

# Design Statement

F.A.P. No. (CN)1063(143)/State Project No. 63-703

Relocation of I-91 NB Interchange 29 and  
Widening of I-91 NB and Route 5/15 NB to I-84 EB  
Hartford and East Hartford, Connecticut

Issued: July 11, 2018

## Prepared for:

State of Connecticut Department of Transportation  
Newington, Connecticut

## CONSULTANTS:

Prime Consultant: CME Associates

Sub-consultant: H.W. Lochner, Inc.

Sub-consultant: VN Engineering

Sub-consultant: Freeman Co.

Sub-consultant: Fitzgerald & Halliday

# Relocation of I-91 NB Interchange 29 and Widening of I-91 NB and Route 515 and I-84 EB

## DESIGN STATEMENT

### Dates

Final Design Plans (FDP) – July 11, 2018

Design Completion Date (DCD) – August 22, 2018

Advertise (ADV) – September 19, 2018

Construction NTP – April 1, 2019

### Federal Aid Project Number

1063(134)PE

### State Project Number

063-703

### Towns

Hartford and East Hartford, CT

### Construction District

District 1

### Final Maintenance Responsibility

I-91, Route 5/15 and Ramps – CTDOT

Airport Road (SR 530) – CTDOT

Main Street (SR 5) – CTDOT

Silver Lane (SR 502) – CTDOT

Reserve Road – City of Hartford

### Description of the Project

The I-91 NB Interchange 29 off-ramp is a single-lane configuration with a steep vertical grade that creates significant traffic delays along I-91 NB due to the heavy volume of cars and trucks. In addition to the geometric deficiencies of the off-ramp, there is a constrained weave condition occurring on the Charter Oak Bridge at the top of the ramp where motorists attempt to access I-84 EB, Route 5/15 NB, Route 2, and Silver Lane. The existing traffic queues extend onto the I-91 NB mainline, taking up the right lane of the three-lane facility. The length of the queue varies, but has been observed to extend approximately 1.4 miles in the vicinity of Wethersfield Cove. The safety issues are compounded by out of state drivers that routinely cut into the right-lane queue at the last moment from the center lane, which further increases congestion on I-91 in this area.

The proposed project includes the widening of I-91 NB for approximately 4,300 feet to provide four lanes from Interchange 27 to 29. The four lanes on I-91 NB will then further widen to five lanes and bifurcate; with the two left-hand lanes diverging as the new Interchange 29 off-ramp, and the remaining three lanes continuing on as I-91NB. The new Exit 29 two-lane off-ramp geometry (major diverge) is anticipated to



relieve congestion and address safety concerns due to motorists entering the ramp queue from the center lane of I-91 NB.

The widening plan will require significant modifications to Bridge No. 00813 (I-91 over US 5/Route 15 NB & SB), Bridge No. 01466 (I-91 over the SB entrance ramp to I-91 SB and US 5/Route 15 SB), and Bridge No. 00480 (I-91 over Airport Road), as well as Bridge No. 03613 (I-91 over a drainage crossing). A new two lane, five-span bridge (more than 800 feet in length), will be constructed over US 5/Route 15 SB in support of the new interchange 29 off-ramp. The new interchange 29 off-ramp will merge with US 5/Route 15 NB on Bridge No. 06000A (Route 15 NB over I-91 NB, Reserve Road and rail spur) requiring widening of five approach spans.

The existing Charter Oak Bridge will be resurfaced and restriped to accommodate the added lane from Ramp 29. The existing lane striping consists of a 12-foot left shoulder, three 12-foot travel lanes and a 12-foot right shoulder. In order to accommodate the two lanes from the new Exit 29 on-ramp, it is proposed to modify the pavement markings to provide a 4 foot left shoulder, four 11-foot travel lanes, and a 12-foot right shoulder. The revised lane configuration and swapping of ramp traffic from the outside to the inside on the Charter Oak Bridge will greatly improve the weave operations.

The added lane on the Charter Oak Bridge will continue north into East Hartford on US 5/Route 15 NB and require significant modifications to Bridge No. 06043B (Route 15 NB over Main Street (US 5)) and Bridge No. 05796 (Route 15 NB and SB over Silver Lane (SR 502)). The geometric revisions at the Interchange 29 off-ramp will require the removal and relocation of the existing ramp to just south of Bridge No. 05922 (I-91 over US 5/Route 15) in the form of a major diverge.

Bridge No. 06000C carries the existing Exit 29 ramp from I-91NB to Route 5/15 NB. This structure will be demolished with minimal or no impact to rights of way, local streets, and the railroad. Special methods of bridge demolition will be studied in order to expedite the construction of this critical portion of the project and to avoid conflicts with an adjacent electric transmission tower and overhead transmission lines.

Due to the proximity of a four-lane merge and lane drop at Interchange 90, it was determined that Route 15 would be widened to three travel lanes from north of the Charter Oak Bridge to the Silver Lane overpass, and provide a lane-drop prior to its merge with I-84 EB. The widening addresses congestion concerns on Route 15 and allows a more desirable distance from Interchange 29 to merge from three travel lanes to two prior to its merge with I-84 EB. This improvement will require the widening of bridge nos. 06043B and 05796 as described above.

### [Exceptions to Minimum Design Standards](#)

Design exceptions were submitted and approved on May 24, 2016 and again in July 2017. A summary of the accepted design exceptions is listed below:

- Travel Lane and Shoulder Widths
  - I-91 NB Median Shoulder
  - I-91 SB Median Shoulder
  - RTE 5/15 NB Left shoulder and lane widths
- Horizontal Alignments
  - RTE 15 NB Exit 89 radius
  - I-91 NB Exit 28 radius
  - I-91 NB Exit 28 compound curve ratios

- Vertical Curvature
  - RTE15 NB Exit 89 crest & sag curve K values
  - Airport Road sag curve K value
- Stopping Sight Distance
  - RTE 15 NB
  - I-91 NB
  - I-91 SB
  - RTE 15 NB
  - I-91 SB to RTE 5/15 SB ramp
- Superelevation
  - I-91 NB
  - RTE 15 NB
  - RTE 15 NB Exit 89
- Minimum Vertical Clearance
  - I-91 over RTE 5/15 (BR 00813)
  - I-91 over RTE 5/15 SB ramps and I-91 SB ramps (BR 01466)

### Public Utilities Affected

The initial utility meeting was held in April 2016 where potential impacts were reviewed with each utility company. Subsequent utility meetings were held during Final Design as the design was refined and some potential utility impacts were avoided. The final design plans were sent to the utility companies in June 2017 with the Semi-Final Design Submission. The following is a summary of the remaining utility impacts:

- Underground utilities at Airport Road will have reduced cover but no relocations are required. Provisions will be included to restrict equipment loading and compaction methods. Temporary steel plates will be also be installed during stage construction to add additional protection.
- Five Eversource utility poles along Airport Road will require relocation due to construction staging. A coordination meeting was held with the City of Hartford for the street lighting. Frontier and Comcast have existing risers on the poles that will be relocated to the new poles. Comcast aerial will also be relocated to the new poles.
- An Eversource Distribution duct bank is in conflict with the Pier 3 widening at the Charter Oak Bridge and will require relocation. There is also an Eversource Transmission duct bank adjacent to the Pier 3 widening that will remain. Piles for the proposed pier will be pre-augured to a depth of approximately 30' below the transmission duct and settle monitoring will be required during construction.
- Two utility poles along Main Street will require relocation due to construction staging for bridge widening. A third pole in the adjacent commuter lot is not in use so will be removed. Crown Castle Fiber has a riser to one of the poles that will be relocated to the new pole.
- An Eversource Utility pole guy wire adjacent to proposed retaining Wall No. 106 may be impacted by excavation so Eversource is adding a temporary tree guy.
- MDC will add shut off valves on either side of the Route 5/15 overpass on Main Street on their lines. These valves will allow for the water mains to be shut off if excessive settlement occurs due to bridge construction.
- Temporary construction access will cross an existing Buckeye Pipeline with limited cover under the Charter Oak Bridge. Protection (timber matting) will be installed during construction to protect this line.
- Frontier will require manhole resets on Airport Road and Reserve Road.

## Salvage Items

The following items shall be salvaged from the project during construction:

1. Metal Bridge Rail Protective Fence (Bridge 06000C)
2. Drainage items used for temporary drainage but not required for permanent.
3. Traffic Flow Monitor
4. Aluminum Pole

Deliver Salvaged Materials to the following address:

### **For Protective Fence**

Hartford Bridge Maintenance  
49 Jennings Road  
Hartford, CT 06120  
Contact: John Riddick  
Phone: (860) 213-1079

### **For Temporary Drainage Structures**

Glastonbury Maintenance Garage  
235 Oak Street  
Glastonbury, CT 06033  
Contact: Ken Rulnick  
Phone: 860-633-1159

### **For Traffic Flow Monitor and Aluminum Pole**

Rocky Hill Maintenance Garage  
1107 Cromwell Avenue  
Rocky Hill, CT 06067  
Contact: Special Services Manager  
Phone: 860-258-4516

## Permits

In addition to the permits listed below, there are areas of environmental concern (AOEC's), low-level areas of environmental concern (LLAOEC's), and ground water areas of environmental concern (GWAEOEC's) shown in the contract documents. There is an entombed area of contaminated material adjacent to I-91 NB just to the north of Airport Road that contains a cap. There is also an area under the Charter Oak Bridge adjacent to the MIRA property on reserve Road that contains contaminated material that is capped. Work in all of these areas is regulated by the special provisions and environmental plans contained in the contract documents.

Permit Program	Issuing Agency
Flood Management General	CT DEEP-IWRD (Through agreement with CTDOT H&D)



CT Inland Wetlands and Watercourses Construction General	CT DEEP-IWRD
Section 401 Water Quality Certification	CT DEEP-IWRD
Section 404 Clean Water Act (Pre-Construction notification)	US Army Corps of Engineers
Stormwater Construction General Permit	CT DEEP
Project Notification	US Coast Guard

### Remarks

There are areas of concrete pavement in the south end of the project that will be retained and repaired in some cases. Widening in this area will be with concrete pavement as well with a bituminous overlay. The nature of the project of widening the existing highway requires that the proposed profile and cross slopes match to the extent possible the existing. The existing survey surface may have areas where the existing surface fluctuates so a wedge course of pavement has been included to account for this. On the Charter Oak Bridge itself, the proposed cross slope will be shifted from the existing location to accommodate the restriping of the shoulders and lanes. A pavement wedge is shown on the plans to accommodate this with defined slopes. The remainder of the bridge is to be milled and paved with a consistent thickness to follow the profile and cross slope of the existing bridge so the slopes are not defined. These areas will require additional field verification.

### Unusual Design Features

In order to limit potential right of way impacts, the several of the widened slopes contain 1.5:1 reinforced slopes. The reinforcement consists of geogrid that can only accommodate limited penetrations. The limits of the reinforced slopes and penetration details are on the plans. In addition to the reinforced slopes there are areas where lightweight fill will be utilized. It should be noted that the proposed MDC stormwater tunnel crosses through the project area just north of the Wethersfield/Hartford town line. The tunnel project includes monitoring points along I-91 that will be impacted by this project. Those monitoring points will need to be reestablished and are shown on the plans.

There is an existing at grade railroad crossing on Reserve Road in Hartford, immediately north of the Charter oak Bridge crossing. Through meetings with the owner of the tracks (Connecticut Department of Agriculture) and the operator of the railroad (Genesee and Wyoming Railroad) it has been decided to replace that crossing. There will also be a temporary at grade crossing for staging that will be constructed under this project to the south of the permanent crossing. The work associated with both crossings is included in the project. CTDOT is designing new signals and protection for the permanent crossing that will be a separate project but constructed at the same time as this project.



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