4) increase law enforcement recognition and conviction of various types of impaired driving beyond alcohol impairment, 5) support all national high visibility impaired driving holiday mobilizations, and 6) increase successful prosecution and conviction of DUI offenders.

RiverCOG supports statewide efforts to reduce the number of speed related fatalities from the five-year moving average of eighty-two in 2014 to a five-year moving average of seventy-six in 2018. Strategies used for aggressive driving include: 1) support High Visibility Enforcement (HVE) events that address speed and aggressive driving, 2) purchase speed measuring devices for law enforcement agencies to use during speed enforcement, 3) use Law Enforcement Liaisons to link the Highway Safety Office, law enforcement agencies, and other safety partners, and 4) support statewide police traffic enforcement training such as Speed Management, Safe Communities, Work Zone Safety, and Data Driven Approaches to Crime and Traffic Safety (DDACTS).

RiverCOG supports statewide efforts to maintain or increase the number of police agencies participating in high visibility enforcement distracted driving enforcement from fifty in 2016 to sixty in 2018. Strategies used for distracted driving include increased enforcement of Connecticut's hand held mobile phone ban for drivers, and education of the driving public regarding the dangers of distracted driving through media campaigns, public awareness campaigns, grassroots outreach and public information campaigns, and educational programs.

- Young Drivers - Young drivers (age fifteen to twenty-five) are involved in a significant number of Connecticut's fatalities and serious injury crashes.

  RiverCOG supports statewide efforts to decrease the number of drivers aged twenty-five or younger involved in fatal crashes from the five-year moving average of twenty-three in 2014 to a five-year moving average of twenty-one in 2018. Strategies for young drivers include: 1) improve laws and regulations that are driven by enhanced stakeholder collaboration to enhance teen safety, 2) develop statewide communications strategies to increase the involvement of parents and the general public in encouraging safer teen drivers, 3) Develop strategies to address risky driving behavior exhibited by young drivers through enhanced media, education, and enforcement of applicable laws, and 4) Improve laws and regulations for young drivers who are not subject to Connecticut's Graduated Driver License (GDL) restrictions.

- Non-motorized Users - pedestrians and bicyclists face a significant risk of fatal and serious injury when struck by motor vehicles. Therefore it is important to reduce the frequency and severity of crashes involving non-motorized road users.

RiverCOG supports statewide efforts to: 1) decrease pedestrian fatalities and serious injuries 15% over the five-year period of the SHSP, preventing thirty-two combined pedestrian fatalities and serious injuries per year, and 2) decrease bicyclist fatalities and serious injuries 15% over the five-year period of the SHSP, preventing ten combined bicyclist fatalities and serious injuries per year.

Strategies for non-motorized road users include: 1) determine causes of non-motorized crashes through improved data collection and enhanced data analysis, 2) identify and study areas with high incidences of non-motorized serious injuries and/or fatalities, 3) create methods and plans to improve environments along all public roadways for safe walking and bicycling, 4) consider road diets, single-lane roundabouts, refuge islands, bike facilities, countdown and accessible pedestrian signals, sidewalks and traffic calming designs, 5) promote the use of traffic enforcement to increase compliance with traffic safety laws by all road users, 6) ensure law enforcement is properly trained in the enforcement of safe use of roadways by non-motorized users, 7) aim to reduce distraction by all road users, 8) allocate a designated percent of safety-related funding for pedestrian and bicycle crash locations, 9) increase attention to non-motorized safety issues at the State, local and private levels, 10) renew the Safe Routes to Schools program, 11) increase involvement at the State, local and private level to ensure that all users understand non-motorized safety laws and practices, 12) improve public awareness of non-motorized users and methods to promote the safety of non-motorized users, and 13) improve the emergency response to pedestrians and bicyclists involved in crashes.

- Motorcyclist Safety - Motorcycles represent a small percentage of motor vehicles owned in Connecticut and are responsible for an even smaller portion of vehicle miles traveled but represent over one fifth of Connecticut's total traffic fatalities.

  RiverCOG supports statewide efforts to: 1) decrease the number of motorcyclist fatalities from the five-year moving average of fifty in 2014 to an average of forty-seven in 2018, 2) decrease the number of non-helmeted fatalities from the five-year moving average of twenty-nine in 2014 to an average of twenty-seven in 2018, and 3) decrease the percentage of fatally injured motorcycle operators with blood alcohol contents greater than or equal to 0.01 by 5% from the five-year moving average of 40% in 2013 to an average of 38% in 2017.

  Strategies for motorcyclist safety include: 1) continue to expand motorcycle rider education programs, specifically the Connecticut Rider Education Program (CONREP), 2) conduct a targeted media campaign promoting helmet use by all riders, not just the young riders covered under the existing law, and 3) conduct a targeted media campaign informing riders of the dangers of riding impaired. This campaign, *None for the Road*, will employ a web video, bus boards, and brochures promoted through rider education courses, dealerships, and local rider organizations, and 4) maintain a website, www.ride4ever.org, aimed at changing unsafe riding behaviors.

- Traffic Incident Management - Traffic Incident Management consists of a planned and coordinated multi-disciplinary approach to detect, respond to, and clear traffic incidents so that traffic flow may be restored as safely and quickly as possible. A TIM program impacts emergency responder's safety by providing multi-disciplinary safety training and evaluation and also impacts motorist safety by improving incident detection and reducing incident response time. A TIM program can contribute to reduced congestion caused by incidents, saving motorists and businesses millions of dollars in lost time and productivity, and reducing associated air pollutants.

  RiverCOG supports statewide efforts to: 1) promote the safety of all transportation users by reducing secondary crashes and associated fatalities and serious injuries caused by traffic incidents, and 2) to increase participation of first responder personnel in incident management training by 50% by 2021.

  Regional TIM initiatives and were discussed in a previous section of this chapter as well as statewide strategies backed by RiverCOG.

- Other Topics – Additional areas of concern for improving safety include commercial vehicles, school busses, transit buses, grade crossings and work zones.

- Improve night-time safety and visibility along Route 9
- Place guiderail in the right of way so that it does not hider the use of the shoulder for cyclists

- Enhance safety in parking facilities at recreational areas such as trails, boat ramps, bike paths, etc,
- Enhance safety driver training programs relating to highway driving, parking, roundabouts, etc.

I. PERFORMANCE-BASED PLANNING AND PROGRAMMING

Background

The Statewide and Nonmetropolitan Transportation Planning and Metropolitan Transportation Planning regulations (May 27, 2016, FHWA 23 CFR Parts 450 and 771 and FTA 49 CFR Part 613) implement changes to the planning process, including the requirement of a performance-based approach to planning and that state DOTs, MPOs, and the operators of public transportation use performance measures to document expectations for future performance. Performance-based planning and programming increases the accountability and transparency of the Federal-aid program and offers a framework to support improved investment decision making by focusing on performance outcomes for national transportation goals.

FHWA defines Transportation Performance Management (TPM) as a strategic approach that uses system information to make investment and policy decisions to achieve national performance goals. FHWA's desired outcomes include optimizing investments of public funds, improving consistency across the region, increasing coordination of decision makers, increasing understanding of what works, and communication federal investment returns. FHWA and FTA established national performance measures in areas such as safety, infrastructure condition, congestion, system reliability, emissions, freight movement, transit safety, and transit state of good repair.

Table 5.1 Required FHWA National Performance Measures

Goal	Area	Measure
Safety	Injuries and fatalities	• Number of fatalities • Fatality rate (per 100 million vehicle miles traveled) • Number of serious injuries • Serious injury rate (per 100 million vehicle miles • Number of non-motorized fatalities and non-traveled) motorized serious injuries
Infrastructure condition	Pavement condition	• 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 National Highway System (NHS) in Good condition • Percentage of pavements on the non-Interstate NHS in Poor condition
Infrastructure condition	Bridge condition	• Percentage of NHS bridges classified as in Good condition • Percentage of NHS bridges classified as in Poor condition
System reliability	Performance of the NHS	• 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
Freight movement	Freight movement on the IS	• Truck Travel Time Reliability Index
Congestion reduction	Traffic congestion	• Annual hours of peak-hour excessive delay per capita • Percent of non-single-occupant vehicle travel
Environmental sustainability	On-road mobile source emissions	• Total emissions reduction

The last of a series of FHWA TPM related rules, the System Performance/Freight/CMAQ Performance Measures Final Rule and Pavement and Bridge Condition Performance Measures Final Rules, took effect on May 20, 2017 and state DOTs have until one year from that date to establish performance targets, and MPOs have until 180 days after the State DOT establishes their performance targets to establish regional performance targets. State DOTs are directed to coordinate with MPOs when setting targets. See Table 5.1 for required FHWA national performance measures.

CTDOT developed performance measure targets in compliance with federal regulations. On December 6, 2017, the RiverCOG MPO Board endorsed a resolution of support for CTDOT's safety performance targets as the regional performance targets for the MPO. On May 23, 2019, the RiverCOG MPO Board endorsed a resolution of support for CTDOT's various performance targets as the regional performance targets for the MPO, including the other areas noted in the table above.

The FTA Transit Asset Management (TAM) final rule requires transit providers and MPOs to set State of Good Repair (SGR) targets and reset them each year (49 CFR Part 625). See Table 5.2 for the required FTA national performance measures.

Transit providers have until October 1, 2018 to develop TAM Plans. They must update their TAM Plan at least every four years and should share their TAM Plan, supporting documents of performance targets, investment strategies, and an annual condition assessment with the State and MPO that provides their funding (49 CFR§625.53). Tier I transit providers must develop an individual TAM Plan, whereas Tier II providers may participate in a group plan facilitated by the State. 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. CTDOT prepared a Tier I TAM Plan for the rail, bus, and ferry transit it provides such as CTtransit and Hadlyme Ferry. CTDOT developed a group Tier II TAM Plan which include the Estuary and Middletown Transit Districts.

CTDOT developed SGR targets for both Tier I and Tier II providers in compliance with federal regulations. On July 19, 2017, the RiverCOG MPO Board endorsed a resolution of support for CTDOT's State of Good Repair Performance Targets as the regional performance targets for the MPO.

As part of this new performance-based approach, recipients of Federal-aid highway program funds and Federal transit funds are required to integrate performance targets and performance plans (such as the CMAQ plan, Strategic Highway Safety Plan, State Freight Plan, Highway and Transit Asset Management Plans, etc.) into MPO planning documents such as the LRP and TIP to the maximum extent practicable.

Targets

HIGHWAY SAFETY

Highway Safety is determined by the interaction between drivers, their behavior, and the highway infrastructure. The five (5) performance measures for Highway Safety include: (1) the number of fatalities; (2) the rate of fatalities; (3) the number of serious injuries; (4) the rate of serious injuries; and, (5) the number of non-motorized fatalities and serious injuries. The region's MTP and TIP program projects to meet the targets set by the CTDOT and agreed upon by RiverCOG including Highway Safety Improvement Program (HSIP) safety projects such as: 1) programmatic highway safety improvements, 2) programmatic driver safety activities, and 3) location-specific highway safety projects.

Table 5.2 Required FTA National Performance Measures Include

Asset Category	Measure
Rolling stock	• Percent of revenue vehicle exceeding useful life benchmark (ULB)
Equipment	• Percent of non-revenue vehicle exceeding useful life benchmark (ULB)
Facilities	• Percent of facilities rated under 3 (SGR) on the TERM Scale
Infrastructure	• Percent of track segments under performance restrictions

Table 5.3 CTDOT and MPO Safety Targets

Measure	Target	Specific Target	18-19 Projected 5 Year Moving Trend
Fatalities (per year)	Maintain five year average	274	275—277
Fatality rate (per 100 million VMT)	Maintain five year average	0.873	0.88—0.89
Serious injuries (per year)	Maintain five year average	1,574	1,381—1,290
Serious injuries rate (per 100 million VMT)	Maintain five year average	5.02	4.41—4.11
Non-motorist fatalities and serious injuries (per year)	Maintain five year average	290	290—290

In an effort to meet federal reporting requirements, CTDOT and MPOs must set targets that are attainable. They must also review performance, assess trends, and set targets on an annual basis. The safety targets are shown in Table 5.3 above.

TRANSIT

The Transit Asset Management (TAM) rule requires that recipients and sub recipients of Federal Transit Administration (FTA) funds set annual performance targets for federally established State of Good Repair (SGR) measures for rolling stock, equipment, facilities and guideway infrastructure. CTDOT has identified asset classes for its transit service providers specific to each of the four assets categories for bus, rail and ferry services.

The percentage of assets exceeding the useful life benchmark (ULB) is the performance measure set for rolling stock and equipment. For facilities, the performance measure is based on a five point condition rating scale derived from FTA's Transit Economic Requirement Model (TERM). Guideway infrastructure is rail specific and the performance measure set by FTA is the percent of guideway with a performance restriction which is interpreted as slow zones.

Under the FAST Act, transit providers are required to submit an annual narrative report to the National Transit Database (NTD) that provides a description of any change in the condition of its transit system from the previous year and describes the progress made during the year to meet the targets previously set for that year. Performance targets are reported annually to the National Transit Database by CTDOT for the state's transit system.

The region's MTP and TIP program projects to meet the targets set by the CTDOT and endorsed by RiverCOG are shown in Table 5.4.

PAVEMENT AND BRIDGE CONDITION

The four performance measures for pavement condition include the percent of the Interstate system in good and poor condition and the percent of the non-interstate National Highway System (NHS) in good and poor condition. The two performance measures for bridge condition include the percent of NHS bridges in good and poor condition.

A pavement condition index (PCI) categorizes pavement by cracking, ride, rutting, raveling, and drainage indexed on scale from one to nine, with a state of good repair equaling six. The calculation of the international roughness index (IRI), cracking, and rutting are determined for pavements. If all three measures are good, then the condition is measured as good. If two or more measures are poor then the condition is measured as poor.

Similarly, bridges are rated on a scale from zero to nine. A bridge with all major components (deck, superstructure, and substructure) rated seven or higher is measured as good. A bridge with all major components rated four or lower is measured as poor.

The region's MTP and TIP programs project to meet the targets set by CTDOT and endorsed by RiverCOG using CTDOTs Pavement Management System and the Bridge Management System (dTIMS – Deighton's Total Infrastructure Management System). These systems provide for a systematic method to view conditions to develop strategies found in CTDOT's Transportation Asset Man-

Table 5.4 LCRVR MTP &TIP Project Goals

Tier II Bus Revenue Vehicles

Asset	Target	Goal
Bus	ULB – 12 years	14% beyond ULB
Cutaway bus	ULB – 5 years	17% beyond ULB
Mini van	ULB – 5 years	17% beyond ULB

Tier II Bus Service Vehicles

Asset	Target	Goal
Rubber and tire vehicles	ULB – 14 years	7% beyond ULB
Automobiles	ULB – 5 years	17% beyond ULB
Vans	ULB – 5 years	17% beyond ULB
Sport utility vehicles	ULB – 5 years	17% beyond ULB

Tier II Bus Facilities

Asset	Target	Goal
Passenger and Parking	TERM 1-5	0% below 3
Admin. and Maint.	TERM 1-5	0% below 3

Tier I Rail Revenue Vehicles

Asset	Target	Goal
Commuter rail locomotive	ULB – 35 years	17% beyond ULB
Commuter rail coach	ULB – 25 years	17% beyond ULB
Commuter rail self propelled car	ULB – 35 years	13% beyond ULB

Tier I Rail Service Vehicles *

Asset	Target	Goal
Rubber and tire vehicles	ULB – 14 years	7% beyond ULB
Steel wheel vehicles	ULB – 25 years	0% beyond ULB

*Report only MNR to FTA, as Amtrak owns the SLE and Hartford Lines

Tier I Rail Guideway Infrastructure *

Asset	Target	Goal
Commuter rail guideway	Percent restricted	2% restricted

* Report only MNR to FTA, as Amtrak owns SLE and Hartford lines

Tier 1 Rail Facilities

Asset	Target	Goal
Passenger and parking	TERM 1-5	0% below 3
Admin. and Maint.	TERM 1-5	0% below 3

Tier I Ferry Facilities

Asset	Target	Goal
Passenger and parking	TERM 1-5	0% below 3
Admin. and Maint.	TERM 1-5	0% below 3

agement Plan (TAMP).

The TAMP acts as a focal point for information about the assets, their management strategies, long-term expenditure forecasts, and business management processes.

CTDOT is required to develop a risk-based TAMP for the National Highway System (NHS) to improve or preserve the condition of the assets and the performance of the system. Asset management is defined as a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information. Its purpose is to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.

Pavement and bridge state of good repair needs are identified, quantified, and prioritized through the TAMP process. Projects to address SOGR repair needs are selected from the TAMP for inclusion in the MTP and TIP.

SYSTEM RELIABILITY

Highway travel time reliability is closely related to congestion and is greatly influenced by the complex interactions of traffic demand, physical capacity, and roadway "events." Travel-time reliability is a significant aspect of transportation system performance.

The national system reliability performance measures assess the impact of the CTDOT's various programs on the mobility of the transportation highway system users. Operational improvement, capacity expansion, and to a certain degree highway road and bridge condition improvement projects, impact both congestion and system reliability. Demand management initiatives also impact system reliability. Travel-time reliability is a new concept to which much of the transportation profession has had only limited exposure, as compared to traditional congestion measures such as the travel time index.

The two performance measures for system reliability condition include: percent of person miles traveled on the Interstate System that are reliable, and

percent of person miles traveled on the non-Interstate NHS that are reliable. The metric used is the level of travel time reliability (LOTTR) which uses the ratio of longer travel times (80th percentile) to normal travel times (50th percentile) using NPMRDS or similar travel time data. Person miles traveled is obtained by incorporating AADT and vehicle occupancy rates.

The region's MTP and TIP programs project to meet the targets set by CTDOT and endorsed by RiverCOG.

FREIGHT MOVEMENT

Freight measures consider factors that are unique to the trucking industry. The unusual characteristics of truck freight include: the use of the system during all hours of the day, high percentage of travel in off-peak periods, and the need for shippers and receivers to factor in more 'buffer' time into their logistics planning for on-time arrivals.

The freight movement is assessed by the Truck Travel Time Reliability (TTTR) index metric. For the first reporting period, Connecticut will be using the analysis conducted as part of the truck freight bottleneck analysis done as part of the freight plan approved by FHWA. Therefore, for this first year of reporting, CTDOT and RiverCOG are using the trend and truck bottleneck analysis done for the recently completed Statewide Freight Plan. The future metric used is the truck travel time reliability metric (TTTR) which uses the ratio of longer travel times (95th percentile) to normal travel times (50th percentile) using NPMRDS or similar travel time data. The measure includes the maximum TTTR per segment (for 5 periods) divided by total Interstate mileage.

AIR QUALITY

US DOT requires that states and MPOs assess the impact of their transportation systems on air quality, and specifically, the impacts of vehicle exhaust emissions. Their performance measure for air quality is based on an assessment of projects selected for funding under the Congestion Mitigation and Air Quality Improvement (CMAQ) program.

The CMAQ program's purpose is to fund transportation projects or programs that contribute to the attainment or maintenance of National Ambient Air Quality Standards (NAAQS) in those specific areas. The performance measure is total emissions reduction. It is calculated by cumulative 2-year and 4-year Emissions Reduction (kg/day) for CMAQ-funded projects of reduced emissions for Nitrogen Oxide (NOx), Volatile Organic Compounds (VOCs), Carbon Monoxide (CO), Particulate Matter (PM10 and PM2.5) and Ozone (O3), CO, PM10 and PM2.5 nonattainment and maintenance areas.

The MTP and TIP programs project to meet the targets set by the CTDOT and endorsed by RiverCOG. CMAQ eligible projects include congestion reduction and traffic flow improvements, ridesharing, transit improvements, travel demand management, and bicycle and pedestrian facilities.

Recreational boaters cruising the Connecticut River just north of the Baldwin Bridge.

Chapter 6.

MUNICIPAL TRANSPORTATION PRIORITIES

CHESTER
CLINTON
CROMWELL
DEEP RIVER
DURHAM
EAST HADDAM
EAST HAMPTON
ESSEX
HADDAM
KILLINGWORTH
LYME
MIDDLEFIELD
MIDDLETOWN
OLD LYME
OLD SAYBROOK
PORTLAND
WESTBROOK
MIDDLETOWN TRANSIT DISTRICT
ESTUARY TRANSIT DISTRICT
LCRVCOG

MUNICIPAL TRANSPORTATION PRIORITES

RiverCOG asked the region's chief elected officials, public works directors, and planners for the transportation priorities of their municipalities. Below is a listing of the priorities of the seventeen municipalities and two transit districts of the Lower Connecticut River Valley Region.

CHESTER

- Road/bridge improvements on Main Street, North Main Street, Lower Goose Hill Road, Pleasant Street, Straits Road, Wig Hill Road, Liberty Street, East Liberty Street, Ferry Road, RT 154, RT 148, RT 145, and RT 82 connector
- Continuity of CT Ferry Operations
- North-South Commuter Recreational Bikeway
- Transit Oriented land use development along public transit route

CLINTON

- Road/Bridge improvements on Walnut Hill Road, Hurd Bridge Road, Egypt Road, Iron Works Road, Cow Hill Road, Airline Road, North High Street, RT 1, High Street, Glenwood Road, Pleasant Valley Road, Long Hill Road, Liberty Street, Nod Road, RT 145, and RT 81.
- Implement recommendations from Route 1 Corridor Study
- Implement plans for Clinton Station Improvements
- Develop multi-modal Plan for Transit Oriented Development around Clinton station including parking, street improvements and enhanced pedestrian and bicycle connections
- Extend Shoreline Greenway from Hammonassett State Park to Menunketesuck Greenway in Westbrook
- Safe Routes to School and Recreational Facilities—with special attention to RT 81 between the Morgan School and recreational complex
- Implement Bicycle and Pedestrian Alliance Bikeways Plan linking residential areas to train station, major public facilities, and waterfront
- Implement bus turnout/pullout areas on RT 81 for proposed Estuary Transit Madison/Clinton to Middletown route
- Extend Estuary Transit route north on RT 81 to Clinton Crossing, High School, and recreation complex
- Develop a Complete Streets plan
- Plan and implement the Clinton segment of an Estuary Transit District route connecting Shoreline East stations and key tourist destinations

CROMWELL

- Road bridge improvements on Coles Road, Evergreen Road, Willowbrook Road, Court Street, Geer Street, Industrial Park Road, New Lane and Washington Road, RT 3, RT 99, RT 372, RT 524, RT 901
- Evaluate the need to reconfigure or construct a new ramp in the vicinity of RT9/RT372 due to growing safety and congestion concerns
- Coles Road phase II and III reconstruction from Christian Hill Road to Evergreen Road, and Evergreen Road to RT 3 with bicycle and pedestrian provisions
- RT 99 intersection improvements and signal replacement at Main Street and intersection improvements at Court Street
- West Street intersection improvements at Franklin Avenue
- Implement Safe Routes to School Plan – sidewalks on Court Street, Geer Street and Main Street north to Sunset Drive
- Intersection improvements to Route 372 at intersection with Country Squire Drive and Willowbrook Road – add dedicated turning lane eastbound 372
- Develop pedestrian walking routes or trails along the CT River
- Develop boat access (docks, possible Town marina) within Town owned parcels on CT River

DEEP RIVER

- Road/bridge improvements on Bushy Hill Road, Westbrook Road, Essex Street, Book Hill Road, Union Street, RT 154, RT 80, RT 602, and RT 145
- Transit Oriented land use development in the Village Core
- Coordination/synchronization with the Valley Railroad
- Complete Safe Routes to School program

DURHAM

- Bridge/culvert improvements on Indian Lane, Seward Lane, Haddam Quarter Road, Bear Rock Road, Guire Road, Cream Pot Road
- RT 17 intersection improvements at RT 68 (widen for turn lane), and intersection improvements at RT 147/Haddam Quarter Road (realignment)

- RT 157 intersection improvements at RT 68, DOT has schematic drawing of a roundabout to fix the congestion at this intersection
- Parmelee Hill Road intersection improvements at RT 17
- RT 147 Intersection improvements at Cherry Hill Road and Maple Avenue
- RT 17 intersection improvements at RT 79, RT 17 to create a four-way intersection at Higganum Road
- RT 17 bicycle route signs and pavement markings
- RT 17 pedestrian access improvements such as sidewalk extension from RT 147/Haddam Quarter
- Road south to RT 79 intersection (west side Main Street)

EAST HADDAM

- Road/bridge improvements on Bashan Road, Creek Road, East Haddam/Colchester Turnpike, Haywardville Road, Lake Shore Road, Landing hill Road, Mott Lane, Newbury Road, Orchard Road, and Schulman Veselak Road, RT 82, RT 149, RT 151, RT 431, RT 434, RT 609
- Sidewalk construction and planning along the southern side of RT 82 with access to Eagle Landing State Park and across the east Haddam swing bridge with access between East Haddam, Eagle Landing State Park and the Valley Railroad station in Haddam
- RT 82 culvert replacement and retaining wall construction at Malt House Brook
- RT 151 bridge repairs over the Salmon River, intersection improvements at RT 149, and intersection improvements at Colchester Turnpike
- RT 82 intersection improvements at RT 149, and swing bridge sidewalks
- Foxtown Road bridge reconstruction over Eight Mile River
- Three Bridges Road bridge reconstruction over Eight Mile River
- RT 151 vertical realignment from west of the Moodus River Crossing
- RT 149 vertical realignment between Trowbridge Road and Clark Gates Road

EAST HAMPTON

- Road/bridge improvements on Brewer Road, Mott Hill Road, White Birch Road, Depot Hill Road, Haddam Neck Road, Lake Drive, Lake Road, Main Street, North Main Street, South Main Street, Old Middletown Road, and Staeth Road, RT 16, RT 66, RT 151, RT 439
- RT 66 intersection improvements at Long Hill Road (realign to perpendicular and slight widening for vehicular bypass)
- RT 66 grading and sight line improvements at Champion Hill Road
- RT 66 intersection improvements at RT 151/Depot Hill Road/Oakum Dock Road (left turn lanes, remove island, close Depot Hill Road at RT 66 and consolidate curb cuts, clear sightlines at Oakum Dock Road)
- RT 151 intersection improvements at Keighly Pond Road and Long Hill Road
- RT 151 incorporate traffic calming measures as high speeds, poor sightlines, frequent curb cuts and minimal shoulder create unsafe conditions for bicyclists and pedestrians
- RT 16 intersection improvements at Hog Hill Road and straighten curve between Harlan Place and Tartia Road
- Flat Brook Road culvert replacement
- Mott Hill Road intersection improvements at Lake Drive
- White Birch Road realign between Chapman Road and Country Road
- RT 16 intersection improvements at Tartia Road and Long Hill Road
- RT 66 intersection improvements at Marlborough Road, Maple Street, Barton Hill Road, and East Hampton mall/Brooks Plaza area
- Pedestrian and bicycle improvements on Main Street to connect Airline Trail to Route 66
- Pedestrian and road improvements including sidewalks and drainage surrounding the Memorial School on Walnut Avenue, Edgerton Street and Smith Street
- Intersection improvements at Route 196 and Main Street

ESSEX

- Road/bridge improvement on Bushy Hill Road, West Avenue, South Main Street, Prospect Street, Methodist Hill Road, North Main Street, River Road, Book Hill Road, RT 604, RT 602, RT 621, RT 154, RT 153
- Implement recommendations in the 2011 Town Transportation Study
- Implement Essex Safe Routes to School Plan
- Repair/replace bridges on Old Deep River Road, Pond Meadow Road, Falls River Road, and Dennison Road over Falls River

- Reconstruction of Westbrook Road (RT 604) and add sidewalks between Centerbrook Center and Bokum Center
- Add sidewalks and bicycle lanes on RT 153 (Plains Road/Westbrook Road), RT 154 (Middlesex Turnpike/Main Street/Deep River Road), and RT 602 (Main Street Ivoryton)
- Install traffic calming measures on RT 154 in Centerbrook
- Reconstruct intersection on RT 154/Main Street at Dennison Road
- Reconstruct intersection at RT 154/Main Street at Deep River Road NB
- Reconfigure central intersection of Centerbrook (RT 154/RT 604/RT 602)
- Reconfigure intersection of RT 153/Westbrook Road at Mares Hill Road
- Reconstruct drainage system on South Main Street
- Improve/reconstruct River Road
- Improve/reconstruct Dennison Road
- Improve/reconstruct Mares Hill Road

HADDAM

- Road/bridge improvements on Candlewood Hill Road, Foot Hills Road, Beaver Meadow Road, Injun Hollow Road, Jail Hill Road, Little City Road, Rock Landing Road and Sima Road, RT 81, RT 82, RT 151, RT 154
- Candlewood Hill Road reconstruction, drainage improvements and bridge improvements
- RT 154 intersection improvements at Thayer Road
- RT 81 intersection improvements at Old County Road/Hidden Lake Road
- RT 81 drainage improvements at Beaver Meadow Road and Brault Road
- Beaver Meadow Road culvert replacement
- Sidewalk construction and planning along the southern side of Route 82 with access to Eagle Landing State Park, and across the East Haddam Swing Bridge with access between East Haddam, Eagle Landing State Park, and the Valley Railroad Station in Haddam
- Traffic calming at the junction of RT 154 and RT 81 in Higganum consistent with enhancement funding guidelines
- Congestion management study for the Bridge Road area, including the possibility of adding secondary roads to the road network to enhance connections between the Swing Bridge and travelers on RT 154
- Traffic calming, including the narrowing of travel lanes on RT 154 (0.8 miles) between the Haddam Fire House and the Haddam Elementary School to reduce traffic speed through the historic district and village area of Haddam and within 1,000 feet of the intersection of RT 154 and 82 East to near the village of Tylerville
- Stamped bike lanes along Route 154 between the Middletown and Chester borders
- Support of the 9-Town Transit fixed route with stops along RT 81 in Higganum
- Safety and operational security of the Connecticut River crossings at the East Haddam Swing Bridge and the Chester-Hadlyme Ferry
- Reconstruction of sidewalks along the eastern side of 154 between Haddam Cemetery and UCONN Extension Center
- Design and construction of sidewalks from Higganum along Depot Road to Higganum Cove
- Reconstruction of the eastern portion of Park Road
- Reconstruction and drainage of McTighe Road, Porkorny Road, and Jail Hill Road
- Dish Mill bridge rehabilitation
- Dublin Hill bridge replacement

KILLINGWORTH

- Road/bridge improvement on Little City Road, Green Hill Road, Cow Hill Road, Iron Works Road, Roast Meat Hill Road, Stevens Road, RT 80, RT 81
- Route 81 transit service
- Traffic management in town center/commercial center
- Scenic Road designation of Green Hill Road and RT 148
- Avoidance of concrete sidewalks to maintain rural character

LYME

- Road/bridge improvements on Grassy Hill Road, Macintosh Road, Joshuatown Road, RT 156, RT 82, RT 148
- RT 156 Scenic/bikeway/marine/multimodal corridor
- Maintenance of the Hadlyme-Chester Ferry corridor
- Reconstruction of Scenic RT 148
- Bridge maintenance best practices to protect stream ecology and maintain rural character

- Reconstruction of retaining walls along RT 156

MIDDLEFIELD

- Road/bridge improvements on Jackson Hill Road, Cherry Hill Road, Cedar Street, Derby Road, Higby Road, and Laurel Brook Road, RT 66, RT 147, RT 155, RT 157, RT 217
- RT 157 drainage improvements north of Cider Hill Road
- RT 147/RT 157 intersection improvements at Peckham Field
- RT 147 intersection improvements at Powder Hill Road
- Jackson Hill Road intersection improvement at Cedar Street/School Street
- RT 157 intersection improvements at Jackson Hill Road
- Miller Road bridge replacement
- RT 157 Intersection improvements at Strickland Road
- Cedar Street drainage improvements
- Cider Mill Road bridge improvements
- Cherry Hill Road bridge improvements

MIDDLETOWN

- Road/bridge improvements on Anderson Road, Bow Lane, Bretton Road, Brush Hill Road, Camp Street, Church Street, Country Club Road, Crescent Street, Cross Street, DeKoven Drive, East Main Street, Farm Hill Road, Grand Street, Higby Road, High Street, Highland Avenue, Industrial Park Road, Laurel Grove Road, Liberty Street 2, Main Street, Main Street Ext, Middle Street, Mile Lane, Millbrook Road, Miner Street, North Main Street, Old Mill Road, Pameacha Avenue, Pine Street, Pleasant Street, Prospect Street, Randolph Road, Rapallo Avenue, Ridge Road, Ridgewood Road, Russell Street, Saybrook Road, Smith Street, South Main Street, Spring Street, Union Street, Vine Street, Wadsworth Street, West Street, Westfield Street, Westlake Drive, and RT 3, RT 17, RT 66, RT 154, RT 157, RT 217, RT 410, RT 545
- Implement recommendations in the Middletown Redevelopment Commission's 2014 Riverfront Plan
- Implement recommendations in the 2013 Complete Streets Master Plan
- Removal of traffic lights on RT 9
- Implement recommendations in the Middletown Area River Crossing Study
- Rehabilitation of the railroad swing bridge
- Downtown transportation infrastructure improvements
- River Road from Pratt and Whitney to Silver Street to RT 9 should be a continuous state roadway to complete a loop with RT 410
- Arrigoni enhancement lighting project
- RT 17 – two way left turn lanes between Pameacha Pond and Highland Ave and widen southbound lane near pond
- North End Industrial Area access improvements
- Install traffic lights at RT 217/Country Club Road and Newfield Street/Congdon Street
- Rehabilitation of Main Street between Washing ton Avenue and Hartford Avenue
- Extend/maintain rail line from Middletown to the Valley Railroad
- RT 9 at 66 intersection improvements
- Pedestrian access from downtown over RT 9/railroad to riverfront
- RT 17 bicycle route signs and pavement markings
- Reconstruct Saybrook Road to allow for sidewalks and safer travel for bicyclists. Improvements would allow for commercial development and provide a link between communities to the South and Middlesex Community College
- Conduct a study regarding bicycle travel between downtown and the high density residential area of northern Middletown

OLD LYME

- Road/bridge improvements on McCurdy Road, Lyme Street, Four Mile River Road, Mile Creek Road, RT 1, and RT 156
- Sidewalk & crosswalk improvements on Halls Road
- Preservation of historic character with proposed I-95 reconstruction
- Improved bicycle and pedestrian access to the shoreline
- Prevention of infrastructure damage from sea level changes and storms
- Access to Northeast Corridor/Shoreline East

OLD SAYBROOK

- RT 1/ Saybrook Junction Pedestrian Node Infrastructure Project - Construct streetscape enhancements within the node of pedestrian activity around its train station and town center to smooth the growing exchange in modes of transportation—train, bus,

automobile, bicycle and pedestrians

- Road/bridge improvements on Schoolhouse Road, Maple Avenue, Bokum Road, Elm Street, RT 1, I-95 improvements with emphasis on the RT 154 Gateway Area per town plan with emphasis on bicycle and pedestrian improvements
- Implement recommendations from the town's 2014 Scenic Roads Plan
- Implement transportation related recommendations from the town's Natural Hazard Mitigation Plan and subsequent updates
- Implement transportation related recommendations from the town's 2018 Community Coastal Resilience Study
- Implement recommendations from the 2013 Mariner's Way Plan
- Implement recommendations from the Route 1 Corridor Study
- Safe routes to school plan and infrastructure
- Enhance sidewalks per Town Sidewalk Plan
- Transit oriented development near the rail station
- Elm Street Underpass

PORTLAND

- Road ridge improvement on Bartlett Street, Breezy Corners Road, Collins Hill Road, Cox Street, High Street, Isinglass Road, Jobs Pond Road, Middle Haddam Road, Old Marlborough Turnpike, Penfield Road, Penfield Hill Road, Rose Hill Road, Sage Hollow Road, Spring Street, and Thompson Hill Road, RT 17, RT 17A, RT 66
- Develop a Complete Streets Plan
- Safe Routes to School improvements near the Brownstone Intermediate School on Main Street
- Extend the Airline Trail from East Hampton through Portland to the town center/river area
- Provide additional trails from the Airline Trail Extension north to Glastonbury and south to Middletown
- RT 17A Streetscape extension - Expanded sidewalks, curb cut consolidation, pavement markings, lane reconfiguration, elimination of above ground utilities, plantings, signage, lighting, furniture, etc. from the Arrigoni to north of Middlesex Avenue
- RT 17A Traffic calming and bike/ped improvements northward from the streetscape extension – narrower travel lanes and widen shoulder for better bicycle access with pavement markings, repair and extend sidewalks and widen where feasible while maintaining street trees
- Breezy Corners Road – intersection and drainage improvements at Middle Haddam Road
- RT 66 – provide four lanes from Sand Hill Road to the Riverdale motel and potentially to RT 16 with bicycle and pedestrian provisions and cut back outcrops at the ledges to improve sightlines, widen shoulders, and reduce winter icing
- RT 66 feasibility study between Main Street and Camp Ingersoll – Corridor study to 1) identify appropriate measures to accommodate pedestrians and bicyclist and identify traffic calming measures and 2) determine the feasibility of using RT 66 ROW to construct a multi-use trail linking the terminus of the Airline Trail to downtown Portland to link with Middletown
- Multi-use trail feasibility study – Trail study to determine the feasibility of a multi-use trail from Riverside Park in Portland to Tryon Street in Glastonbury. This could be extended west to link with Middletown and its complete streets network and north to the Glastonbury Ferry and be part of a regional trail system on both sides of the Connecticut River.

WESTBROOK

- Road/bridge improvements on Breakneck Road, Monahan Road, Cross Road, East Pond Meadow Road, Pond Meadow Road, RT 625, Dennison Road, McVeagh Road, RT 166, RT 153, RT 1, and RT 145
- Implement recommendations from the Route 1 Corridor Study
- Sidewalk/bikeway connectors to rail station
- Transit oriented development near the rail station/ village center
- RT 145 Scenic road corridor
- Improved connections to the waterfront/marinas/ boat launches
- Harbor dredging and improved marina access per Westbrook Blueways Plan
- Kirtland Landing boat launch/kayak/canoe trails
- Menunketesuck Greenway trail construction
- Sidewalk connector from rail station to Town Center
- Bus stops along RT 1
- Extension of Shoreline Greenway from Menunketesuck Greenway at Clinton town line to Old Saybrook
- Implementation of town Sidewalk Plan
- Implementation of recommendations from Natural Hazard Mitigation Plan

MIDDLETOWN TRANSIT DISTRICT

- FTA 5307 capital and operating assistance
- FTA 5311 capital and operating assistance
- Express bus service from Middletown to CT Fastrack in New Britain
- Sunday service for both fixed and dial-a-ride programs
- Add a second Meriden to Middletown run to provide 30 minute service vs. 60 minute.

ESTUARY TRANSIT DISTRICT

- FTA 5307 capital and operating assistance
- FTA 5311 capital and operating assistance
- Shoreline Route – Change from deviated fixed route to regular fixed route and expand bus size to thirty feet
- RT 81 Service – Madison/Clinton to Middletown route through Killingworth and Haddam along RT 81 to Middlesex Community College
- Improved connections – realign schedules to create a pulse system operating from the Old Saybrook train station to improve transfers and reduce travel time
- Bradley Airport Service – Semi-express service to Bradley from Old Saybrook with stops at park and ride lots and the Middletown bus terminal
- Southeast Route – earlier service times for commuters to New London/SEAT and Saturday service through Old Lyme, East Lyme and New London with access to the Crystal Mall
- Midshore Route – Saturday service to provide access to Haddam and Middletown with CT transit Hartford connection
- RT 80 Service – Old Saybrook to North Branford service through Ivoryton, Winthrop, Killingworth, Madison, and Guilford with CT transit New Haven connection
- Sunday Service – Study to implement Sunday service on the Shoreline Route, Riverside Route, and Southeast Route for riders in the service and retail industries which are open on Sundays
- Increased frequency Riverside Route – Add a second route opposite to the existing route to cut headways in half to provide better connections and improved access along this growing route
- Increased frequency Southeast Route - Add a second route opposite to the existing route to cut headways in half to provide better connections and improved access along this growing route
- Medical transportation – Provide additional medical transportation to Middletown and provide service to New Haven
- Westbrook Commuter Service – Commuter route between Westbrook Station along RT 153 to RT 9 with limited stops serving the Essex and Chester park and ride lots times with Shoreline east arrival/ departure times for easy transfers
- Old Saybrook Local Service – Study a local route to serve RT 1, Main Street, Old Boston Post Road, Maple Ave and Fenwick to reduce dial-a-ride trips, improve access to public transportation, and Shoreline East commuters
- Summer Services – Service to beach communities/ attractions in the summer tourism months possibly branded separately to attract visitors to the region

LCRVCOG

- Preservation of rail rights of way for any future uses
- Advocate for the construction of bikeways, bike paths, pedestrian paths and multi-use trails to connect activity nodes, lessen congestion, and improve air quality
- Establish coalitions to promote and market multi-use trails and coordinate with CTDOT to incorporate bicycle and pedestrian accommodations in state projects
- Implement Route 1 Corridor Study recommendations
- Implement Route 81 Corridor Study recommendations
- Implement Route 66 Corridor Study recommendations
- Support CTDOTs implementation of roundabout designs in the region where applicable
- Designation of scenic roads and highways
- Support livable communities initiatives
- Support transportation control measures
- Support congestion management process
- Support regional and statewide intelligent transportation initiatives
- Support incident management initiatives
- West Street (Middletown) replace bridge 03993 over the P&R railroad
- Central Business District (Middletown) parking garage
- RT 66 (Middletown) rehabilitation of Arrigoni Bridge approach spans
- Multi-use Trail (Middletown) Wesleyan Hills to Downtown
- Willowbrook Road (Cromwell) reconstruction and

widening north of RT 372

- RT 156/Hartford Avenue (Old Lyme) bicycle route, reconfiguration of Hartford Avenue, parking, town park and amenities
- RT 17 to RT 9 (Middletown) ramp and flow configuration modifications and improvements
- RT 66 (East Hampton) intersection improvements at RT 196/Old Marlborough Road
- Westlake Drive (Middletown) improvements and reconstruction
- Higganum Road (Durham) reconstruction
- RT 621 (Essex) conversion to one-way southbound
- RT 9 (Chester) replace bridge 02937 over Pattaconk Brook
- RT 148 (Chester) replace bridge 06639 over Great Brook
- RT 3 (Cromwell) replace bridge 01338 over RT 9
- Westbrook Road (Essex) Safe Routes pedestrian safety improvements
- RT 154 (Haddam) replace bridge 00625 over Candlewood Hill Brook
- RT 148 (Killingworth) replace bridge 02680 over brook
- RT 147 (Middlefield) replace bridge 02719 over Lyman Meadow Brook
- RT 82 (East Haddam) replace bridge 02507 over Hungerford Brook
- RT 82 (East Haddam) replace bridge 02506 over Hemlock Valley Brook
- Johnsonville Road (East Haddam) replace bridge 4656 over Moodus River
- RT 154 (Old Saybrook) replace bridge 02708 over Plum Bank Creek
- RT 156 (Old Lyme) replace bridge 01395 over Black Hall River
- RT 1 (Old Saybrook) replace bridge 01890 over Center Brook
- RT 9 (Middletown) interchange modifications at RT 66 and RT 17
- I 95 (Old Lyme) widening from the Baldwin Bridge to the Rocky Neck Connector
- Tourism/Passenger/Freight Rail Economic and Structural Feasibility and Impacts Study of the Valley Railroad Line
- Regional Freight Plan/Statewide Freight Plan
- RiverCOG Comprehensive Bicycle and Pedestrian Plan
- RiverCOG Comprehensive Transit Plan
- Transportation system preservation programs and projects (repaving, bridge repair, roadway reconstruction, sign replacement, signal replacement, bridge inspections, etc.)
- Transportation system improvement programs and projects (safety enhancements, mobility enhancements, enhancements to increase productivity and economic growth, etc.)
- Support the New Freedom 5310 Program
- Support the State Matching Grant Program for Elderly and Disabled Demand Response Transportation
- Support a Safety Study along RT 9 south of Middletown assessing lighting and reflectivity

Sunset on the Connecticut shoreline.

Chapter 7.

FINANCIAL PLAN & UNLIMITED CONSTRAINT

A. FINANCIAL PLAN
B. ANTICIPATED HIGHWAY & TRANSIT EXPENDITURES
C. VISION PROJECTS

A. FINANCIAL PLAN

The Metropolitan Transportation Plan is required by federal guidelines to be fiscally constrained. This means plans can only include projects that the region can reasonably expect to afford to build and operate over the given time period. As a long range plan, the fiscal constraint must be based upon the estimates of the available revenue for transportation needs over the timeframe of the plan. CTDOT has provided estimates of the anticipated highway funding. These estimates have been allocated to major categories of system preservation and system improvements. System preservation projects include tasks such as roadway repaving and bridge repair or replacement. System improvement projects include designs that enhance safety, improve mobility, increase system productivity or promote economic growth.

The Federal Highway Administration (FHWA) estimate for the RiverCOG region 2019 – 2045 is $1,811,047,853. Of that estimate, $1,227,228,977 is the allocation of funding for preservation, determined by weighting factors which include vehicle miles of travel, congested vehicle miles of travel, and lane mile. The system improvement allocation is estimated at $486,918,876 and $96,900,000 is allocated to major projects of statewide significance. River COG estimates transit funds based on the prior LRPs and forecasts about $185,000,000 in transit funds from 2019 to 2045. The anticipated transit expenditures in table 7.3 are based on statewide programs funded in the region, as provided by FTA, rather than the region's allocation of the total statewide anticipated expenditures. Maintaining the transit system in a state of good repair and implementation of the TAM plan, requires the use of all transit funds for the scope of the MTP

The projects listed in the regional transportation plan are funded with reasonably expected public resources. The majority of funding comes from the Federal Highway Administration and Federal Transit Administration. The State of Connecticut and municipal government resources provide most of the non-federal matching funds. Available funds and source estimates are shown in more detail in tables 7.1 and 7.2.

B. ANTICIPATED HIGHWAY & TRANSIT EXPENDITURES

The implementation of many of the projects listed within this plan requires coordination between regional agencies, towns, and CTDOT to maximize the benefits derived from this planning process. Specific anticipated highway and transit expenditures are shown in Tables 7.3 and 7.4.

C. VISION PROJECTS

Certain regional plans and projects have or will have positive inter-modal impact and benefit all seventeen towns and adjacent regions. While subsequent studies and plans will provide additional regional and town specific recommendations, projects of regional significance identified in the 2019 - 2045 RTP and in need of reiteration include:

- road improvements for safety of all modes of travel (*Complete Streets Program*)
- coordinated transit routing and bus stop improvements
- bikeway corridor construction
- mapping of trail systems (*recreational, marine, and heritage*)
- construction of designated bicycle lanes and pedestrian pathways
- regional rail coordination and access
- boating and ferry access
- sidewalk construction and critical crosswalk connections

These projects will support inter-modal efficiency, encourage land use development which promotes sustainable transportation access, support greenway protection initiatives, and coordinate transportation capital improvements within the region's towns to achieve integration of sustainable inter-modal access.

Table 7.1 Projected Available Highway Funds for the LCRV Region (2019 - 2045)

System Improvements	System Preservation	Major Projects	Total
$486,918,876	$1,227,228,977	$96,900,000	$1,811,047,853

Source: Bureau of Policy & Planning, Connecticut Department of Transportation, 2018

Table 7.2 Funding Source Estimates for the LCRV Region (2019 - 2045)

FHWA	FTA	STATE	LOCAL	TOTAL
$1,458,824,683	$92,500,000	$759,782,170	$27,735,000	$2,338,841,853

Table 7.3 Anticipated Highway Expenditures (2019- 2045)

Town	Location	Description	Est. Year	Est. Cost	State $
System Improvements					
Haddam	Route 82/Route 154	Replace T intersections with rounda-bouts	2019	$6,000,000	
Middletown	CBD	Parking garage	2019	$14,000,000	
Middletown	Route 66	Bridge 00524 approach spans	2019	$25,000,000	
Haddam	RT 82	Sidewalks	2019	$2,000,000	
Essex	Townwide	Sidewalks	2021	$145,00	100%
Old Lyme	Hartford Ave	Sidewalks/enhancements	2021	$400,000	100%
Old Saybrook	Route 1	Sidewalks	2021	$225,000	100%
Portland	Main Street	Sidewalks	2021	$205,000	100%
Westbrook	Town Center	Sidewalks	2021	$200,000	100%
Projected Expenditures		$48,175,000			
Projected Balance for Unscheduled Projects		$438,743,876			
System Preservation					
Old Saybrook	Route 154	Bridge 02708 and 01386 replacement	2019	$4,000,000	
Haddam	Route 9	Bridge 06728 replacement	2019	$1,000,000	
Deep River	Route 80	Bridge 02929 replacement	2019	$1,500,000	
Clinton	Carter Hill Road	Bridge 04610 replacement	2020	$1,500,000	
Cromwell	North Road	Bridge 05939 replacement	2020	$2,500,000	
Haddam	Dublin Hill Road	Bridge 04692 replacement	2019	$3,500,000	
Durham	Higganum Road	Reconstruction/improvements	2019	$3,000,000	100%
Cromwell	Coles Road	Reconstruction/improvements	2019	$2,500,000	100%
Chester	Main Street	Reconstruction/improvements	2020	$2,500,000	100%
Haddam	Candlewood Hill Road	Reconstruction/improvements	2020	$2,000,000	100%
Projected Expenditures		$25,000,000			
Projected Balance for Unscheduled Projects		$1,252,287,977			
Major Projects					
East Haddam	Route 82	Rehab br 01138 o/CT River		$25,400,000	
Middletown	Route 9/Route 17	Op/safe improvements		$25,000,000	100%
Middletown	Route 9	Removal of signals		$60,000,000	
District 2	Route 9/Route 17	Replace highway signs and supports		$11,500,000	
Old Lyme/East Lyme	Interstate 95	Widening from Baldwin to I-395		$292,866,242	100%
Projected Expenditures		$96,900.000			
Projected Balance for Unscheduled Projects		$0			

Table 7.4 Anticipated Transit Expenditures (2019 - 2045)

Transit	Location	Description	Est. Year	Est. Cost	State $
Transit capital	ETD		2019	$50,000	
Transit capital	ETD		2020	$95,000	
Transit capital	ETD		2021	$60,000	
Transit capital	ETD		2022	$20,000	
Transit capital	ETD		2023	$26,000	
Transit capital	ETD		2024	$80,000	
Transit capital	ETD		2025+	$4,882,500	
Transit capital	MTD		2019	$160,000	
Transit capital	MTD		2020	$150,000	
Transit capital	MTD		2021	$310,000	
Transit capital	MTD		2022	$270,000	
Transit capital	MTD		2023	$1,755,000	
Transit capital	MTD		2024	$240,000	
Transit capital	MTD		2025+	$16,975,000	
Transit	**Location**	**Description**	**Est. Year**	**Est. Cost**	**State $**
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2020	$25,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2021	$40,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2022	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2026	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2029	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2032	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2035	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2038	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2041	$20,000,000	20%
Bus replacement	All Transit Districts	Fleet overhauls, replacements and others	2044	$20,000,000	20%
Bus Upgrades	Statewide Bus	Systemwide technology upgrades for buses	2022	$15,000,000	20%
Bus Upgrades	Statewide Bus	Systemwide technology upgrades for buses	2027	$15,000,000	20%
Bus Upgrades	Statewide Bus	Systemwide technology upgrades for buses	2032	$15,000,000	20%
Bus Upgrades	Statewide Bus	Systemwide technology upgrades for buses	2037	$15,000,000	20%
Bus Upgrades	Statewide Bus	Systemwide technology upgrades for buses	2042	$15,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2019	$5,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2020	$25,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2021	$5,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2022	$25,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2023	$20,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2028	$20,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2033	$20,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2038	$20,000,000	20%
Facility SOGR	All Transit Districts	Bus maintenance facility, other facility improvements	2043	$20,000,000	20%

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Transit	Location	Descrtiption	Est. Year	Est. Cost	State $
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2023	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2024	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2025	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2026	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2027	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2028	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2029	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2030	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2031	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2032	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2033	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2034	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2035	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2036	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2037	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2038	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2039	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2040	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2041	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2042	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2043	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2044	$3,300,000	20%
Bus Fleet Expansion	Statewide Bus	Bus fleet expansion in urban areas including real time scheduling and smart card fare boxes	2045	$3,300,000	20%
Transit	Statewide	Multimodal fare technology improvements	2023	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2024	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2027	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2028	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2031	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2032	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2035	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2036	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2039	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2040	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2043	$15,000,000	20%
Transit	Statewide	Multimodal fare technology improvements	2044	$15,000,000	20%

Continued to pg. 94

Table 7.4 Continued, Anticipated Transit Expenditures (2019- 2045)

Transit	Location	Description	Est. Year	Est. Cost	State $
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2019	$4,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2020	$4,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2021	$4,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2022	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2023	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2024	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2025	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2026	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2027	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2028	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2029	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2030	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2031	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2032	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2033	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2034	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2035	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2036	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2037	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2038	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2039	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2040	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2041	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2043	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2043	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2044	$7,000,000	20%
Transit capital	CT Transit	Systemwide Admin. capital/Misc. support	2045	$7,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2019	$3,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2021	$15,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2023	$3,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2025	$33,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2027	$13,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2029	$35,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2032	$15,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2033	%3,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2035	$33,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2037	$130,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2039	$35,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2041	$15,000,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2042	$3,500,000	20%
Bus replacement	CT Transit	Bus fleet overhaul and replacement	2044	$33,000,000	20%

Continued to pg. 95

Table 7.4 Continued, Anticipated Transit Expenditures (2019- 2045)

Transit	Location	Description	Est. Year	Est. Cost	State $
Rail SOGR	Statewide	Rail freight network state of good repair	2020	$10,000,000	100%
Rail SOGR	Statewide	Rail freight network state of good repair	2021	$10,000,000	100%
Rail SOGR	Statewide	Rail freight network state of good repair	2022	$10,000,000	100%
Rail SOGR	Statewide	Rail freight network state of good repair	2023	$10,000,000	100%
CT Rail	Various	Rail fleet coaches	2024	$100,000,000	100%
CT Rail	Various	Rail fleet coaches	2025	$100,000,000	100%
CT Rail	Various	Rail fleet coaches	2026	$100,000,000	100%
CT Rail	Various	Rail fleet coaches	2031	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2032	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2033	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2038	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2039	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2040	$15,000,000	100%
CT Rail	Various	Rail fleet coaches	2045	$15,000,000	100%
CT Rail	Various	Rail fleet locomotives	2020	$75,000,000	100%
CT Rail	Various	Rail fleet locomotives	2021	$75,000,000	100%
CT Rail	Various	Rail fleet locomotives	2022	$75,000,000	100%
CT Rail	Various	Rail fleet locomotives	2023	$100,000,000	100%
CT Rail	Various	Rail fleet locomotives	2024	$300,000,000	100%
CT Rail	Various	Rail fleet locomotives	2025	$300,000,000	100%
CT Rail	Various	Rail fleet locomotives	2026	$300,000,000	100%
CT Rail	Various	Rail fleet locomotives	2027	$275,000,000	100%
CT Rail	Various	Rail fleet locomotives	2030	$33,000,000	100%
CT Rail	Various	Rail fleet locomotives	2031	$33,000,000	100%
CT Rail	Various	Rail fleet locomotives	2032	$33,000,000	100%
CT Rail	Various	Rail fleet locomotives	2034	$140,000,000	100%
CT Rail	Various	Rail fleet locomotives	2035	$140,000,000	100%
CT Rail	Various	Rail fleet locomotives	2036	$140,000,000	100%
CT Rail	Various	Rail fleet locomotives	2037	$140,000,000	100%
CT Rail	Various	Rail fleet locomotives	2043	$45,000,000	100%
CT Rail	Various	Rail fleet locomotives	2044	$45,000,000	100%
CT Rail	Various	Rail fleet locomotives	2045	$45,000,000	100%
CT Rail	Various	New rail shop for diesel/dualpower locomotive and coach repairs	2033	$3,500,000	100%
CT Rail	Various	New rail shop for diesel/dualpower locomotive and coach repairs	2034	$4,000,000	100%
CT Rail	Various	New rail shop for diesel/dualpower locomotive and coach repairs	2036	$80,000,000	100%
SLE SOGR	Various	Stations/parking state of good repair	2026	$10,000,000	100%
SLE SOGR	Various	Stations/parking state of good repair	2036	$15,000,000	100%

Continued to pg 96

Table 7.4 Continued, Anticipated Transit Expenditures (2019- 2045)

Transit	Location	Description	Est. Year	Est. Cost	State $
SLE	Various	Track Improvements	2023	$2,000,000	100%
SLE	Various	Track Improvements	2024	$3,000,000	100%
SLE	Various	Track Improvements	2025	$15,000,000	100%
SLE	Various	Track Improvements	2026	$15,000,000	100%
SLE	Various	Track Improvements	2027	$15,000,000	100%
SLE	Various	Extension of service to RI	2032	$75,000,000	100%
SLE	Various	Extension of service to RI	2033	$100,000,000	100%
SLE	Various	Extension of service to RI	2034	$50,000,000	100%
SLE	Various	Extension of service to RI	2035	$25,000,000	100%
Projected Expenditures		$4,449,500,000			
Projected Balance for Unscheduled Projects		$17,890,600,000			

Appendix A:

PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT

A robust public involvement process is essential in the planning process. Public review, comments, and questions bring new information forward and ensure that the plan accurately reflects the community. The information received through the public involvement process not only assists the writing of the plan, but further assists decision makers as they use the Metropolitan Transportation Plan in making regional transportation investments.

The public comment period for the Metropolitan Transportation Plan commenced on March 1, 2019 and ended April 1, 2019. The River MPO voted to provisionally adopt the Metropolitan Transportation Plan at their meeting on March 27, 2019 contingent upon there being no substantial additions or modifications to the Plan before the end of the public comment period. No significant comment was received after the provisional adoption of the draft plan.

The draft plan was published on the RiverCOG website and a notice was issued to local papers on March 1, 2019. Two public comment sessions were scheduled, the first was held at the Middletown Area Transit meeting on March 13 at the MAT Building, 91 N. Main St., Middletown. A second public comment session was held on March 25 prior to the Regional Planning Committee meeting at the RiverCOG office.

JULY 25, 2018 COG/MPO BOARD

COG and MPO Board members were told about the update process, schedule, and their role in the MTP revisions and asked that status updates be provided to the COG and MPO Board on a regular as basis as the plan is developed

SEPTEMBER 24, 2018 REGIONAL PLANNING COMMISSION

Possibly look at vehicle registration by town in the demographics chapter. Statistics - the population is not growing at a fast rate, yet traffic congestion seems to be increasing considerably. Raul Debrigard

Federal planning factor #8 seems out of place on the list. We should be preserving the character of our towns not the roadway infrastructure (stating the northeast corridor relocation plan in the Old Lyme area as an example). Mary Stone

RT 9 is very dark and there are often run of the road crashes and wildlife collisions at night where people may be falling asleep. Consider adding street light to RT 9 south of Middletown for safety reasons. Sandra Childress

Hopefully the RT 66 corridor study will suggest a bypass in Portland to alleviate congestion east of the Aragon Bridge. Elwin Gould.

OCTOBER 24, 2018 - MIDDLESEX CHAMBER COMMUNITY CONNECTIONS BUSINESS EXPO

Route 17 in Portland needs repairs.

Upgrade the Valley Railroad to run from Old Saybrook to Middletown.

Continue to work on the Airline Trail extension in Portland and East Hampton

Work to redevelop the Elmcrest site in Portland for economic development and transportation opportunities so Portland residents do not have to go the Middletown and Glastonbury as often.

Speeding is an issue on the more rural backroads and towns that do not have resources for enforcement.

More trolleys/buses are needed in urban areas.

More rail freight to move goods and reduce truck traffic on the highways.

Finish RT 11 towards the shore.

Remove traffic signals along RT 9 in Middletown.

Better/additional connections are needed to Metro North in order to get to NYC.

Bring RT 82 to I-95 through Salem.

Remove lights from RT 9 to reduce congestion.

Preserve the Haddam/East Haddam swing bridge.

Develop/re-development along RT 81 in Higganum.

Better traffic flow along RT 9 in Middletown. Consider a flyover or bypass.

Widen I-95 to reduce congestion.

RT 81 Clinton redevelopment. Elderly housing at the old Morgan School.

Remove traffic light on RT 9.

Reduce highway congestion.

Reduce congestion on RT 9 in Middletown.

Reduce congestion on I-95 especially in the summer.

The RT 66 Corridor Study important to the towns for both transportation improvement sand economic development purposes.

Pass the transportation lockbox amendment.

Congestion on I-95 is a problem.

Connecticut's poor infrastructure hurts businesses. We need better roads with less congestion, better freight rail infrastructure, and more frequent public transit.

Signal timing at many intersections is poor. It seems that lights are either to fast or to slow.

Many two lane state roads are congested.

Lights on Route 9 Middletown is more of a seasonal/ summer problem.

The Haddam/East Haddam swing bridge is old/historic but it needs to be kept open or so as not to lose the crossing.

Need an I-95/RT 34 New Haven type bypass on RT 9 in Middletown. Maybe elevate RT 9 northbound and depress RT 9 southbound to keep traffic moving through the area better.

Alleviate congestion. More busses, trains, carpools, etc. Consider subway potential.

More/better bus service in Middletown for people that do not drive.

There are significant numbers of deer/wildlife along the side RT 9 especially in the evening and I drive slow not to hit them. Put up warning signs.

The light on RT 9 slow traffic down but it is not too bad.

Remove traffic lights on RT 9 in Middletown.

I do not want tolls on Connecticut highways.

More transit, busses and trains.

Find ways to get people out of single occupancy vehicles. We need more car/van pools to reduce congestion.

Now that we have Hartford to New Haven rail consider Hartford to Middletown to Old Saybrook as a rail corridor as a future option or Hartford to Middletown at least if there is not enough people to continue south.

Too much salt is being used in the winter which is bad for the environment and it does not seem to be working as well to keep the roads clear. Consider going back to just sand.

RT 9 in Middletown light removal plans such as the roundabout and elevated structures create more problems than they solve so leave it as is.

JANUARY 28, 2019 REGIONAL PLANNING COMMISSION BOARD

Draft MTP presentation

FEBRUARY 8, 2019 MIDDLESEX CHAMBER ENVIRONMENT AND INFRASTRUCTURE COMMITTEE

Draft MTP presentation

FEBRUARY 25 REGIONAL PLANNING COMMISSION

Recommendation for a safety study of Route 9 south of Middletown assessing street lighting and marking reflectivity.

Language acknowledging the emergence of Uber and Lyft ride sharing technologies and how they and new technology will change transportation in the next 25 years.

A mention of the on-demand transit pilot in Old Saybrook, Westbrook, and Centerbrook.

Reference the Rt. 1 study and resulting traffic calming measures

Reference to congestion in Portland on either side of the Arrigoni Rt.17/66 (there is a portion of the plan that talks about congestion only being around Rt. 9 lights)

Break down how much CT sees out of the $305 billion federal dollars referenced in the beginning of the plan.

MARCH 12 LETTER FROM CT RESOURCE CONSERVATION AND DEVELOPMENT

On March 11, CT RC&D hosted a Farmer Roundtable Dinner and Farm Energy Workshop at Bishop's Orchards in Guilford, CT with over forty farmers and agriculture producers who traveled from various COG regions in Connecticut. The assembled group of farmers and agriculture producers discussed the need to improve regulatory land use coordination and planning for agriculture in regional and state transportation plans as well as municipal and regional plans of conservation & development and com-

prehensive economic development strategies.

It was noted that Connecticut agriculture is a four billion industry/business sector that employs almost 22,000 residents in CT. These numbers do not include ancillary support industries, producers and distributors that depend on the success of these agriculture producers. The emphasis of the discussion highlighted the need for more regional coordination of business support for agriculture. Several attendees noted that many of the COGs incorporate agriculture planning and agriculture freight commodity movement into their regional planning policies. This letter is to provide additional comments toward the development and adoption of the RiverCOG Regional Transportation Plan and other plans under development. The farmer/agriculture comments included:

Encourage expansion of agriculture planning in your UPWP and your Regional Transportation Plan updates.

Incorporate agriculture land use and planning review as part of your intermunicipal review of new land use regulations or amendments.

Encourage more data collection and mapping to better understand product sourcing, farm worker and disadvantage population access via transit as well as freight planning for commodity movement.

Consider the formation of a Regional Agriculture Council to support existing municipal Ag Commissions and towns without Ag Commissions.

MARCH 12 LETTER FROM CT RESOURCE CONSERVATION AND DEVELOPMENT

In reading through the draft 2019 Regional Transportation Plan, CTRC&D would like to offer the following comments and recommendations:

CTRC&D is currently working with the Estuary Transit District on an Access to Agriculture project for incorporating transit information systems for transit dependent populations to inform them of sources for locally grown food, fresh produce vendors, farms, CSAs, as well as soup kitchens and pantries through smart phone and digital technology. It would be helpful for the transportation planning support process to incorporate this type of project into the recommendations for transit section as well as overall transportation scenario planning.

It is anticipated that this Access to Agriculture project will also expand to provide information via the regional transit system for information on basic needs, services, and emergency planning which is proximal to the transit routes and stops. Wording that incorporates this type of expansion and associated technology would also be helpful toward the overall transportation planning process.

Additionally, on Page 53-54, in reference to the Air Line Trail State Park, CTRC&D is writing a Master Plan for the Air Line Trail State Park, incorporating maintenance, marketing, access and economic growth analysis in the town centers of the adjacent twelve towns. East Hampton, Portland are two of RiverCOG's towns that CTRC&D will be supporting in this Master Plan process. We anticipate that RiverCOG representatives will want to be involved and would recommend incorporating this project into the 2019 RTP.

MARCH 13 PUBLIC INFORMATION MEETING

Draft MTP/AQC presentation at regularly scheduled Middletown Transit District Board Meeting

MARCH 25 PUBLIC INFORMATION MEETING

Draft MTP/ACQ presentation at regularly scheduled Regional Planning Commission Board Meeting

The COG should support CTDOTs continued use of traffic rotary and roundabout designs when possible – Elwin Guild

The COG should support safety driver training such as 1) highway driving – right lane is for travel/left lane is for passing, 2) backing into traffic from parking lane – back up two-thirds of a car length then turn the wheel hard into back up lane (Old Saybrook Main Street) – Ken Soudan

1) Safety – p72, secH Need to improve night time safety and visibility for RT 9 (lighting/retro-reflective markings)

2) Security – p72 secG Need for improved security for Park & Ride lots (security cameras/lighting)

3) Safety – p72 secH CTDOT must address reduces areas for cyclists when replacing and installing guiderails. Each time these rails are installed the bike path gets smaller, most often occurring on state roads and highways

4) Recreation/Safety – p72 secH Need for additional parking at recreational areas (trails, boat moorings, bike paths, etc.)

5) Tolls – p60, sec D Potentially coming via legislature/concerns regarding regressive tax/Losing Washington dollars to gain Connecticut dollars/Moves traffic into local (bypass) roads creating traffic issues for the municipalities – Frank DeFelice

P29 Commuter parking lot safety issues

P32 River traffic comments

P33 Kayak comments

P36 Regarding terminology consistency

P37 Using web links where possible

P37 Regarding Aetna building

P38 Greenway still in play

P50 Bus service to Wesleyan/Middlesex CC

P51 Draft 2017 bike/ped plan update is no longer a draft

P51 Be careful putting bike/ped together in the same paragraph as they have different needs and issues

P52 There is a marking program – give/get share the road

P53 Bike/walk paragraph incomplete

P53 2015 is park bond date

P53 Add Middletown complete streets

P54 Stay consistent on “complete streets” ‘active transport” and “regional bike/ped plan” language throughout the document

P54 Trails or greenway

P54 Prioritize commuter bike abilities

P85 Arrigoni lighting done? Middletown project updates?

P87 Three comments under RiverCOG

P88 Consistency with Bike/Ped Plan

P90 Mapping of trails – hiking, kayaking, greenway, blue blazes, etc. – Beth Emery

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Appendix B:

ENVIRONMENTAL JUSTICE

ENVIRONMENTAL JUSTICE

Transportation projects using federal funds have to comply with Title VI of the Civil Rights Act of 1964 and Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Population, of 1994. Title VI states that persons cannot be excluded from participation in, denied benefits of, or subjected to discrimination under programs receiving federal assistance based on race, color or national origin. E.O. 12898 furthers this cause by addressing the effects of programs, policies, and activities on minority and low income populations.

Incorporating environmental justice (EJ) into the planning process makes for better transportation decisions that meet the needs of everyone. It does so by:

- Mitigating impacts on minority and low income populations
- Enhancing participation in the decision making process and;
- Assuring minority and low income populations receive a proportionate share of benefits.

RiverCOG has an EJ work program consisting of ongoing and constantly evolving tasks. Primary tasks include keeping statistics at the census block group level in relation to minority and low income communities and providing this information in tabular and mapped formats, keeping a current EJ mailing list consisting of interested organizations such as church groups, social service organizations, and neighborhood groups, and also use of alternative media sources where applicable. Outreach is improved by including a representative of minority and low income communities in the special study advisory committees when applicable and working with areas directly affected by any such study using cooperative methods agreed upon by all involved parties.

RiverCOG mitigates disproportionately high and adverse impacts in the planning process by first identifying potential impacts of proposed plans and programs and then comparing the potential impacts of the proposed alternatives. Potential impacts are then analyzed to see if minority and low-income populations are adversely affected and modifications made to mitigate disproportionate impacts to the communities. Enhanced public participation and impact mitigation in the early stages of project development are two ways to assure minority and low income populations receive an appropriate share of benefits resulting from federal expenditures.

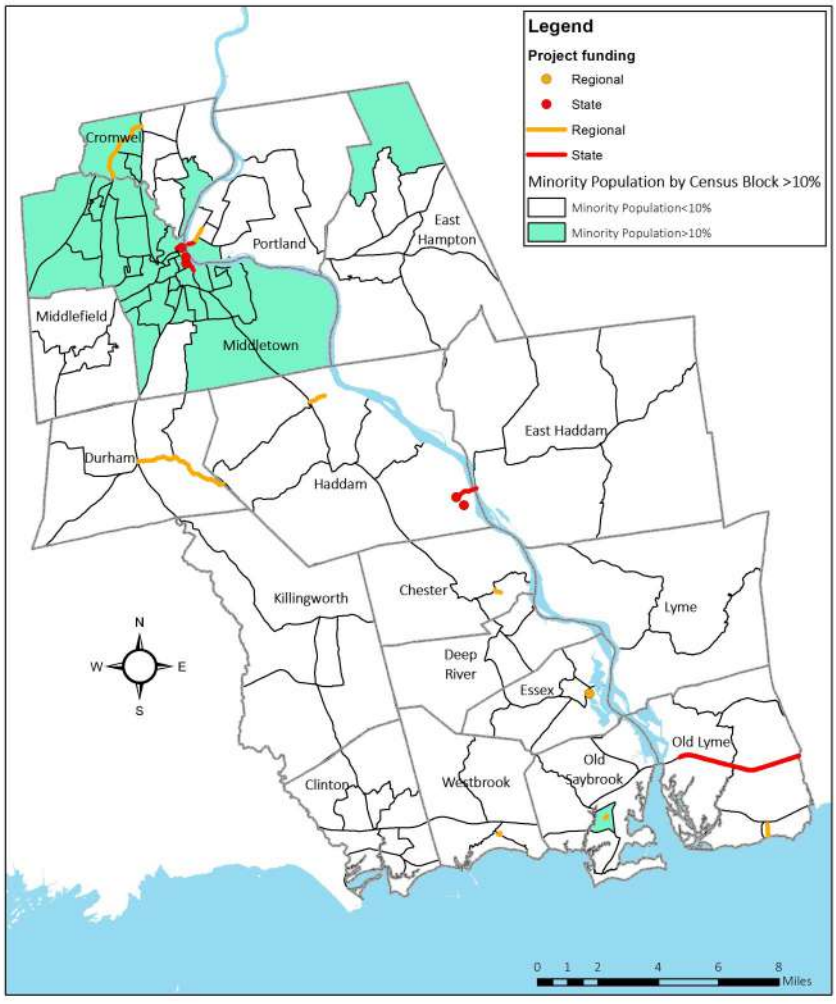
MINORITY POPULATION

RiverCOG keeps statistics and maps at the various geographic census levels for the White, Black, American Indian/Alaskan Native, Asian, and Native Hawaiian/Pacific Islander, Other, two or more races, and Hispanic Origin populations. Map B.1 highlights areas within the LCRV region with minority populations greater than 10%.

LOW INCOME POPULATION

The ratio of income to poverty level is determined by the U.S. Bureau of the Census as part of the decennial cen-

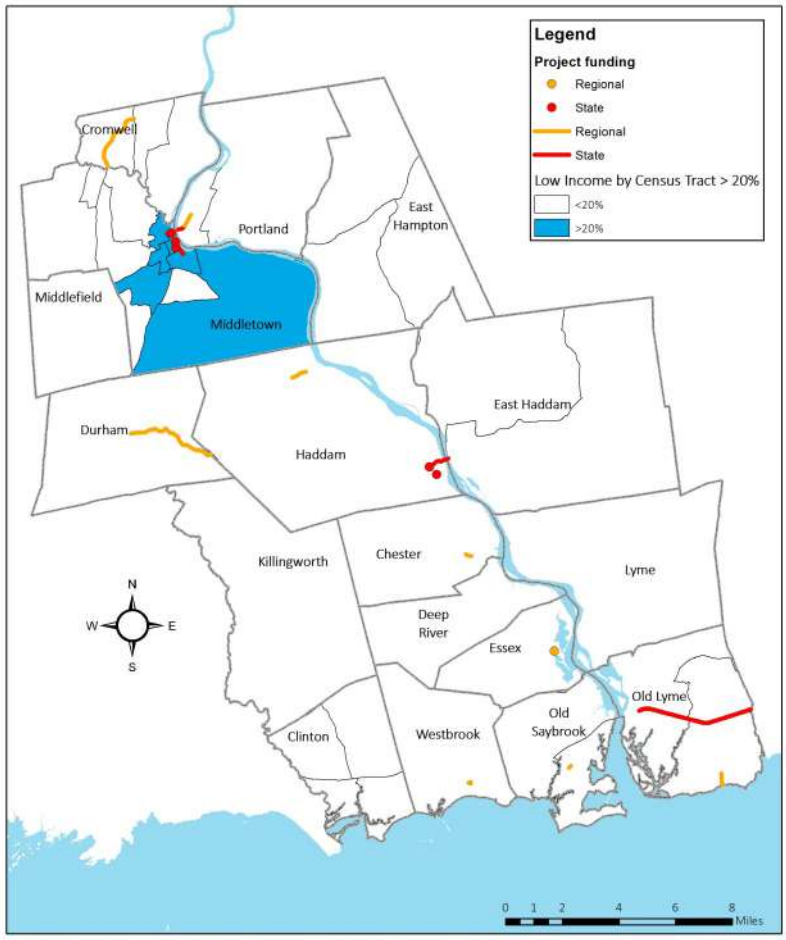
Map B.1 LCRV Region Minority Population



Source: U.S. Census Bureau, American Community Survey (2008 - 2012) 5-year Estimates, CT DOT

sus, based on household size and income. Poverty level statistics are then produced for persons residing in households below the poverty level. The low income population is considerably smaller than the minority population in the region. Map B.2 shows areas within the LCRV region where the percentage of low income households exceeds 20%.

Map B.2 LCRV Region Low Income Population



Source: U.S. Census Bureau, American Community Survey (2008 - 2012) 5-year Estimates, CT DOT

LIMITED ENGLISH PROFICIENCY

Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency (LEP) was signed on August 11, 2000. The E.O. requires that federal agencies or agencies receiving federal financial assistance examine the services they provide and implement a system by which LEP populations can access services without unduly burdening the agency. A LEP person is a person who does not speak English as their primary language and has limited ability to read, speak, write or understand English. They do, however, speak another language, and due to their limited English fluency, must use that other language if they are to have an equal opportunity to participate or benefit from any aid or service provided by federally funded programs or activities.

Based on the small size of the LEP population in the region, most LEP outreach efforts are limited to studies and projects that directly affect neighborhoods with high concentrations of non-English-speaking persons, when necessary. Interpretation services are available upon advanced request. Map B.3 shows areas within the LCRV region where the percentage of LEP persons exceeds 5%.

TRANSIT

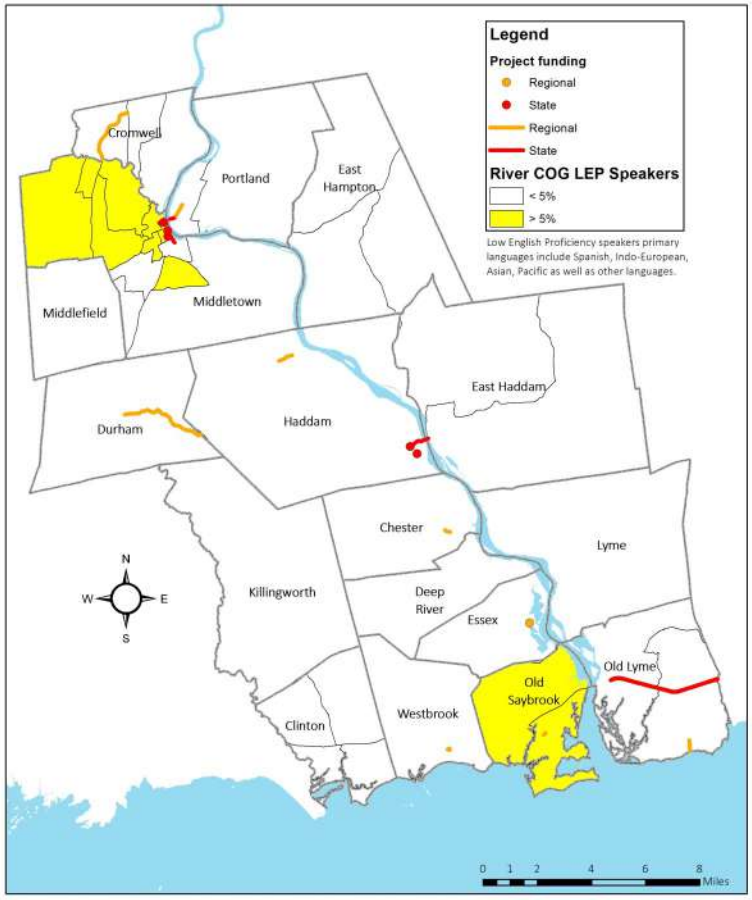
Fixed route transit is mapped in relation to minority and low income census tracts in the tri-annual Middletown Transit District Title VI report. The report identifies minority communities and inventories transit service and travel patterns. It also analyzes and compares transit level of service and quality of service in the minority and low income tracts versus the non-minority and non-low income tracts. Minority and non-minority census tracts exhibit very similar characteristics system wide. The minority tracts perform, on average, slightly better than non-minority tracts based on travel time and costs. The resulting report shows whether the benefits from the service are proportionate in different areas of the community and supports route modification where necessary. MTD's jobs access program is designed to help low-income workers gain access to job sites otherwise unavailable to them. The report recommended extending hours of service for the bus system to enable people who are dependent on transit to access activities that take place before bus service starts in the morning or after bus service ends in the evening.

HIGHWAYS

Future improvements to RT 9 relating to the removal of traffic signals has the potential to adversely affect minority or low-income neighborhoods adjacent to or within close proximity to the roadway. RiverCOG works with CTDOT and the City of Middletown to help identify potential impacts, solicit input, and discuss concerns for mitigation.

Plans for the Removal of Traffic Signals on Route 9 and Main Street Improvements were presented to the public in July 2016. Main concerns included the effect of the additional traffic on Main Street, despite the operational benefits of the proposed bump-outs, and the view obstruction

Map B.3 LCRVR LEP Population



American Community Survey & RiverCOG NEED MORE INFO

of the Connecticut River by the southern elevated section of Route 9 southbound. A follow up public meeting and CEPA scoping meeting was held in March 2018 breaking out work into three separate projects addressing the prior public concerns. Right of way impacts associated with the proposed Route 9 northbound off-ramp require the acquisition and relocation of three commercial properties and traffic pattern changes in an EJ neighborhood. Based on views and comments the community expressed concerning the proposed projects, the projects will be further revised to lessen impacts in this area.

Most other highway improvements are not expected to directly affect minority or low-income neighborhoods, as the operational and safety improvements typically occur within the existing right of way, and therefore do not affect residential neighborhoods. Similarly, arterial recommendations included in the region's plans and studies are not expected to affect minority or low-income neighborhoods.

BICYCLE AND PEDESTRIAN

RiverCOG's bicycle and pedestrian program does not negatively impact low income or minority neighborhoods. Bike/ped safety improvements typically benefit low income individuals as these improvements provide additional alternative modes to public transit and improved bicycle and pedestrian safety in both urban and rural areas.

OTHER FACTORS

Many projects, programs, and investments are difficult to map geographically but are still considered in relation to EJ. These projects and investments include, but are not limited to, transit operating subsidies, transit capital purchases, transportation control measures (TCM) such as vehicle controls, fuel standards, encouraging employer rideshare incentives, bicycle and pedestrian programs that promote non-motorized transportation alternatives, and land development strategies that help to manage transportation demand. Transit system operating subsidies and capital purchases, as well as other projects, benefit the target EJ populations.

EJ ASSESMENT

One purpose of EJ is to promote public participation in an effort to involve minority and low income populations in decision-making from the early stages of the planning process through to the end. Another purpose of EJ is to determine if minority and low income populations are receiving their fair share of benefits or a disproportionate share of burdens as a result of transportation projects and investments. These purposes are directly related since one of the best determinants of benefits and burdens is through those who are actually being affected by the projects.

The majority of EJ studies are done on a project level basis due to the small minority and low income population found in the region. For example, special studies, such as corridor studies, have an EJ representative on the advisory committee, and neighborhood organizations are consulted when affected. Similarly, these persons and organizations are contacted on a project level basis such as for meetings relating to transportation projects. Outreach efforts for the LRP, TIP, special studies and other documents include publishing notices in local and foreign language newspapers and sending information to those on the EJ mailing list in addition to the standard mailing list.

The regional TIP and LOTCIP and major state projects shown in Maps B.1, B.2 and B3 are small scale projects such as roadway rehabilitation or reconstruction projects and intersection improvement projects which equally benefit and burden all roadway users regardless of the census block group of residence. These types of system preservation and improvement projects provide considerably greater benefits than burdens. The state projects are larger in scale but most also provide considerably greater benefits than burdens.

As noted above, the burdens and benefits are evaluated at the project level since factors such as noise, dust, travel delay, displacement and other negative factors associated with projects are generally localized and affect primarily those adjacent to the project. To determine burdens and benefits at the regional level, the region's minority and low income populations were mapped based on the overall minority and low income populations in the region. This assessment provides an indication of how the benefits and burdens of transportation investments are distributed between the targeted and non-targets EJ areas.

INVESTEMENT IMPACT CONSIDERATIONS

Overall, the minority population comprises 9.8% of the region's population. Map A.1 shows the Census 2010 block groups where the minority population is greater than 10%. Approximately 41% of the projects are in or adjacent to minority block groups. Based on investment levels of projects, approximately 25% of the funds are spent in areas in or adjacent to minority census block groups.

The low income population, consisting of persons below the poverty level, comprises 13% of the region's population. Map B.2 shows the Census 2010 tracts where the low income population is greater than 20%. The specific roadway segment and spot projects are mapped in relation to the low income block groups. Approximately 24% of the projects are in or adjacent to low income block groups. Based on investment levels of regional projects, approximately 24% of the regional funds are spent in areas in or adjacent to low income census block groups.

Map B.3 shows the LEP population greater than 5% based on the 2012-2016 American Community Survey. The specific roadway segment and spot projects are mapped in relation to the LEP Tracts. Approximately 29% of the projects are in or adjacent to LEP tracts. Based on investment levels of projects, approximately 22% of the funds are spent in areas in or adjacent to LEP populations.

IMPLEMENTATION IMPACT CONSIDERATIONS

Three projects mapped in the plan are primarily maintenance projects and two are enhancement projects. These types of roadway maintenance and improvement projects typically cause temporary disruptions to the motoring and abutting communities. The resulting disturbances to motorists commonly include traffic delays, diversions, and increased congestion on both the project roadway as well as surrounding streets. Disturbances to abutters include increased particulate matter or other air pollutants, noise pollutions, and light pollution if the construction work is performed at night. Project implementation impacts are generally burdens.

OPERATIONAL IMPACT CONSIDERATIONS

The projects shown provide for maintaining the existing infrastructure in the region. Benefits and burdens will affect the current users of the facilities, which in most cases will be primarily local residents. The Arrigoni Bridge project in Middletown may also benefit additional users from beyond the region based on land use and transportation patterns in the vicinity of the project. Operational impacts can concurrently be benefits and burdens to different user populations.

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Appendix C:

MUNICIPAL BRIDGES

The following tables show the complete list of all municipal bridges as expanded on from Chapter 3 of the plan. They may be eligible for funding under the local bridge program, but the municipalities are responsible for the inspections. All other bridges on the list are over twenty feet and inspected biannually by CTDOT. The sufficiency rating indicates the bridge sufficiency to remain in service, with 100% representing an entirely sufficient bridge and 0% representing an entirely insufficient bridge.

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
04605	Chester	North Main St.	Great Brook	Culvert	2001	2/22/2016
04608	Chester	Wig Hill Rd.	Pattaconk Brook	Slab	1950	2/22/2016
05286	Chester	North Main St.	Great Brook	Culvert	1983	2/22/2016
06061	Chester	North Main St.	Great Brook	Culvert	1990	2/22/2016
026001	Chester	Cedar Lake Rd.	Pattaconk Brook	Slab	1940	9/12/1991
026002	Chester	Bailey Rd.	Pattaconk Brook	Culvert	1970	9/12/1991
026003	Chester	Hoopole Hill Rd.	Pattaconk Brook	Culvert	1970	9/21/1991
026004	Chester	Turkey Hill Rd.	Great Brook	Culvert	1965	9/12/1991
026005	Chester	Deep Hollow Rd.	Stream	Slab	1940	9/11/1991
026006	Chester	Deep Hollow Rd.	Chester Creek	Slab	1940	9/11/1991
026007	Chester	Deep Hollow Rd.	Chester Creek	Arch - Deck	1995	
026008	Chester	Straits Rd.	An Unnamed Brook	Culvert	1990	9/11/1991
026009	Chester	Liberty St.	An Unnamed Brook		1995	
026010	Chester	Kings Hwy.	An Unnamed Brook	Slab	1940	9/11/1991
026011	Chester	Dock Rd.	Chester Creek Tributary	Stringer/Multi-beam or Girder	1900	6/4/1996
04117	Clinton	Glenwood Rd.	Indian River	Culvert	1958	10/24/2016
04118	Clinton	Beach Park Rd.	Hammock River	Slab	1947	10/25/2016
04119	Clinton	Kelseytown Rd.	Menunketesuck River	Tee Beam	1938	10/24/2016
04609	Clinton	Pleasant Valley Rd.	Menunketesuck River	Slab	1930	9/15/2016
04610	Clinton	Carter Hill Rd.	Menunketesuck River	Slab	1930	9/15/2016
04612	Clinton	Kelseytwn Brdge Rd.	Menunketesuck River	Tee Beam	1938	10/24/2016
05662	Clinton	Brickyard Rd.	Menunketesuck River	Slab	1934	10/24/2016
06195	Clinton	Liberty St. #1	Amtrak Railroad	Slab	1992	3/26/2015
06203	Clinton	Silver Birch Ln.	Brook	Culvert	1980	10/20/2016
06296	Clinton	Waterside Ln.	Hammock River	Slab	1994	10/20/2016
06956	Clinton	Country Village Rd.	Brook	Culvert	1970	12/5/2017
027002	Clinton	Cream Pot Rd.	Indian River	Culvert	1982	3/14/1991
027003	Clinton	Hurd Bridge Rd.	Indian Stream	Slab	1950	3/12/1991
027004	Clinton	Woods Ln.	Menunketesuck River	Stringer/Multi-beam or Girder	1970	3/13/1991
027005	Clinton	Knollwood Dr.	An Unnamed Stream	Culvert	1960	3/12/1991
027006	Clinton	Causeway Rd.	Hammock River	Box Beam or Girders - Multi-ple	1975	3/11/1991
05006	Cromwell	Industrial Park Rd.	Mattabesset River	Stringer/Multi-beam or Girder	1983	6/13/2016
05939	Cromwell	North Rd. Ext.	Coles Brook	Culvert	1980	6/6/2016
033001	Cromwell	Christian Hill Rd.	Coles Brook	Culvert	1931	1/11/1991
033003	Cromwell	New Ln.	An Unnamed Stream	Culvert	1970	4/4/1991
033004	Cromwell	River Rd.	An Unnamed Stream	Culvert	1980	4/4/1991

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
04636	Deep River	Village St.	Deep River	Slab	2012	2/25/2016
04637	Deep River	Union St.	Deep River	Slab	1930	2/2/2016
04638	Deep River	Essex St.	Pratt Cove	Box Beam or Girders - Multiple	1999	2/1/2016
05287	Deep River	Spring St.	Deep River	Culvert	1982	2/2/2016
06056	Deep River	Bridge St.	Deep River	Slab	1990	2/25/2016
122001	Deep River	Tower Hill Rd.	An Unnamed Brook	Culvert	1970	2/13/1991
122002	Deep River	Plains Rd.	Deep River	Culvert	1970	7/19/1991
04849	Durham	Saw Mill Rd.	Parmelee Brook	Box Beam or Girders - Multiple	2001	4/18/2016
04850	Durham	Maple Ave.	Allyn Brook	Slab	1957	4/13/2016
037001	Durham	Air Line Dr.	Asmon Brook	Culvert	1980	9/16/1991
037002	Durham	Howd Rd.	Sawmill Brook	Slab	1940	9/16/1991
037003	Durham	Coe Rd.	Parmalee Brook	Culvert	1970	9/13/1991
037004	Durham	Howd Rd.	Parmalee Brook	Culvert	1989	9/13/1991
037005	Durham	Indian Ln.	Parmalee Brook	Culvert	1970	9/13/1991
037006	Durham	Parmelee Hill Rd.	Parmalee Brook	Slab	1940	9/13/1991
037007	Durham	Meetinghouse Hill Rd.	Coginchaug River	Culvert	1970	9/16/1991
037008	Durham	Maiden Rd.	Stream	Slab	1931	9/16/1991
037009	Durham	Pisgah Rd.	Cream Pot Brook	Culvert	1945	9/17/1991
037010	Durham	Picket Ln.	Hersig Brook	Culvert	1970	9/16/1991
037011	Durham	Guire Rd.	Hersig Brook	Culvert	1970	9/16/1991
037012	Durham	Picket Ln.	An Unnamed Brook	Culvert	1975	9/17/1991
037013	Durham	Blue Hills Rd.	Arrigoni Brook	Culvert	1950	9/7/1991
037014	Durham	Johnson Ln.	Sumner Brook	Arch - Deck	1948	
037015	Durham	Creamery Rd.	Coginchaug River			
04647	East Haddam	EH/Col Tpke	Moodus Reservoir	Slab	2000	12/6/2016
04648	East Haddam	Gristmill Rd.	Moodus River	Slab	1956	11/8/2016
04649	East Haddam	Clark Hill Rd.	Roaring Brook	Slab	1935	11/14/2016
04650	East Haddam	Dolbia Hill Rd. #2	Eight Mile River	Slab	2005	11/21/2014
04651	East Haddam	Foxtown Rd.	Eight Mile River	Slab	1940	11/14/2016
04656	East Haddam	Johnsonville Rd.	Moodus River	Slab	1930	11/17/2016
05267	East Haddam	Jones Hill Rd.	Eight Mile River	Slab	2006	11/17/2016
06126	East Haddam	Haywardville Rd.	Eight Mile River	Culvert	1970	11/8/2016
040001	East Haddam	East Shore Dr.	Stream	Arch - Deck	1983	6/6/1991
040002	East Haddam	Clark Sates Rd.	Stream	Culvert	1980	6/4/1991
040003	East Haddam	Falls Bansham Rd.	Moodus River	Culvert	1965	6/4/1991
040004	East Haddam	Falls Bashan Rd.	Moodus River	Culvert	1965	6/5/1991
040005	East Haddam	Ackley Cemetery Rd.	Early Brook	Culvert	1975	6/5/1991

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
040006	East Haddam	Geoffrey Rd.	Eight Mile River	Stringer/Multi-beam or Girder	1970	6/4/1991
040007	East Haddam	North Moodus Rd.	Moodus River	Culvert	1975	6/5/1991
040008	East Haddam	Joe Williams Rd.	Shady Brook	Culvert	1965	6/10/1991
040009	East Haddam	Bashan Rd.	Stream	Culvert	1960	6/6/1991
040011	East Haddam	Haywardville Rd.	Early Brook	Culvert	1970	6/4/1991
040012	East Haddam	Salem Rd.	Lake Hayward Brook	Culvert	1965	6/10/1991
040013	East Haddam	Foxtown Cemetery Rd.	Lake Hayward Brook	Culvert	1980	6/6/1991
040014	East Haddam	Foxtown Cemetery Rd.	Stream	Culvert	1965	5/31/1991
040015	East Haddam	Foxtown Cemetery Rd.	Foxtown Cemetery Road Brook	Culvert	1965	5/31/1991
040016	East Haddam	Foxtown Cemetery Rd.	Stream	Culvert	1965	6/10/1991
040017	East Haddam	Bardman Rd.	Succor Brook	Culvert	1970	6/6/1991
040018	East Haddam	Creamery Rd.	Succor Brook	Culvert	1975	6/3/1991
040019	East Haddam	Lumber Yard Rd.	Succor Brook	Culvert	1975	6/3/1991
040020	East Haddam	Three Bridges Rd.	Strong Brook	Culvert	1985	6/5/1991
040021	East Haddam	Hungerford Rd.	Hungerford Road Brook	Culvert	1970	6/3/1991
040022	East Haddam	Bone Mill Rd.	Hemlock Valley Brook	Culvert	1965	6/6/1991
040023	East Haddam	Bone Mill Rd. #2	An Unnamed Brook	Stringer/Multi-beam or Girder	1985	4/25/2014
040024	East Haddam	Florida Rd.	Stream	Culvert	1980	6/3/1991
05610	East Hampton	Shipyard Rd.	Mine Brook	Slab	1941	10/19/2016
05739	East Hampton	Chestnut Hill Rd.	Pine Brook	Culvert	1987	10/20/2016
041001	East Hampton	White Birch Rd.	Fawn Hill Brook	Slab	1960	4/12/1991
041002	East Hampton	Walnut Ave.	Pocotopaug Creek	Slab	1950	4/16/1991
041003	East Hampton	Main St.	Pocotopaug Creek	Arch - Deck	1925	4/15/1991
041004	East Hampton	Niles St.	Pocotopaug Creek	Stringer/Multi-beam or Girder	1950	4/11/1991
041005	East Hampton	Flat Brook Road	Flat Brook	Slab	1980	4/16/1991
041006	East Hampton	Flat Brook Rd.	Flat Brook	Culvert	1970	4/15/1991
041007	East Hampton	Blacksmith Rd.	An Unnamed Brook	Arch - Deck	1850	4/10/1991
041008	East Hampton	Terp Rd.	Pine Brook	Slab	1950	5/21/1991
041009	East Hampton	Old Chestnut Hill Rd.	Pocotopaug Creek	Slab	1970	4/16/1991
041010	East Hampton	Tartia Rd.	Safstrom Brook		2000	
041011	East Hampton	Wopowog St.	Safstrom Brook	Culvert	1975	4/10/1991
041012	East Hampton	Long Crossing Rd.	Pine Brook	Culvert		

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
04356	Essex	Pond Meadow Rd.	Falls River	Culvert	1980	10/23/2017
04660	Essex	Walnut St.	Falls River	Culvert	1968	3/3/2016
04662	Essex	Dennison Rd.	Falls River	Culvert	1968	8/8/2017
04663	Essex	River Rd.	Falls River	Stringer/Multi-beam or Girder	1954	9/18/2017
04664	Essex	Dennison Rd.	Falls River	Culvert	1964	8/8/2017
05288	Essex	Cheney St.	Brook	Culvert	1983	10/23/2017
05289	Essex	Main St. #2	Brook	Culvert	1983	10/31/2017
049001	Essex	Ivory St.	Falls River (North Branch)	Slab	1940	7/10/1991
049002	Essex	Ivory St.	Falls River (South Branch)	Slab	1940	7/10/1991
049003	Essex	Falls River Dr.	Falls River	Culvert	1980	7/2/1991
049004	Essex	Old Deep River Rd.	An Unnamed Brook	Slab	1940	7/2/1991
04681	Haddam	St. Peters Ln.	Candlewood Hill Brook	Culvert	1963	6/16/2017
04682	Haddam	Dublin Hill Rd.	Bible Rock Brook	Slab	1920	6/16/2017
04688	Haddam	Little City Rd.	Ponset Brook	Culvert	1961	6/16/2017
04816	Haddam	Depot Rd.	Ponset Brook	Culvert	1983	6/14/2017
04817	Haddam	Scovil Rd.	Candlewood Hill Brook	Culvert	1983	6/14/2017
05405	Haddam	Depot Rd.	Candlewood Hill Brook	Box Beam or Girders - Multi-ple	1986	6/20/2017
05406	Haddam	Boulder Dell Rd.	Bible Rock Brook	Culvert	1986	6/29/2015
05515	Haddam	Jail Hill Rd.	Beaver Meadow Brook	Slab	1986	6/27/2017
05537	Haddam	Beaver Meadow Rd.	Beaver Meadow Brook	Culvert	1983	6/27/2017
06020	Haddam	Thayer Rd.	Bible Rock Brook	Slab	1990	6/27/2017
06028	Haddam	Grapevine Rd.	Candlewood Hill Brook	Slab	1990	6/25/2015
06209	Haddam	Little City Rd.	Candlewood Hill Brook	Slab	1991	6/23/2017
06301	Haddam	Dish Mill Rd.	Ponset Brook	Stringer/Multi-beam or Girder	1963	6/23/2017
06938	Haddam	Beaver Meadow Rd.	Beaver Meadow Brook	Culvert	1974	6/26/2017
060001	Haddam	Dudley Clark Rd.	An Unnamed Brook	Culvert	1970	9/16/1991
060002	Haddam	Dudley Clark Rd.	Stream	Culvert	1970	9/16/1991
060003	Haddam	Ruth Hill Rd.	Clark Creek	Culvert	1965	9/16/1991
060004	Haddam	Beaver Meadow Rd.	Beaver Meadow Brook	Culvert	1971	9/16/1991
060005	Haddam	Walkley Hill Rd.	Swain Johnson Brook	Slab	1920	9/10/1991
060006	Haddam	Pownsett Rd.	Saltpeter Brook	Culvert	1983	9/16/1991
060007	Haddam	Candlewood Hill Rd.	Candlewood Hill Brook	Slab	1940	9/16/1991
060008	Haddam	Hidden Lake Rd.	Hidden Lake Spillway	Slab	1939	9/14/1991
060009	Haddam	Wiese Albert Rd.	Candlewood Hill Brook	Slab	1950	9/17/1991
060010	Haddam	Brainard Hill Rd.	Bible Rock Brook	Culvert	1983	9/17/1991
060011	Haddam	Oxbow Rd.	Bible Rock Brook	Culvert	1949	9/17/1991
060012	Haddam	Little City Rd.	Candlewood Hill Brook	Box Beam or Girders - Multi-ple	1991	10/29/1991
060013	Haddam	Candlewood Hill Rd.	Candlewood Hill Brook	Salb	1936	3/17/1997

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
060014	Haddam	Candlewood Hill Rd.	Candlewood Hill Brook	Slab	1936	3/17/1997
060015	Haddam	Candlewood Hill Rd.	Candlewood Hill Brook	Slab	1936	3/17/1997
04712	Killingworth	River Rd. #1	Deer Lake Brook	Stringer/Multi-beam or Girder	1960	11/7/2017
04716	Killingworth	Reservoir Rd.	Menunketesuck River	Culvert	2009	11/7/2017
06614	Killingworth	Abner Ln.	Pond Meadow Brook	Slab	1998	11/9/2017
069001	Killingworth	Burr Hill Rd.	An Unnamed Brook	Culvert	1970	7/12/1991
069002	Killingworth	Bunell Bridge Rd.	Hammonasset River	Culvert	1950	7/15/1991
069003	Killingworth	Emanuel Church Rd.	An Unnamed Brook	Culvert	1965	7/15/1991
069005	Killingworth	Birch Mill Rd.	Pond Meadow Brook	Culvert	1980	7/11/1991
069006	Killingworth	Alders Bridge Rd.	An Unnamed Brook	Culvert	1980	7/12/1991
069007	Killingworth	Roast Meat Hill Rd.	Menunketesuck River	Culvert	1950	7/11/1991
069008	Killingworth	River Rd.	An Unnamed Brook	Culvert	1980	7/15/1991
069009	Killingworth	Paper Mill Rd.	Chatfield Hollow Brook	Slab	1950	7/11/1991
069010	Killingworth	River Rd.	An Unnamed Brook	Culvert	1960	7/11/1991
069011	Killingworth	Roast Meat Hill Rd.	Indian River	Culvert	1970	7/10/1991
04723	Lyme	Mount Archer Rd.	Eight Mile River	Box Beam or Girders - Multiple	1966	9/3/2014
04724	Lyme	Joshuatown Rd.	Eight Mile River	Arch - Deck	1920	12/11/2017
04726	Lyme	Macintosh Rd.	Eight Mile River	Stringer/Multi-beam or Girder	1972	9/26/2016
05818	Lyme	Day Hill Rd.	Roaring Brook	Stringer/Multi-beam or Girder	1989	9/19/2016
06039	Lyme	Salem Rd.	East Br Eight Mile River	Stringer/Multi-beam or Girder	1991	9/23/2016
074001	Lyme	Gungy Rd.	Cedar Pond Brook	Culvert	1965	6/10/1991
074002	Lyme	Beaver Brook Rd.	Cedar Pond Brook	Culvert	1960	6/11/1991
074003	Lyme	Grassy Hill Rd.	Beaver Brook	Arch - Deck	1950	6/10/1991
074004	Lyme	Kenny Rd.	Beaver Brook	Culvert	1960	6/11/1991
074005	Lyme	Joshuatown Rd.	Joshua Creek	Slab	1950	6/11/1991
074006	Lyme	Cove Rd. #1	Hamburg Cove	Slab	1960	6/10/1991
074007	Lyme	Birch Mill Rd.	Falls Brook	Stringer/Multi-beam or Girder	1940	8/8/1991
074008	Lyme	Sterling City Rd.	Falls Brook	Slab	1960	6/10/1991
04150	Middlefield	Cherry Hill Rd.	Coginchaug River	Stringer/Multi-beam or Girder	2000	5/16/2016
04843	Middlefield	Miller Rd.	Coginchaug River	Tee Beam	1936	5/5/2016
04844	Middlefield	Strickland Rd.	Coginchaug River	Slab	1936	5/5/2016
05553	Middlefield	Cider Mill Rd.	Coginchaug River	Box Beam or Girders - Multiple	1933	5/16/2016
081001	Middlefield	Mattabeseck Rd.	An Unnamed Brook		2006	2/9/2005
04187	Middletown	Main St. Ext.	Sumner Brook	Arch - Deck	1935	8/23/2016
04189	Middletown	Ridge Rd.	Sumner Brook	Culvert	1938	7/27/2016
04190	Middletown	River Rd. #1	Sumner Brook	Box Beam or Girders - Multiple	1920	8/23/2016

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
04533	Middletown	Mill St.	Sumner Brook	Stringer/Multi-beam or Girder	1953	7/22/2016
04535	Middletown	Middlefield St.	Coginchaug River	Stringer/Multi-beam or Girder	1900	7/29/2016
04538	Middletown	Miner Street	Fall Brook	Culvert	1978	7/22/2016
04542	Middletown	Bell Street	Sawmill Brook	Culvert	1955	8/4/2016
05352	Middletown	East Main St.	Sumner Brook	Stringer/Multi-beam or Girder	1985	7/28/2016
005450	Middletown	Mill Brook Rd.	Sumner Brook	Slab	1934	5/10/2004
05564	Middletown	Russell St.	Sumner Brook	Slab	1935	7/27/2016
05616	Middletown	Mill St.	Long Hill Brook	Culvert	2001	7/27/2016
05621	Middletown	Wilcox St.	Sumner Brook	Frame	2010	8/4/2016
05622	Middletown	Boardman Ln. #1	Sawmill Brook	Culvert	1981	7/29/2016
05957	Middletown	River Rd. # 2	Brook	Culvert	1970	7/28/2016
05958	Middletown	Wesleyan Hills Rd.	Long Hill Brook	Culvert	1960	5/20/2016
05959	Middletown	Heritage Blvd.	Miner Brook	Culvert	1986	6/27/2016
082001	Middletown	Country Club Rd.	West Highland Brook	Culvert	1965	5/7/1991
082002	Middletown	Timber Ridge Rd.	East Bradley Brook	Culvert	1985	5/7/1991
082003	Middletown	Bradley St.	Bradley Brook	Culvert	1981	5/7/1991
082004	Middletown	Smith St.	Sawmill Brook	Culvert	1972	5/7/1991
082005	Middletown	Freeman Rd.	An Unnamed Stream	Culvert	1995	
082006	Middletown	Freeman Rd.	An Unnamed Stream	Slab	1930	5/8/1991
082008	Middletown	Maromas Rd.	Hubbard Brook	Culvert	1988	5/8/1991
082009	Middletown	Reservoir Rd.	Reservoir Brook	Culvert	1960	5/8/1991
082010	Middletown	Bow Ln.	An Unnamed Stream	Culvert	1975	5/8/1991
082011	Middletown	Chamberlain Rd.	Harris Brook	Slab	1927	5/9/1991
082012	Middletown	Mill Brook Rd.	An Unnamed Stream	Slab	1930	5/9/1991
082013	Middletown	Mill Brook Rd.	Summer Brook	Culvert	1975	5/9/1991
082014	Middletown	Bow Ln.	An Unnamed Stream	Culvert	1982	5/9/1991
082015	Middletown	River Rd. #1	An Unnamed Stream	Culvert	1960	5/9/1991
082016	Middletown	Arbutus St.	Round Hill Brook	Culvert	1970	5/13/1991
082017	Middletown	Anderson Rd.	Laurel Brook	Culvert	1930	5/13/1991
082018	Middletown	Brown St.	Long Hill Brook	Culvert		
082019	Middletown	Randolph Rd. #1	Long Hill Brook	Culvert	1980	5/13/1991
082020	Middletown	Wadworth St.	An Unnamed Stream	Culvert	1985	5/13/1991
082021	Middletown	Butternut St.	An Unnamed Stream	Culvert	1975	5/15/1991
082022	Middletown	Butternut St.	An Unnamed Stream	Culvert	1930	5/15/1991
082023	Middletown	River Rd. #1	Reservoir Brook	Slab	1965	5/15/1991
082024	Middletown	High St.	An Unnamed Stream	Culvert	1939	5/15/1991
082025	Middletown	Mile Ln.	East Swamp Brook	Culvert	1970	5/16/1991

Bridge No.	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
082026	Middletown	Lawrence Dr.	West Swamp Brook	Culvert	1980	5/16/1991
082028	Middletown	Ridgewood Rd.	An Unnamed Stream	Culvert	1980	5/16/1991
082029	Middletown	Country Club Rd.	Fall Brook	Culvert	1980	5/16/1991
082030	Middletown	Smith St.	Fall Brook	Culvert	1980	5/17/1991
082031	Middletown	Industrial Park Rd.	Fall Brook	Culvert	1992	
082032	Middletown	Industrial Park	An Unnamed Stream	Culvert	1980	5/17/1991
082033	Middletown	Boardman Ln.	Sawmill Brook	Culvert	1980	5/17/1991
082034	Middletown	Wesleyan Hills Rd.	Pedestrian Walkway	Culvert	1980	6/5/1991
082035	Middletown	Long Hill Rd.	Pedestrian Walkway	Culvert	1980	6/5/1991
082037	Middletown	Pameacha Ave.	Long Hill Brook	Culvert	1920	
082038	Middletown	Lee St.	Prout Brook	Slab	1940	6/9/2004
082039	Middletown	Anderson Rd.	Laurel Brook	Culvert	1995	5/10/2004
082040	Middletown	West Lake Dr.	Miner Brook	Culvert	1985	4/26/2013
04346	Old Lyme	Button Ball Rd.	Amtrak Railroad	Slab	1933	4/13/2014
04738	Old Lyme	Town Woods Rd.	Mill Brook	Culvert	1982	5/23/2016
04739	Old Lyme	Sill Ln. #1	Mill Brook	Culvert	1982	5/25/2016
04747	Old Lyme	Mile Creek Rd.	Blackhall River	Stringer/Multi-beam or Girder	1955	6/16/2016
04818	Old Lyme	Sill Ln. #2	Mill Brook	Culvert	1982	5/25/2016
104001	Old Lyme	Tantummaheag Rd.	An Unnamed Brook	Arch - Deck	1960	6/12/1991
104002	Old Lyme	Hatchetts Hill Rd.	Three Mile River	Culvert	1980	6/13/1991
104003	Old Lyme	Mile Creek Rd.	Three Mile River	Culvert	1990	6/12/1991
104004	Old Lyme	Mccurdy Rd.	Duck River	Culvert	1960	3/7/1991
04749	Old Saybrook	Nehantic Trail #2	Mud Creek	Box Beam or Girders - Multiple	2003	11/18/2015
05923	Old Saybrook	Ingham Hill Road	Amtrak Railroad	Stringer/Multi-beam or Girder	1990	3/23/2016
06021	Old Saybrook	Schoolhouse Rd.	Amtrak Railroad	Box Beam or Girders - Multiple	1933	4/26/2014
105001	Old Saybrook	Otter Cove Dr.	Stream	19 - Culvert (includes frame culverts)	1980	6/28/1991
105002	Old Saybrook	Ingham Hill Rd.	Fishing Brook	Slab	1931	7/1/1991
06519	Portland	Wilcox Hill Rd.	Reservoir Brook	Arch - Deck	1995	4/29/2014
112001	Portland	Penfield Hill Rd.	Carr Brook	Culvert	1938	
112002	Portland	Cox Rd. #2	Carr Brook	Slab	1960	
112003	Portland	Cox Rd.	Carr Brook	Slab	1960	
112004	Portland	Cox Rd.	Carr Brook	Slab	1960	
112005	Portland	South Rd.	Carr Brook	Culvert	1982	
112006	Portland	Rose Hill Rd.	Carr Brook	Slab	1938	
112007	Portland	Old Marlborough Tpke.	Reservoir Brook	Slab	1938	
112008	Portland	Thompson Hill Road	Reservoir Brook	Slab	1939	
112009	Portland	Isinglass Hill Rd.	An Unnamed Stream	Slab	1950	6/5/1991

Bridge	Town	Feature Carried	Feature Intersected	Structure Type	Year Built	Inspected
03894	Westbrook	Old Clinton Rd.	Amtrak Railroad	Box Beam or Girders - Multiple	1997	3/31/2014
04807	Westbrook	Old Clinton Rd.	Patchogue River	Slab	1976	4/25/2016
06084	Westbrook	Wesley Ave.	Patchogue River	Box Beam or Girders - Multiple	1991	4/25/2016
06658	Westbrook	Flat Rock Pl.	Wetlands	Box Beam or Girders - Multiple	1996	7/10/2014
06659	Westbrook	Flat Rock Pl.	Wetlands	Box Beam or Girders - Multiple	1996	5/20/2014
06660	Westbrook	Flat Rock Pl.	Wetlands	Box Beam or Girders - Multiple	1996	5/20/2014
06942	Westbrook	Winthrop Rd.	Falls River	0Frame	2016	12/28/2016
154001	Westbrook	Pritchett Dr.	Stream	Culvert	1988	7/18/1991
154002	Westbrook	Winthrop Rd.	Falls River	Arch - Deck	1945	5/7/1999
154003	Westbrook	Lynn Rd.	Falls River	Slab	1939	7/17/1991
154004	Westbrook	Fishing Brook Rd.	Spring Lot Brook	Culvert	1986	7/17/1991
154005	Westbrook	Fair View Rd.	An Unnamed Brook	Culvert	1987	7/16/1991
154006	Westbrook	Brookwood Dr.	Spring Lot Brook	Culvert	1986	7/17/1991
154007	Westbrook	Pond Meadow Rd.	Stream	Culvert	1982	7/16/1991
154008	Westbrook	Willard Ave.	Stream	Culvert	1970	7/16/1991
154009	Westbrook	Toby Hill Rd. #1	Trout Brook	Culvert	1982	7/16/1991

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Appendix D:

TRANSPORTATION DEMAND MANAGEMENT STRATEGIES

Improved Transportation Options:

Bicycle parking	Bike racks, lockers, changing facilities, etc.
Commercial centers	Vibrant downtowns, business districts, villages, etc.
Connectivity	Connected roadway and path networks
Density and clustering	Locating common destination together to increase accessibility
Livable communities	Accessible, livable community design
Parking management	Efficient parking, evaluation, and solutions
Smart growth	Accessible, efficient, livable development
Streetscape	Improve urban street design
Transit oriented development (TOD)	Transit stations to promote livable communities

Incentives to Reduce Driving and Use Alternative Routes:

Asset management	Preserve the value of assets such as roads and parking facilities
Comprehensive market reforms	Policy changes resulting in efficient transportation pricing
Context sensitive design	Flexible design requirements based on community values
Contingency based planning	Identifying solutions to potential future issues
Institutional reform	Creating organization that support efficient transportation
Operation and management	Encourage efficient use of existing systems
Prioritization	Principals for prioritization of activities and investments
Regulatory reform	Policy changes to encourage innovation and efficiency

Parking and Land Use Management:

Alternative work schedules	Flextime, compressed work week, staggered shifts, etc.
Bus rapid transit (BRT)	Higher quality transit service in busy urban corridors
Car sharing	Rental services to substitute for ownership
Bicycling improvements	Improving the bicycling facilities and connections
Guaranteed ride home	Subsidized ride home for alternative mode commuters when needed
Light rail transit (LRT)	Convenient service in busy urban corridors
Non-motorized planning	Planning for pedestrians, bicyclists, etc.
Park and ride	Convenient parking with links to transit/rideshare facilities
Pedestrian improvements	Improving the walking environment and connections
Public bicycle systems	Bike rental systems for short urban trips
Ridesharing	Encouraging carpools and vanpools
Transit station improvements	Improving station and stop conditions
Telecommuting	Telecommunications as a substitute for physical travel
Traffic calming	Designs to reduce traffic speeds and volumes
Transit improvements	Improving public transit services

Policy and Institutional Reforms:

Carbon taxes	Taxes based on carbon content to encourage conservation
Commuter financial incentives	Travel allowances, transit benefits, etc.
Congestion pricing	Variable road pricing to reduce peak period trips
Complete streets	Design for diverse modes, users, and activities
Distance based pricing	Fees and taxes based on mileage
Fuel Taxes	Fuel tax increases for TDM objectives
HOV priority	High occupancy vehicle priority lanes and strategies
Parking pricing	Direct charges for parking
Roadway pricing	Value pricing, congestion pricing, toll roads, etc.
Road space allocation	Design to favor efficient modes
Transit encouragement	Encourage public transit use
Vehicle use restrictions	Limit vehicular traffic at a particular times and place
Walking/bicycling encouragement	Encourage non-motorized transportation use

For further information regarding the Metropolitan Transportation Plan or to provide feedback, please contact the offices of the Lower Connecticut River Valley Council of Governments at (860)581-8554.