



# CONNECTICUT DEPARTMENT OF TRANSPORTATION

*Statewide Computerized Traffic Signal  
Systems Needs Assessment*

# EARLY DEPLOYMENT NEEDS ASSESSMENT-NOVEMBER 2015

The Connecticut Department of Transportation (ConnDOT) formed a Needs Assessment Team to review statewide Computerized Traffic Signal Systems (CTSS) infrastructure and elements to develop an early deployment recommendation. The Needs Assessment Team included ConnDOT staff representing Highway Operations - ITS Engineering and Support, the Signal Lab, Traffic Engineering, and Engineering Application. The primary goal of this needs assessment was to improve statewide CTSS design, management, implementation, operations, and maintenance by developing a sustainable CTSS program. Within this program, ConnDOT will replace traffic signal hardware as needed and optimize timings to improve the efficiency, safety, and reliability of the CTSS. The program will also ensure that the improvements done to federally funded CTSS is in conformance with Federal Regulations. Early deployment recommendations are summarized below, with additional information included in subsequent sections.

## NEEDS ASSESSMENT TEAM'S EARLY DEPLOYMENT RECOMMENDATIONS:

**Need # 1:** Rocky Hill Transyt System 1 Rte 3 equipment is approaching the end of its serviceable life and requires replacement and upgrades:

- Replace obsolete DOS-based CTSS equipment (Installation Date 1990)
- Expand coverage to include all signals on West St
- Connect existing CTSS to statewide fiber network to improve system reliability
- To provide performance based Measures of Effectiveness (MOEs) and reporting
- Complement CTSS with installation of Intelligent Transportation Systems (ITS) such as video detection systems
- Review Existing Timing Plans and update as needed
- Estimated project cost: \$8-10 Million

**Need # 2:** Additional CTSS coverage along Newington Rte 175:

- Along anticipated alternate route that motorists will seek to avoid future construction in the Capitol Region
- Due to anticipated extensive CTSS equipment replacement
- Along heavily-traveled route currently lacking coverage
- To reduce stops, overall delay and improve traffic flow
- System to include Rte 9 to Rte 15
- Estimated project cost: \$8-10 Million

**Need # 3:** Replace existing Transyt CTSS equipment in the Capitol Region:

- Replace obsolete DOS-based CTSS equipment
- Aging systems installed between 1990 and 1996 (19 to 25 years of age)
- Total Number of Systems/Intersections: 10/77 respectively
- Review Existing Timing Plans and update as needed
- To improve region wide Traffic Signal Management, Operations and Maintenance
- Estimated project cost: \$2.5 Million

**Need # 4:** Retime and re-evaluate existing CTSS in the Capitol Region:

- Review Existing Timing Plans and update as needed
- To reduce stops, overall delay and improve traffic flow
- To improve region wide Traffic Signal Management, Operations and Maintenance
- Retiming of CTSS will be continuously reviewed every three (3) to five (5) years
- Performance based Measures of Effectiveness (MOEs) and reporting
- Estimated project cost: \$2.5 Million (includes state forces time and consultant fees)

# INTRODUCTION & OVERVIEW

Computerized Traffic Signal Systems (CTSS) continue to play an important role in the provision of transportation services to Connecticut travelers. CTSS is a system for synchronizing the timing of any number of traffic signals in an area, with the aim of reducing stops, reducing overall delay, and improving traffic flow.



As existing CTSS infrastructure in Connecticut continues to age, and the need for improved reliability of CTSS continues to grow, the Connecticut Department of Transportation (ConnDOT) is exploring a variety of opportunities for system improvements. This document summarizes identified CTSS needs for various regions throughout Connecticut.

## BACKGROUND

Well planned computerized traffic signal systems management, operations, and maintenance practices can save money and provide a high value trade off compared to other types of infrastructure investment. The proactive management, operations, and maintenance of CTSS, in addition to supporting the analytical foundation to measure success, are essential for CTSS to be efficient.

The State of Connecticut operates two types of Computerized Traffic Signal Systems: DOS-based Transyt systems and Naztec systems. The DOS-based Transyt systems are obsolete and incompatible with ConnDOT's current Operations and Maintenance IT network. While many of these devices installed between the early-1990s to the early-2000s are functional with frequent and continued maintenance, they are approaching the end of their serviceable life. ConnDOT manages these CTSS devices through two centers in Newington and Rocky Hill. Communications to field CTSS devices are provided through leased telecommunications lines. Unreliable data communication through the leased lines to field devices results in data collection limitations.

I-95 features a large portion of state's CTSS operated by ConnDOT, including a vast network of CTSS extending across much of the Capitol Region and South Central Region of the state. Other areas with CTSS coverage include Lower CT River Valley, Northeastern, Northwest Hills, Naugatuck Valley, Western, and Southeastern Regions. ConnDOT's CTSS provide a through route to motorists primarily along I-95, with several of these systems in the extreme southwest corner of the state. Additional CTSS assist motorists near the Capitol Region and along I-91 in the central sections of the state.

## NEEDS ASSESSMENT OVERVIEW

A Needs Assessment Team reviewed statewide CTSS infrastructure and elements to develop an early deployment recommendation. This review process included background research on existing and proposed systems as well as a series of needs assessment meetings. The Needs Assessment Team included input from Highway Operations, ITS Engineering and Support, the Signal Lab, Traffic Engineering, and Engineering Application staff. The goal of this needs assessment was to improve statewide CTSS design, management, implementation, operations, and maintenance by developing a sustainable CTSS program. Within this program, ConnDOT will replace traffic signal hardware as needed and optimize timings to improve the efficiency, safety, and reliability of the signal systems. The program will also ensure that the improvements done to federally funded CTSS is in conformance with Federal Regulations (*see Appendix E*). The Needs Assessment Team compiled a list of needs prioritized based on multiple considerations, including: age of equipment, time since last retiming, currently planned projects, high traffic volumes on roadways, roadways with frequent incidents, etc. These prioritizations represent a snapshot in time. As projects develop and are implemented, as needs evolve, as opportunities present themselves, the prioritization of these projects will likely change over time. For additional information on existing conditions and needs assessment priority listing recommendations, please refer to *Appendices A through C*.

ConnDOT staff identified general CTSS needs, as well as specific CTSS needs for the following Planning Regions:

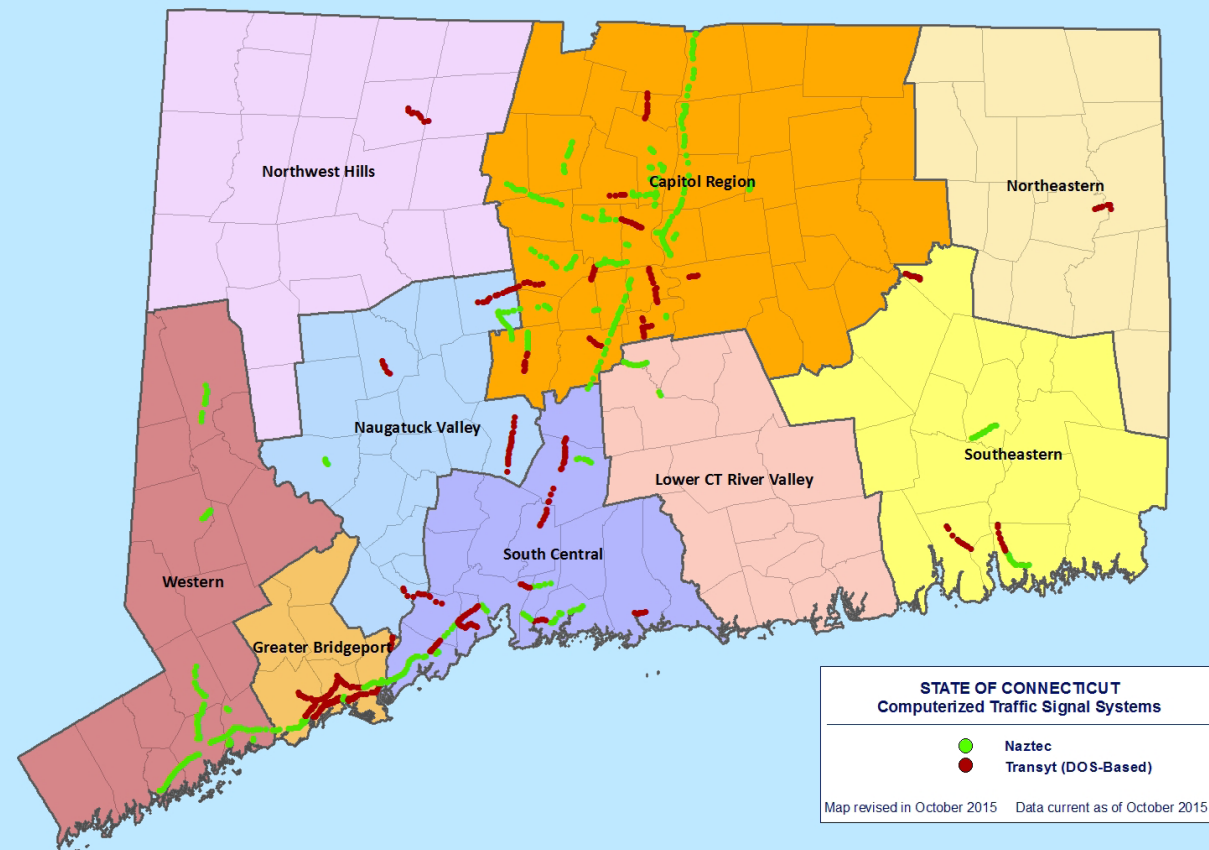
- Capitol Region
- South Central Region
- Greater Bridgeport Region
- Western Connecticut Region
- Naugatuck Valley Region
- Lower Connecticut River Valley Region
- Southeastern Connecticut Region

According to the Federal Highway Administration (FHWA), effectively updating the CTSS yields significant benefits along the corridors and road networks on which they are installed thereby mitigating congestion and reducing accidents, fuel consumption, air pollutants, and travel times.

## GENERAL CTSS NEEDS

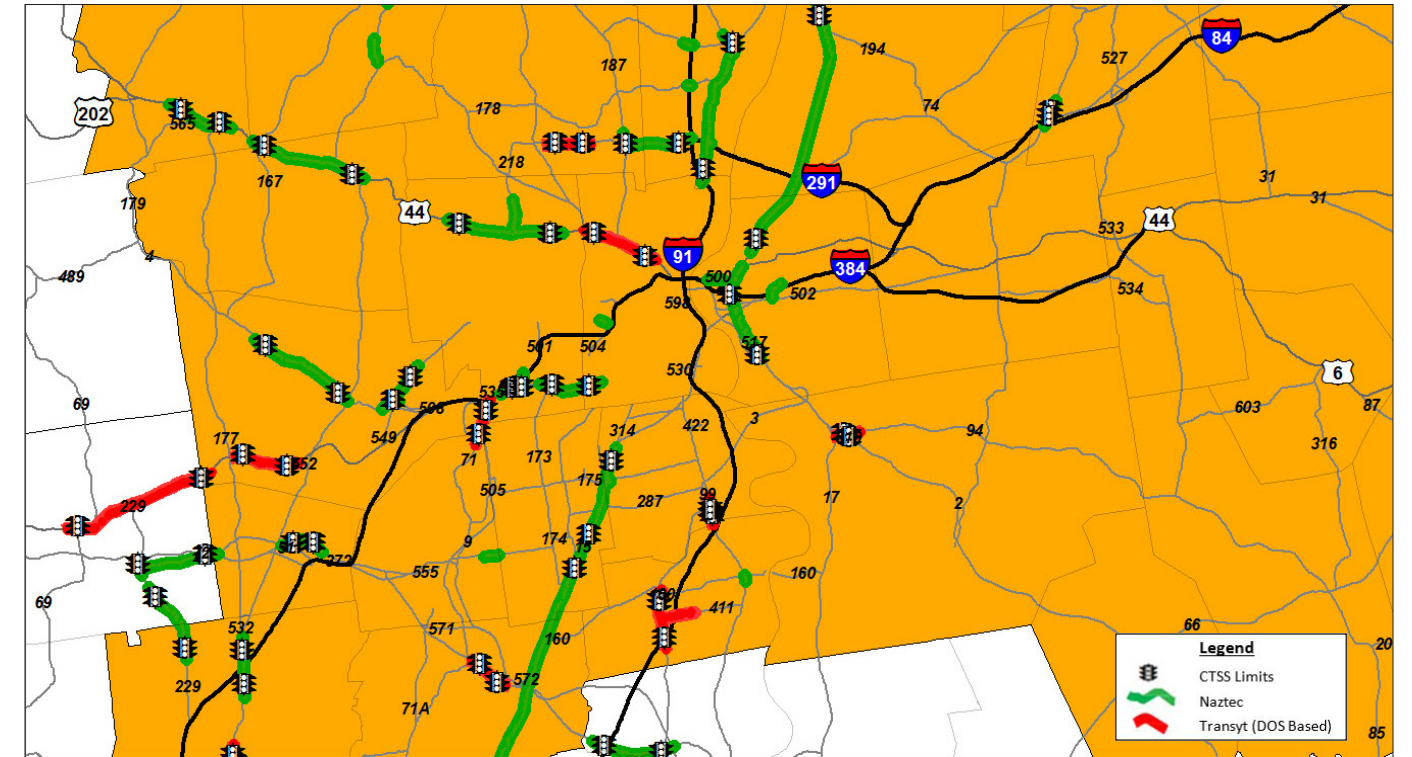
General needs identified by ConnDOT staff include the following:

- Increase CTSS reliability to improve management, operations, and maintenance.
- Replace and upgrade obsolete CTSS equipment that are approaching the end of their serviceable lives, including Rocky Hill Rte 3 and Branford Rte 1. Existing Transyt CTSS equipment is DOS-based and incompatible with the Department's current computer network. It is anticipated that there will be two "full" CTSS replacements per year, except years in which a new CTSS is proposed. In years when new CTSS is proposed, there will be one "full" CTSS replacement per year.
- Increase CTSS coverage along heavily-traveled routes currently lacking coverage. It is anticipated that one new CTSS will be completed every three years.
- Retime and re-evaluate existing CTSS retiming plans to reduce stops, reduce overall delay, and improve traffic flow. Plan for periodic review of CTSS retiming every three (3) to five (5) years.
- Expand the fiber optic network from Advanced Transportation Management System (ATMS) to existing CTSS to improve reliability and collection of Measure of Effectiveness (MOEs).
- Complement CTSS with other ITS to improve traffic flow and regional situational awareness.



\*Refer to Appendix A-5 for larger sized map

## CAPITOL REGION



### Capitol Region Council of Governments (CROG)

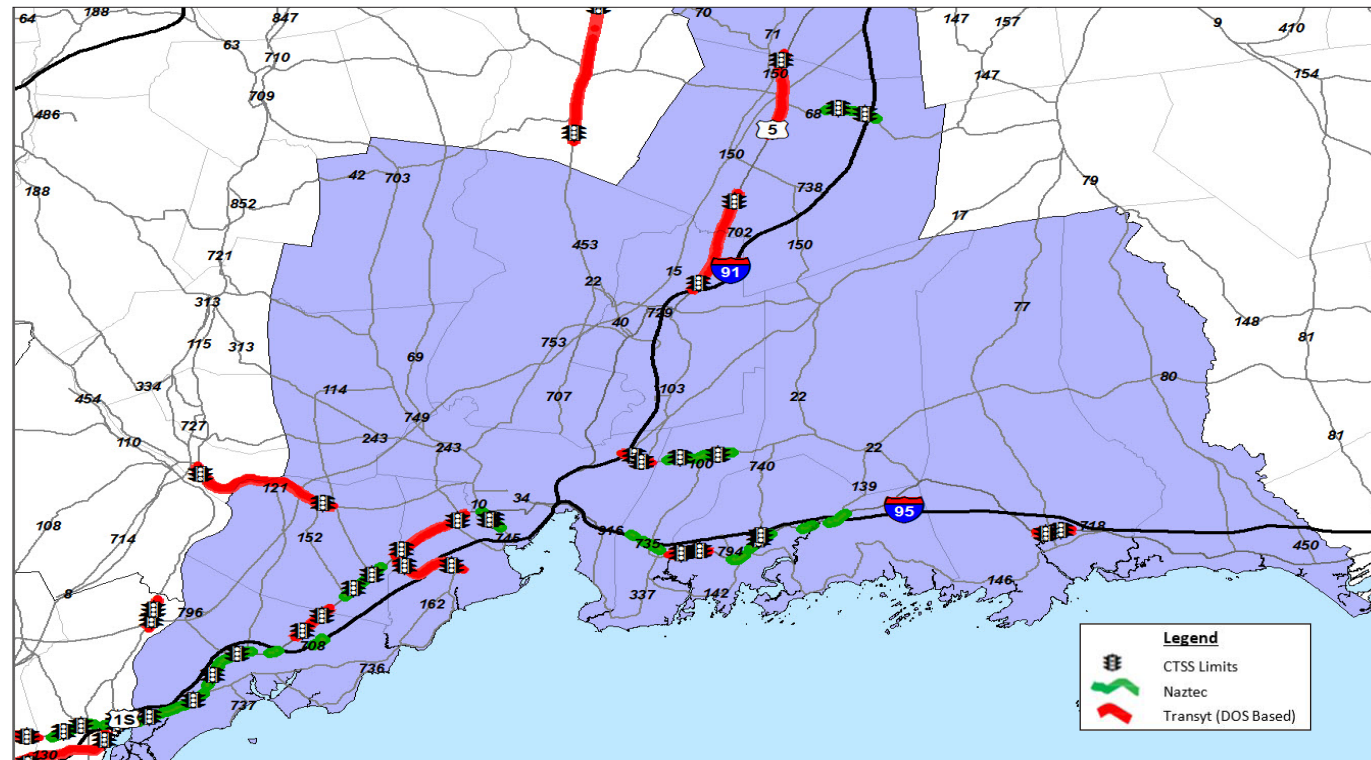
The Capitol Region area has some of the most extensive CTSS coverage in the state. CTSS in Capitol region provides coverage along key thoroughfares, including I-91 and I-84, as well as minor extensions along Rte 5 and Rte 44. CTSS needs identified for this region include: replacement of aging and obsolete CTSS equipment, retiming CTSS, additional CTSS coverage to fill in key gaps, and expansion of CTSS coverage along anticipated alternate routes that motorists will seek to avoid future construction. The leased line communications link to field devices is unreliable and results in data collection issues. When feasible, CTSS should be linked to the existing fiber network used by ATMS devices along the I-91/I-84 corridor. The CTSS improvement projects should consider adoption of non-intrusive methods of detection such as video detection systems and other ITS. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended.

Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.

#### HIGHLIGHTS:

- Replace existing obsolete and aging systems, including Rocky Hill Rte 3.
- Increase CTSS coverage along heavily-traveled routes currently lacking coverage, particularly Newington Rte 175, Rte 173 and Rte 176.
- Review Existing Timing Plans and update as needed. Plan for periodic review of CTSS Retiming every three (3) to five (5) years.
- To improve reliability and collection of Measure of Effectiveness (MOEs), connect CTSS to existing fiber network used by ATMS along I-91/I-84 corridor.
- Consider complementing existing CTSS with non-intrusive video detection systems and other ITS.

# SOUTH CENTRAL



South Central Connecticut Council of Governments (SCRCOG)

Coverage of CTSS in the South Central Region is focused along the I-95 corridor, as well as minor extensions along I-91 and Rte 5. The region is home to a number of major educational and health care institutions. CTSS needs identified for this region include: replacement of approximately fifty percent of existing CTSS, and review and update of existing timing plans in areas of heavy congestion such as along the I-95 corridor (commuter traffic). The leased line communications link to field devices is unreliable and results in data collection issues. When feasible, CTSS should be linked to the existing fiber network used by ATMS devices along the I-91/I-95 corridor, especially Milford and Branford Rte 1. The CTSS improvement projects should consider adoption of non-intrusive methods of detection such as video detection systems and other ITS. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended.

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- Approximately fifty percent of existing CTSS devices are obsolete and have been targeted for replacement and upgrade.
- To improve reliability and collection of Measure of Effectiveness (MOEs), connect CTSS to existing fiber network used by ATMS along I-91/I-95 corridor especially Milford and Branford Rte 1.
- Review Existing Timing Plans and update as needed. Plan for periodic review of CTSS Retiming every three (3) to five (5) years.
- Consider complementing existing CTSS with non-intrusive video detection systems and other ITS.

# GREATER BRIDGEPORT



Greater Bridgeport Regional Council (GBRC)

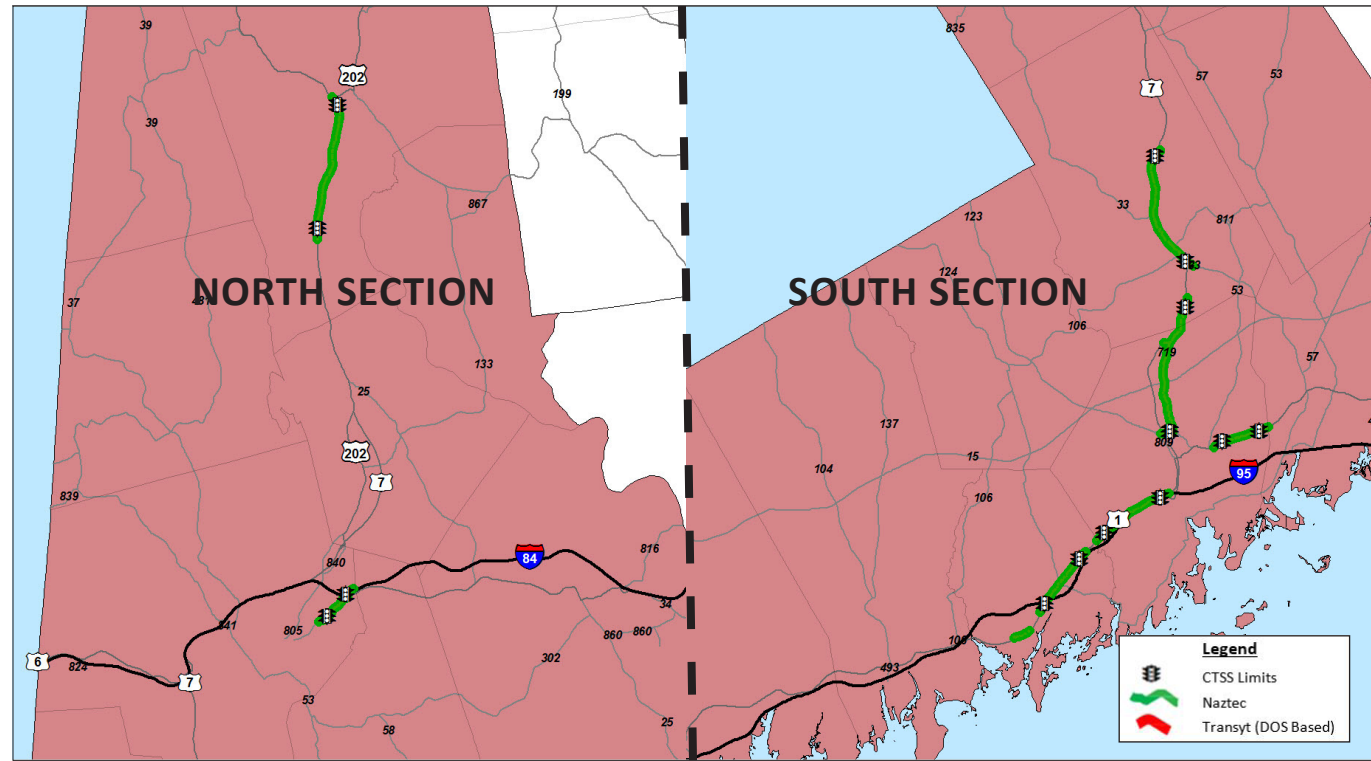
Greater Bridgeport Region CTSS are limited almost exclusively to the I-95 corridor. CTSS needs identified for this region include: replacement of several aging and obsolete CTSS equipment, review and update of existing timing plans in areas of heavy congestion such as along the I-95 corridor (commuter traffic). There is a prevalence of DOS-based CTSS equipment in the region that is no longer supported and must be replaced. The leased line communications link to field devices is unreliable and results in data collection issues. When feasible, CTSS should be linked to the existing fiber network used by ATMS devices along the I-95 corridor. The CTSS improvement projects should consider adoption of non-intrusive methods of detection such as video detection systems and other ITS. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended, especially along the Bridgeport Rte 1 corridor. Bridgeport stakeholders should also refer to the HIGHLIGHTS in the South Central region as proposed projects within the two regions may overlap geographically. This region also has several retrofitted equipment requiring replacement (additional information can be found in Appendix B-3).

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- Several aging and obsolete CTSS have been targeted for replacement and upgrade.
- To improve reliability and collection of Measure of Effectiveness (MOEs), connect CTSS to existing fiber network used by ATMS along I-95 corridor.
- Review Existing Timing Plans and update as needed. Plan for periodic review of CTSS Retiming every three (3) to five (5) years especially along Bridgeport Rte 1 corridor.
- Consider complementing existing CTSS with non-intrusive video detection systems and other ITS.
- Replace retrofitted CTSS equipment.

# WESTERN CONNECTICUT



Western Connecticut Council of Governments (WCCOG)

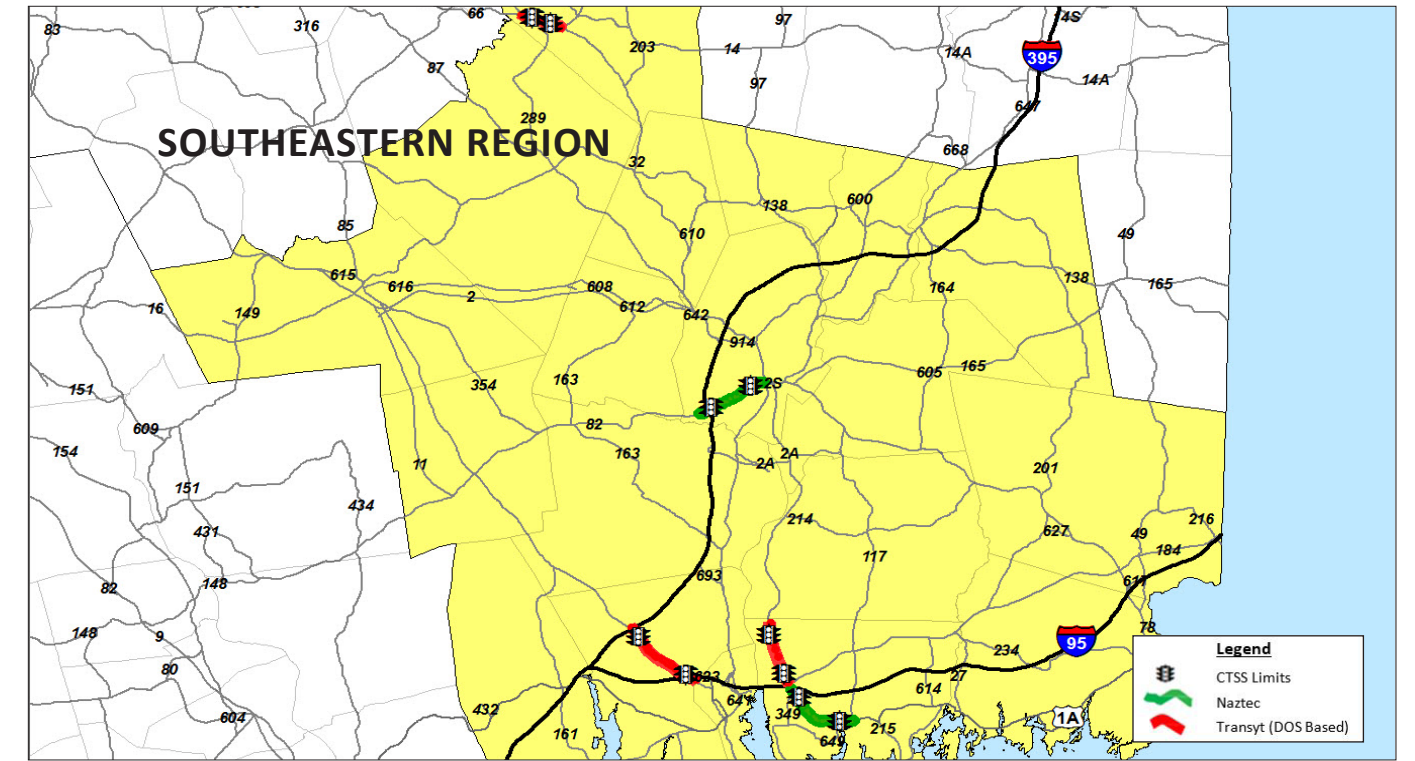
CTSS in Western Connecticut are dispersed throughout the region. As part of the needs assessment review, most of the CTSS in the region have been targeted for retiming and re-evaluation. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended. The updated CTSS devices will enable collection and reporting of performance based Measure of Effectiveness (MOEs). This region also has several retrofitted equipment requiring replacement (additional information can be found in Appendix B-3).

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- Review Existing Timing Plans and update as needed. Plan for periodic review of CTSS Retiming every three (3) to five (5) years.
- Recommendation for a study to review if additional systems are needed.
- Consider complementing existing CTSS with non-intrusive video detection systems and other ITS.
- Replace retrofitted CTSS equipment in this region.

# OTHER REGIONS



Southeastern Connecticut Council of Governments (SECCOG)

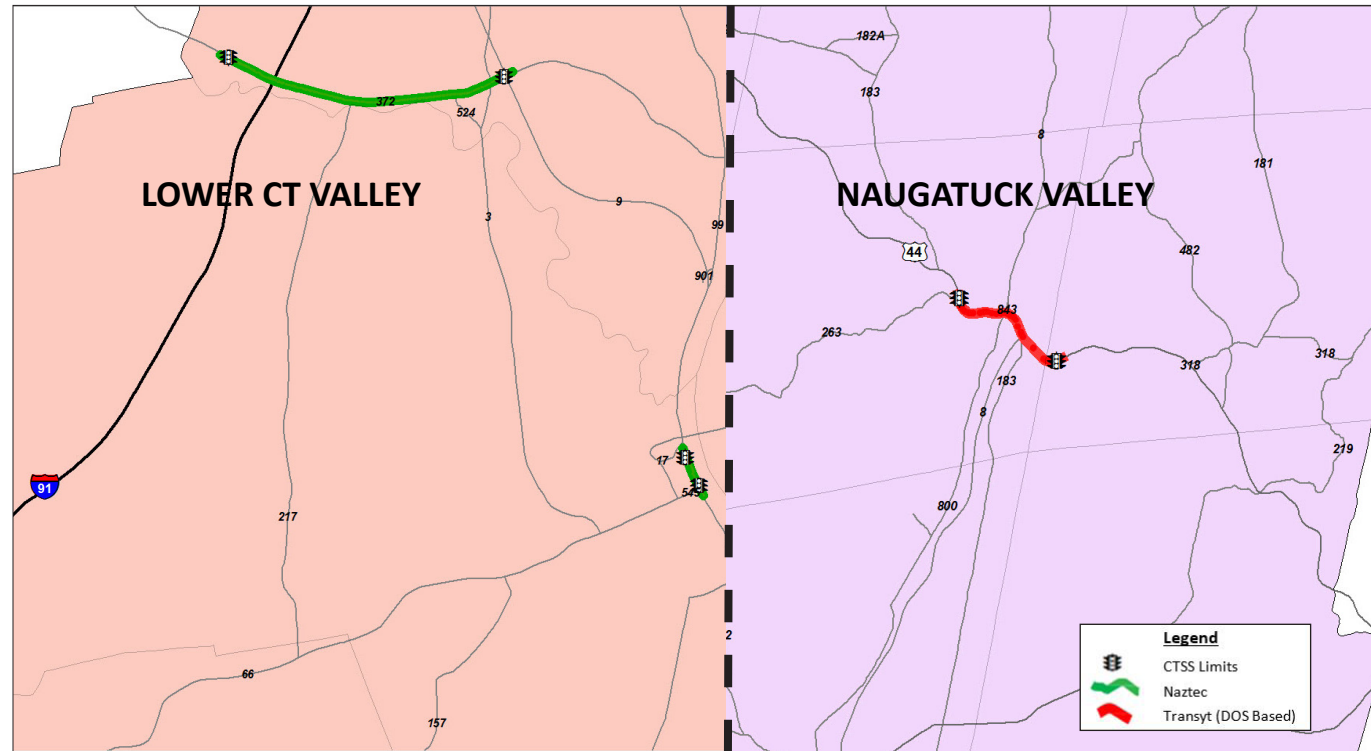
The area of study includes Southeastern Connecticut. The extent of CTSS coverage in this region is limited. Three (3) CTSS in this region have been targeted for replacement and upgrade. Existing timing plans need to be reviewed and updated as needed. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended. Communications to field devices in this region is accomplished via leased telecommunication lines which are unreliable, resulting in data collection limitations. A study to review if additional CTSS are needed in the region is recommended.

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- Three (3) CTSS in the region have been targeted for replacement and upgrade.
- Review Existing Timing Plans and update as needed. Retiming of CTSS will be continuously reviewed every three (3) to five (5) years.
- Recommendation for a study to review if additional systems are needed.

# OTHER REGIONS



Lower CT River Valley Council of Governments (RIVERCOG)  
Naugatuck Valley Council of Governments (NVCOG)

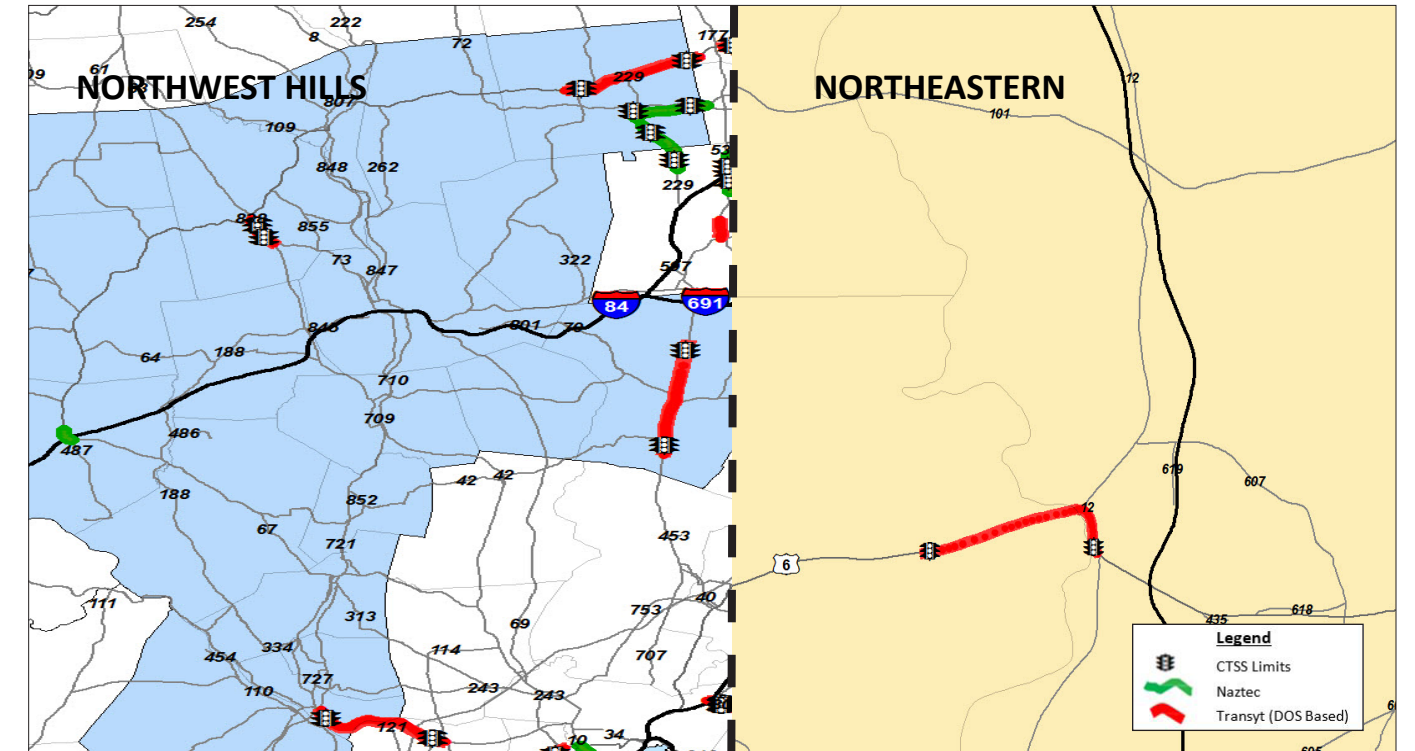
The area of study includes Lower CT Valley and Naugatuck Valley. The extent of CTSS coverage in the discussed regions is limited and distributed in rural areas. CTSS in the Naugatuck Valley Region has been targeted for replacement and upgrade to operate more efficiently. Existing timing plans need to be reviewed and updated as needed. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended. Possible future expansion of CTSS coverage throughout the regions can be targeted by Stakeholders. A study to review if additional CTSS are needed in these regions is recommended.

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- Three (3) CTSS in the Naugatuck Valley region have been targeted for replacement and upgrade.
- Review Existing Timing Plans and update as needed. Retiming of CTSS will be continuously reviewed every three (3) to five (5) years.
- Recommendation for a study to review if additional systems are needed.

# OTHER REGIONS



Northwest Hills Council of Governments (NHCOG)  
Northeastern Connecticut Council of Governments (NECCOG)

The area of study includes Northwest Hills and Northeastern Connecticut Regions. The extent of CTSS coverage in the discussed regions is limited and distributed in rural areas. CTSS in the regions have been targeted for replacement and upgrade to operate more efficiently. Existing timing plans need to be reviewed and updated as needed. Periodic review of CTSS timing and retiming every three (3) to five (5) years is recommended. Possible future expansion of CTSS coverage throughout the regions can be targeted by Stakeholders. A study to review if additional CTSS are needed in these regions is recommended.

*Refer to the Appendices for more information on Existing Conditions, Needs Assessment Priority Listing Recommendations, and Active and Future Projects with CTSS.*

## HIGHLIGHTS:

- CTSS in the regions have been targeted for replacement and upgrade.
- Review Existing Timing Plans and update as needed. Retiming of CTSS will be continuously reviewed every three (3) to five (5) years.
- Recommendation for a study to review if additional systems are needed.



Prepared by IBI Group