U.S. Department of Transportation
Federal Highway Administration

I-84 HARTFORD PROJECT
HARTFORD, CONNECTICUT
DRAFT PURPOSE AND NEED STATEMENT

October 2016

I. PROJECT BACKGROUND AND HISTORY

The City of Hartford is the capital of Connecticut, and the largest employment center in the State. Known as the "Insurance Capital of the World", three of the top five employers in Hartford are in the insurance industry. Downtown Hartford is home to approximately 80,000 jobs with employment concentrated in the insurance, financial, legal, and government sectors.[1]

Interstate 84 (I-84) bisects the city, and within Connecticut, it serves as a critical east-west transportation link between New York and Massachusetts. It provides connectivity to and from Interstate 91 (I-91) in Hartford, a major north-south section of interstate highway between New Haven and Massachusetts; and Route 2 in East Hartford, a major east-west expressway serving eastern Connecticut. Locally, commuters use I-84 and its interchanges to access Hartford's business districts, State Capitol and downtown areas.

The ***I-84 Hartford Project*** limits extend from just east of the Flatbush Avenue Interchange (Interchange 45) to just west of the I-91 Interchange (Interchange 51/52) in downtown Hartford. The Sisson Avenue, Sigourney Street and Capitol Avenue interchanges are within the project limits (see Figure 1: Project Limits). Within the corridor area are many local streets, buildings, parks, several parking lots, and Union Station. Two other transit corridors are within the I-84 Hartford Project limits: the recently completed bus rapid transit system known as CT*fastrak*; and Amtrak's Hartford Line, which will ultimately be upgraded and included in the New Haven-Hartford-Springfield (NHHS) rail corridor, currently under construction.

Connecticut Department of Transportation (CTDOT) recently completed the Hartford Rail Alternatives Analysis to address the future of the aging Hartford rail viaduct, which is a critical link in the regional passenger and freight rail system, in particular the NHHS Rail Program. The Analysis included options to maintain, reconstruct or relocate the rail corridor. The interstate and the railroad are each a physical constraint on the other. It has become increasingly clear that design solutions for the interstate and the railroad are potentially linked, as the alternative development process for the highway greatly influences the alternative development process for the rail line and vice versa. This provides the opportunity for CTDOT to integrate the highway and rail elements in the development of a holistic corridor transportation solution, as opposed to two separate modal solutions.

Construction of I-84 in Hartford began in 1959 and was completed in 1969. Its alignment grew from various 1940s and 1950s studies of the "East-West Expressway," a highway meant to relieve congestion on local streets and to provide fast and efficient travel between the west and southwest and the central business district of Hartford. Within Hartford the highway corridor plan generally followed the corridor of the railroad and the Park River. The plan was solidified in 1956 upon the passage of the National System of Interstate and Defense Highways, with the East-West Expressway approved as a portion of I-84.

[1]City of Hartford, *One City, One Plan – POCD 2020*, adopted June 3, 2010.

There was great debate concerning the freeway's most suitable location; impacts and costs were weighed against maximum benefits to the traveling public. When I-84 was constructed, it not only displaced many families, businesses and institutions, it created a lasting impact, especially on nearby neighborhoods. Where in some locations the Park River, the railroad and bordering industries had previously been the physical demarcation between north and south neighborhoods, I-84 with its massive interchanges, bridges, and elevated structures has been a far more disruptive and imposing barrier. As one CTDOT report observed upon completion of the expressway, "The impact of the I-84 freeway upon the physical environments into which it was introduced has been both dramatic and overwhelming."[2] The scale of the interstate so dominates the area that surrounding neighborhood communities have long insisted that the highway's physical and visual impact be lessened as part of any reconstruction plan.

When I-84 in Hartford was designed, it was originally anticipated that the interstate would be carrying between 50,000 and 66,000 vehicles per day by the year 1975; however, shortly after the highway opened in 1970, the actual traffic volume was between 70,000 and 100,000 vehicles per day. Today, I-84 in Hartford is the most heavily-traveled section of highway in the State, with traffic volumes in excess of 175,000 vehicles per day.

Much of I-84 and its interchange ramps in Hartford are elevated on structures known as viaducts, consisting of several long, multi-span bridges high above ground level. Now near or past their anticipated life span, many of the viaducts are classified as either "structurally deficient" or "functionally obsolete" or both, and are in need of rehabilitation or replacement. While still safe for the public to drive on, a "structurally deficient" classification means that there are deteriorated conditions of significant bridge elements and potentially reduced load-carrying capacity. Bridges with a structurally deficient (SD) designation typically require repair to remain in service and eventually require rehabilitation or replacement to address the underlying deficiency. If a bridge is classified as "functionally obsolete," it means that the bridge no longer meets the current design standards for its intended use. CTDOT has spent tens of millions of dollars to maintain and make repairs to keep these bridges in a state of good repair and will have to continue to perform extensive work, such as recurring repairs, rehabilitation and even bridge replacement as the structures' conditions continue to decline.

[2]CTDOT et al, *I-84 Environmental and Joint-Use Study Hartford, CT*, 1970.

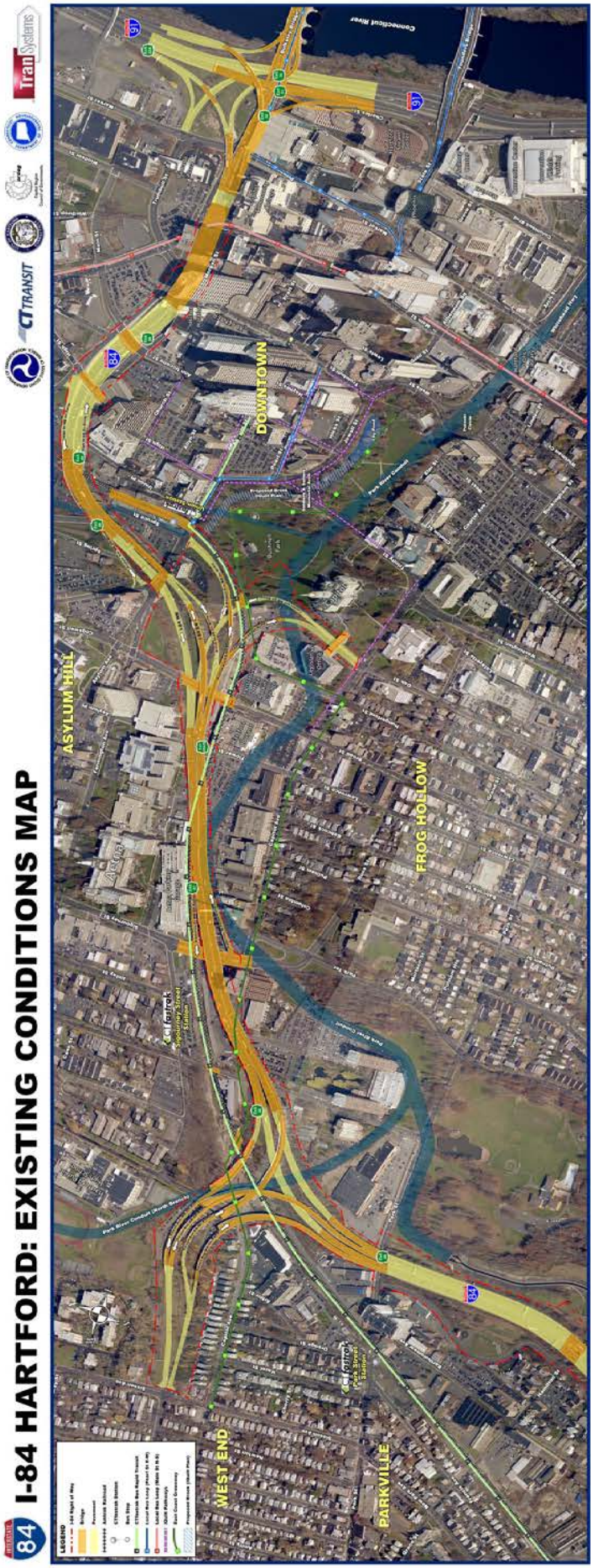

Figure 1: Project Limits

In 2010, the Capitol Regional Council of Governments (CRCOG) completed the "I-84 Viaduct Study." Led by the Hub of Hartford Committee, the planning study explored a broad range of possible project alternatives that would improve the I-84 infrastructure, while considering economic development opportunities, neighborhood connectivity, community cohesion, livability and mobility. The I-84 Viaduct Study documented how I-84 is a visual and physical barrier, dividing employment centers, communities and neighborhoods within Hartford. Crossings of I-84 are mostly limited to locations where local streets pass under the highway viaduct spans. These crossings are characterized by environments that are unappealing and challenging to pedestrians and bicyclists, discouraging travel and interaction between communities that the highway bisects. The planning study explored these community impacts in concert with other issues and proposed conceptual alternatives that would "reduce the visual and environmental impacts of the highway; promote walkable, bikeable environments that support transit use and enhance transit access; and reconnect the City across the highway."

Among the preliminary alternatives that were initially evaluated and subsequently eliminated in the study were the Skyway Viaduct and Boulevard concepts. The Skyway Viaduct would have been at a higher elevation than the existing viaduct. Many existing ramps would have been removed with access to the downtown provided by interchanges at the edge of the project limits. This alternative was eliminated because it did not adequately address downtown Hartford access needs. The Boulevard concept would have replaced the highway viaduct with a high volume tree-lined street, but was eliminated because it performed poorly from multiple perspectives.

The study developed the following four potential concepts, but did not select a preferred alternative:

- Highway replaced with an enhanced viaduct structure
- Highway replaced with an enhanced viaduct structure with improved connections across the highway
- Viaduct replaced by a surface highway; rail line relocated to the north side of I-84; city reconnected across highway
- Viaduct replaced by a tunnel; rail line relocated to the north side of I-84; city reconnected across the highway

Many of the ideas and concepts coming out of this Planning Study have been incorporated as "Goals and Objectives" into the ***I-84 Hartford Project*** to give a broader vision of the project for project decision-makers, distinct from the Project Purpose and Need.

II. PURPOSE AND NEED

This purpose and need statement will serve as the foundation for developing evaluation criteria that will drive the decision making process resulting in selection of a preferred alternative. This decision making process, or alternatives analysis process, will evaluate a range of build and no-build alternatives based on how they achieve project purpose and need; goals and objectives; and

how they compare in terms of their environmental and socioeconomic impacts. It is imperative that the preferred alternative meets the purpose and need elements being: structural deficiencies; traffic operational and safety deficiencies; and mobility deficiencies. It is also important that the preferred alternative takes all reasonable measures to remedy the impacts this section of the interstate has imposed on the neighborhoods, businesses, and communities of Hartford. In an effort to address this, a set of Goals and Objectives has been established to further support the decision making process and lead to a transportation solution that is also a solution to the various community impacts caused by the interstate.

A. Purpose

The purpose of the ***I-84 Hartford Project*** is to address structural deficiencies, improve traffic operations and safety, and improve mobility on the I-84 mainline and its interchanges between Flatbush Avenue and I-91 in Hartford. Addressing these deficiencies would allow I-84 to continue to serve as a vital link in the interstate highway system in the Northeast and provide needed access to Hartford business districts and the State Capitol. The project would also improve access, safety, and mobility for bicycles and pedestrians within the project area. At the same time, the ***I-84 Hartford Project*** would aspire to reduce the highway's footprint on the city; lessen the highway's visual and physical impact on adjoining neighborhoods; better integrate the highway into the urban environment; create linkages to existing and proposed future modes of transportation; and support Hartford's economic development goals.

B. Need

1. Bridge Structure Deficiencies

There are several long, multi-span bridges within the ***I-84 Hartford Project*** corridor that are in an advanced state of deterioration. The bridges within the project limits also include those carrying portions of the Sisson Avenue ramps (Interchange 46), Sigourney Street ramps (Interchange 47) and the Asylum Street/Capitol Avenue/Broad Street ramps (Interchange 48).

The corridor is approximately 2.5 miles long; however, it comprises approximately 4.5 miles of bridges with a total deck area of over 1.3 million square feet, or about 30 acres. These structures were originally designed for a 50-year service life, and now that they have reached the end of their intended life span, costly repairs are routinely needed to control their continued deterioration. Between 2002 and 2012, CTDOT spent approximately $60 million to rehabilitate some of the bridges within the corridor, and an additional $50+/- million is programmed for repairs in the next three years. Despite continual maintenance, repairs and capital investment, the condition of the bridges will continue to worsen over time and lead to extensive rehabilitation and ultimately full replacement of many of the bridges.

2. Traffic Operational and Safety Deficiencies

The designs of the interchanges within the corridor do not meet current design standards and are inadequate for today's traffic conditions. Designed in the 1950s and early 1960s for much lower traffic volumes, the interchange designs also do not meet driver expectations and, consequently, can contribute to driver confusion. Between 2009 and 2011, there were 1,840 motor vehicle accidents within this corridor. Some of the many operational deficiencies that contribute to a higher than average statewide crash rate include:

- Closely spaced interchanges that create difficulties in expressway signage and conflicts between traffic entering and exiting the highway;
- Poor lane continuity;
- Short distances between on-ramps and off-ramps creating weave sections;
- Partial interchanges with left-hand entrance and exit ramps;
- Substandard shoulder widths (minimum is 10', existing shoulders are 2-4'); and
- Undesirable horizontal alignments.

The existing interchange and ramp spacing is less than the recommended guidelines for urban freeways. Design guidance by the American Association of State Highway and Transportation Officials (AASHTO) recommends interchange spacing of one mile in urban areas and a minimum of 1,000' between successive on-ramps or off-ramps and 2,000' between successive on- and off-ramps. When interchanges are spaced closer than one mile, the interaction between the highway mainline traffic and the ramp traffic becomes constrained, which can lead to a significant reduction in free flow speeds. Including Flatbush Avenue and the I-91 interchange, the existing corridor has eight (8) full or partial interchanges within 2.7 miles.

Due to the existing substandard shoulder widths, damaged or disabled vehicles block travel lanes until towing assistance can arrive on the scene, causing significant delays. Responding to incidents within the corridor during heavy congestion is very difficult because drivers have little room to pull off the travel lanes. Heavy congestion within the corridor, coupled with the lack of standard shoulder widths also adversely affects the emergency response times for Hartford Hospital and St. Francis Hospital, among others. The sense of openness created by shoulders of adequate width also contributes to driving ease and reduced stress.

Due to the high volume of traffic, wider shoulders are needed on I-84 to provide space for vehicles to pull-off in emergencies, provide space for evasive maneuvers to avoid or reduce accidents, provide space for maintenance operations such as snow removal, and provide space to control drainage during rain events to avoid ponding on the highway.

3. *Mobility Deficiencies*

This section of I-84 was designed in anticipation of 50,000 and 66,000 vehicles per day by the year 1975. Traffic volumes have increased to approximately 175,000 vehicles per day, with up to 7,200 vehicles in the morning peak hour on I-84 westbound. These volumes include the freight movement of goods, which is above the national average within this section of I-84. The existing interstate layout and ramp configurations do not meet modern design standards. The closely spaced interchanges and multiple-lane weaving sections create a constrained environment for the high traffic volumes and cause higher travel friction. This section of highway experiences significant delays on a daily basis, and I-84 west of I-91 accounts for 53% of all delays on the region's freeways.[3] The interstate operates at a Level of Service (LOS) F during the morning and afternoon peak hours. Speed data from INRIX reveals that the interstate travel speeds are often below 20mph for more than an hour at a time. A significant amount of nonrecurring congestion is caused by crashes, disabled vehicles and work zones. The relatively high crash rate on I-84, coupled with the lack of usable shoulders, frequently lead to emergency and disabled vehicles blocking a travel lane(s), which dramatically reduces the available capacity of I-84. This temporary but significant congestion reduces the reliability of I-84.

A significant portion of the traffic using the interstate during the morning and afternoon peak hours is commuters working in Hartford. The freeway interchanges provide important access to and from the employment centers via the city street system. In addition to the employment centers, the concentration of businesses, institutions and neighborhoods in the vicinity of I-84 in Hartford create a heavy traffic demand and also rely on the interchanges for access. The need for access at interchanges has to be balanced with the need to improve the interchanges' designs and spacing.

There is also a need to address vehicular, pedestrian and bicycle accommodation deficiencies and connectivity issues along city streets that are located within I-84 right of way or directly affected by proposed I-84 improvements. Improvements should create more inviting, attractive, safe and accessible pedestrian and bicyclist environments to better accommodate non-motorized modes of travel. The Urban Land Institute identified development strategies for Hartford, and one of the recommendations included "creating a more pedestrian-friendly community with better access to the downtown area, and improving both perceived and real safety for employees and residents."[4]

[3] CRCOG, *I-84 Viaduct Study*, Fall 2010.
[4] Panel Advisory Services by the Urban Land Institute, City of Hartford, September 2007.

III. PROJECT GOALS AND OBJECTIVES

As stated earlier, a set of Goals and Objectives has been established to provide other potential and broader factors to be considered by the CTDOT and FHWA in the alternatives analysis screening process. The project goals and objectives are as follows:

A. Ensure the long-term serviceability of the corridor by:

1. Creating opportunities for connections to existing and future modes of transportation within the corridor;
2. Coordinating with the City of Hartford and CRCOG towards a workable solution that is compatible with city and regional initiatives; and
3. Developing a holistic corridor multi-modal solution that balances the needs of the highway with the needs of the rail corridor and CT*fastrak.*

B. Maximize the public investment in this corridor by:

1. Utilizing cost-effective solutions that maximize capital investment over the lifespan of the project;
2. Reducing maintenance requirements and operations costs;
3. Sequencing staged construction to minimize the impact on the traveling public and the local community;
4. Reconfiguring the interstate in a manner that frees up land no longer needed for highway purposes, increasing the opportunities for open space, development or other purposes; and
5. Implementing recycling strategies to reuse existing materials on site.

C. Ensure better integration of the interstate with the urban environment by:

1. Reducing the physical impact of the interstate by reducing the footprint of I-84 and its ramps;
2. Repairing the visual and physical connectedness of the areas that the interstate corridor divides;
3. Using architectural features and details on the proposed structures and other design treatments that would improve the highway's aesthetic qualities as viewed from neighboring areas;
4. Creating aesthetically pleasing spaces for those highway areas that are shared with or adjacent to local streets and properties including passive parks and recreational uses in accordance with Hartford's sustainability goals; and
5. Supporting the City's urban design goals; and pedestrian, biking and transit interconnectivity.