

Executive Summary

The purpose of this document is to provide an update to the 2004 I-95 Corridor Branford to Rhode Island Feasibility Study conducted by Clough, Harbor, and Associates (CHA), which evaluated the feasibility of adding one operational lane in each direction along I-95 between Exit 54 in Branford and the Connecticut/Rhode Island State Line. This report provides an update to the 2004 Feasibility Study, to reflect current conditions. The report also includes an analysis of operations, existing conditions, and provides conceptual improvements between Exit 75 (Route 1) to Exit 80 (Waterford Parkway) which was not included in the 2004 Study because that area was being evaluated as part of the Route 11 project that was ongoing at the time the 2004 study was being prepared.

Methodology

The update of the 2004 Feasibility Study:

- Identifies the impacts and issues associated with adding an operational lane on I-95 between Exit 54 in Branford and the Connecticut/Rhode Island State Line.
- Estimates Average Summer Weekday Existing 2016 I-95 Mainline/Ramp traffic volumes; and perform Mainline and Weaving segments Level of Service (LOS) analyses.
- Estimates Average Summer Weekday Future No-Build 2045 (2 lanes) and Future Build 2045 (3 lanes) I-95 Mainline/Ramp traffic volumes; and perform Mainline and Weaving segments LOS analyses.
- Estimates Existing 2016 LOS analyses based on Average Summer Weekday AM and PM Peak hour volumes provided by the CTDOT.
- Estimates Future No-Build 2045 and Future Build 2045 LOS analyses based on forecasted volumes that were estimated by applying model growth rates (from the CT Statewide Travel Demand model) to the 2016 Peak hour volumes.
- Summarizes structures within the study area and identify structures with a condition rating less than 5.
- Updates the Crash analysis to reflect the most recent available 3-year Crash data (2014-2016).
- Summarizes projects and improvements that have been made to Mainline I-95 and the Interchanges within the study area since the inception of the 2004 Feasibility Study Report.
- Updates the Existing Cultural resource, Surface waters and Watercourse, Groundwater resource, and Surface water resource mapping.
- Revises the Construction cost estimate to construct the additional operational lane from Exit 54 in Branford to the Connecticut/Rhode Island State Line, as well as provide costs for future recommended projects. The methodology used for developing cost was the same risk-based

analysis associated with the development of costs for the widening of I-95 West of Bridgeport.

Corridor Characteristics

Since the existing characteristics of I-95 differ greatly throughout the corridor, the study area has been divided into three separate areas for the analysis necessary to complete the update to the 2004 Feasibility Study (see Figure ES-1).

Figure ES-1 Project Study Area



Area 1: This area is located between the western limit of the study area at Exit 54 and the Baldwin Bridge in Old Saybrook. It is approximately 25 miles in length. This section of I-95 features left and right shoulders with varying widths of 10 ft. to 12 ft., along with a paved median with concrete barrier curb separating the northbound and southbound travel lanes. The existing pavement is comprised of concrete ridged pavement overlaid with several bituminous layers. The existing available right-of-way is fairly a wide swath along this segment, varying from approximately 250' to 300' in total width (centered off the I-95 median). This width limits the number of parcels required to be taken to widen the freeway to the ultimate proposed cross section.

In 2016, Average Summer Weekday Daily Traffic Volumes (ASWDT- both directions combined) range from approximately 105,000 vehicles per day (vpd) in Branford to approximately 97,000 vpd on the Baldwin Bridge. By 2045, under the Future No-Build condition, the volumes are anticipated to increase to 135,000 vpd in Branford to 126,000 vpd on the Baldwin Bridge, an approximate increase of 30% from 2016. The planned addition of an extra lane (additional capacity) in future is anticipated to attract more trips to the corridor (also known as induced demand). As a result, volumes are anticipated to range increase to approximately 140,000 vpd in Branford to approximately 130,000 vpd on the Baldwin Bridge- increase of approximately 33% from 2016.

In 2016, during the AM Peak hour, all of the Area 1 northbound segments operate at a Level of Service (LOS) of D or better. In the southbound direction, most segments operate at a LOS of D or better, except the segment between Exits 54 and 55 in Branford. Under the Future No-Build 2045 condition, the northbound direction is anticipated to continue operating at LOS D or better. However, the southbound operations are anticipated to deteriorate (LOS E and worse) between

Exit 54 in Branford and Exit 61 in Madison. With the planned addition of an operational lane in each direction (Future Build 2045 condition), both the northbound and southbound segments are anticipated to operate at acceptable LOS of D or better.

In 2016, during the PM Peak hour, most of the Area 1 northbound and southbound segments operate at a Level of Service (LOS) of D or better, except the northbound and southbound segment between Exits 54 and 55 in Branford. By 2045, under the Future No-Build condition, almost all segments in both directions are anticipated to experience a deterioration in traffic operations (LOS E and worse). With the planned addition of an operational lane in each direction (Future Build 2045 condition), both the northbound and southbound segments are anticipated to operate at acceptable LOS of D or better.

Crash records for I-95 from the most recent three-year period, 2014-2016, were assembled and analyzed for Area 1. In the northbound direction, high crash rates (greater than 2.5 crashes per 100 million vehicle-miles traveled- MVMT) were observed in Branford at Exit 54, and in Madison at Exit 61. In the southbound direction, high crash rates were observed in Branford between the Exit 54 Off ramp and On ramp, in Branford at Exit 56, in Madison between the Exit 61 off and On ramps, and in Clinton at Exit 63.

Area 2: This area is located between the Baldwin Bridge in Old Lyme and the Gold Star Memorial Bridge in New London and is approximately 15 miles in length. The cross-sectional characteristics of the roadway differ greatly as you pass through this area. Between the Baldwin Bridge and the I-95/I-395 interchange, the northbound and southbound lanes of I-95 feature narrow left shoulders varying between 4 ft. and 8 ft. in width, and right shoulders varying between 8 ft. and 10 ft. in width. This segment of I-95 also features steep longitudinal grades and has been the location of several deadly crashes over the years. State Projects 104-164, 44-151, and 172-442 were recently completed between 2014 and 2017 and addressed some of the safety concerns throughout this section. The existing metal beam rail separating the northbound and southbound I-95 travel lanes was removed and replaced with concrete median barrier with a grassed median. State Project 44-156 is currently under design and will address vehicular safety on I-95 at Interchange 74, as well as addressing traffic operations between Interchange 74 and Interchange 75 in East Lyme. The existing available right-of-way is a fairly wide swath along this segment, varying approximately from 200' to 300' in total width centered off the I-95 median, but due to the topography, several existing properties will be impacted from widening the roadway to the ultimate proposed cross section.

The original 2004 Feasibility Study included assumptions associated with the future improvements at the I-95/ I-395 interchange. At the time the 2004 Feasibility Study was published, a study of the I-95/I-395 interchange was in progress, which considered the feasibility of reconstructing the interchange to include the missing connections from southbound I-95 to northbound I-395 and southbound I-395 to northbound I-95. The study also included extending Route 11 to the I-95/I-395 interchange and providing an interchange with direct connections to Route 11 from both I-95 and I-395. The extension of Route 11 to the I-95/I-395 interchange has since been cancelled, and the I-95/I-395 interchange concepts have been revised under this study to remove the Route 11 connection. This re-evaluation has resulted in reduction in the footprint for the interchange.

In 2016, Average Summer Weekday Daily Traffic Volumes (ASWDT- both directions combined) range from approximately 84,000 vehicles per day (vpd) in Old Lyme to approximately 121,000 vpd on the Goldstar Bridge. By 2045, under the Future No-Build condition, the volumes are anticipated to increase to 110,000 vpd in Old Lyme to 158,000 vpd on the Goldstar Bridge- an approximate increase of 31% from 2016. With the planned addition of an extra lane along the corridor and expected induced demand, volumes are anticipated to range from approximately 112,000 vpd in Old Lyme to approximately 160,000 vpd on the Goldstar Bridge- increase of approximately 34% from 2016.

In 2016, during the AM Peak hour, all Area 2 northbound and southbound segments operate at a Level of Service (LOS) of D or better. By 2045, under the Future No-Build condition, most segments in the northbound and southbound directions are anticipated to continue operating at LOS D or better, except the northbound segment between Exits 74 and 76 in Niantic and the southbound segment between Exits 70 and 72 in Old Lyme. With the planned addition of an operational lane in each direction (Future Build 2045 condition), both the northbound and southbound segments are anticipated to operate at acceptable LOS of D or better.

In 2016, during the PM Peak hour, most Area 2 northbound and southbound segments operate at a Level of Service (LOS) of D or better, except the northbound segment between Exits 75 and 76 in East Lyme and the southbound segment between Exits 82 and 82A in New London. By 2045, under the Future No-Build condition, almost all segments in both directions are anticipated to experience a deterioration in traffic operations (LOS E and worse). With the planned addition of an operational lane in each direction (Future Build 2045 condition), most of the northbound and southbound segments are anticipated to operate at LOS of D or better, except the southbound segments between Exits 75 and 76 in East Lyme and Exits 82 and 82A in New London (which are projected to deteriorate to LOS E as a result of induced demand due to the planned operational lane). Improvements to these and other areas will be addressed in detail in the next phase of the study i.e. I-95 East Traffic Operations Study using Average Summer Friday and Weekday Traffic Volumes.

Crash records for I-95 from the most recent three-year period, 2014-2016, were assembled and analyzed for Area 2. In the northbound direction, high crash rates were observed in East Lyme at between Exit 74 and Exit 76, with the highest crash rate occurring between the Exit 74 off and on ramps. In the southbound direction, high crash rates were observed in Old Lyme at Exit 71, in Niantic at Exit 74, and in New London at Exit 82, with the highest crash rate occurring between the Exit 74 off and on ramps.

Area 3: This area is located between the Gold Star Memorial Bridge in Groton and the Connecticut/Rhode Island State Line and is approximately 16 miles in length. The cross-sectional characteristics of the roadway are fairly consistent as you pass through this area. The northbound and southbound lanes of I-95 feature 8 ft. +/- left shoulders and right shoulders varying between 10 ft. and 12 ft. in width. This section of I-95 also features steep longitudinal grades and a wide grassed median separating the northbound and southbound travel lanes. State Project 58-307 is currently under design, which provides safety improvements to the acceleration and deceleration lanes along I-95, as well as improvements to the interchange operations at Exit 88, Exit 89, Exit 90, Exit 91, Exit 92, and Exit 93, in the towns of Gorton, Stonington, and North Stonington. The existing available right-of-way is fairly wide swath along this section, varying approximately 330' to 1,050'

in total width centered off the I-95 grassed median, limiting the number of parcels required to be taken to widen the freeway to the ultimate cross section.

In 2016, Average Summer Weekday Daily Traffic Volumes (ASWDT- both directions combined) range from approximately 104,000 vehicles per day (vpd) in Groton to approximately 50,000 vpd near the Rhode Island border. By 2045, under the Future No-Build condition, the volumes are anticipated to increase to 136,000 vpd in Groton to 72,000 vpd near the Rhode Island border – increase ranging from 31% to 42% compared to 2016 volumes. With the planned addition of an extra lane along the corridor and expected induced demand, volumes are anticipated to increase to 139,000 vpd in Groton to 73,000 vpd near the Rhode Island border – increase ranging from 33% to 44% compared to 2016 volumes.

In 2016, during the AM Peak hour, all Area 3 northbound and southbound segments operate at a Level of Service (LOS) of D or better. By 2045, under the Future No-Build condition, most segments in the northbound and southbound directions are anticipated to continue operating at LOS D or better, except the southbound segment between Exits 89 and 90 in Mystic. With the planned addition of an operational lane in each direction (Future Build 2045 condition), both the northbound and southbound segments are anticipated to operate at acceptable LOS of D or better.

In 2016, during the PM Peak hour, most Area 3 northbound and southbound I-95 segments operate at a Level of Service (LOS) of D or better, except the northbound segment between Exits 89 and 90 in Mystic. By 2045, under the Future No-Build condition, most segments continue to operate at LOS D or better, except the northbound and southbound segments between Exits 89 and 91 in Mystic. With the planned addition of an operational lane in each direction (Future Build 2045 condition), most of the northbound and southbound segments are anticipated to operate at LOS of D or better, except the southbound segment between Exits 85 and 86 in Groton (which deteriorates to LOS E).

Crash records for I-95 from the most recent three-year period, 2014-2016, were assembled and analyzed for Area 3. In the northbound direction, there were no high crash locations identified. In the southbound direction, high crash rates were observed in New London near Exit 82, between Exits 86 and 88 in Groton, and in Stonington north of the southbound service plaza.

In general, high crash rates in all areas could be attributed to the steep longitudinal grades, short acceleration and deceleration lanes, congestion, and excessive vehicle speeds.

Future Project Recommendations

From the update of the traffic and crash data analysis, several projects are recommended for implementation in the near, mid, and long-term future. While the original 2004 Feasibility Study presented the viability of adding one additional operational lane in both the northbound and southbound directions between Exit 54 in Branford and the Rhode Island State Line, this report presents several smaller selective widening projects, aimed at providing immediate improvements to traffic operations and corridor safety. Projects are spaced throughout the three areas of the I-95 East corridor, and since many projects can be constructed independently of the complete widening of the entire corridor, they can be considered as separate single and complete projects with independent utility. The following are the recommended projects that can be implemented along the I-95 East corridor:

Short Term Improvements:

- I-95 northbound Widening from Exit 54 to Exit 55 (Branford), Estimated Cost: \$88 Million*
- I-95 southbound Acceleration Lane Improvements at Exit 63 (Clinton), Estimate Cost: \$11 Million*
- I-95 southbound Acceleration Lane Improvements at Exit 88 (Groton), Estimated Cost: \$5 Million*
- I-95 northbound Acceleration and Truck Climbing Lane Improvements at Exit 90 (Mystic), Estimated Cost: \$40 Million*

Mid Term Improvements:

- I-95 / I-395 Interchange Reconstruction and Widening (East Lyme/Waterford), Estimated Cost: \$900 Million*
- I-95 northbound and southbound Widening between Exit 70 and Exit 74 (Old Lyme to East Lyme), Estimated Cost: \$540 Million*
- I-95 northbound and southbound Widening between Exit 80 and Exit 82A (Waterford to New London), Estimated Cost: \$275 Million*

Long Term Improvements:

- I-95 northbound and southbound Widening between Exit 54 and Exit 69 (Branford to Old Saybrook), Estimated Cost: \$1.6 Billion*
- I-95 / Route 32 Interchange Reconstruction (New London). Estimated Cost: \$40 - \$60 Million*

Note:

*Future improvement project costs are based on preliminary concepts and are subject to change pending further study and design.