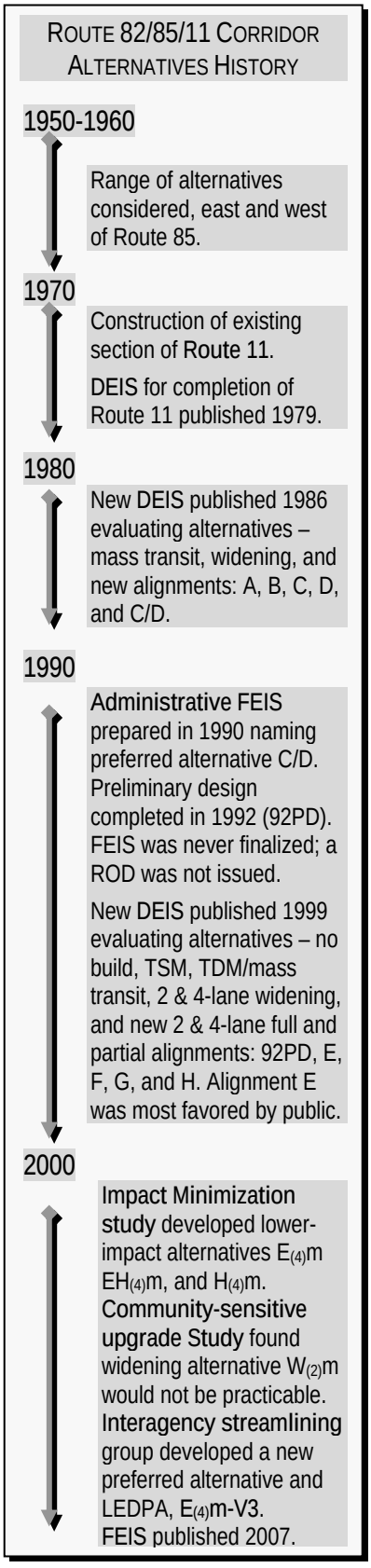
DESCRIPTION OF ALTERNATIVES

Alternatives for transportation improvements in the Route 82/85/11 corridor have been considered for nearly 50 years. The history of the development and evaluation of previously studied alternatives is summarized in Section 3.1. Alternatives evaluated in this FEIS were developed after review of previous alternatives analyses; these alternatives are introduced in Sections 3.2 and 3.3. The process undertaken in the development and selection of the preferred alternative is discussed in Section 3.4, followed by a description of the preferred alternative.

3.1 BACKGROUND AND PREVIOUSLY STUDIED ALTERNATIVES

The Route 82/85/11 corridor has been studied since the 1950s in an effort to implement transportation improvements for the area. In the late 1950s, a broad spectrum of alternatives was considered, including alignments both east and west of Route 85. At the time, potential alignments along the east side of Route 85 were dropped from consideration due to the very rough terrain in the area, which would have created severe engineering, cost and environmental impact problems. These early studies were the basis for design and construction of the existing portion of Route 11, in 1972, from its intersection with Route 2 south to its current terminus at Route 82 in Salem.

The current FEIS process has taken into account the history of the study area with respect to prior studies and previously-considered alternatives. Alternatives that were previously examined and determined to be clearly impractical and/or ineffective at reasonably meeting the project purposes and needs were not revisited in this FEIS. The alternatives that were given consideration in the previous environmental documents, but ultimately eliminated from further study, were revisited briefly as part of this study. Although it was determined that these alternatives did not meet the earlier project purposes, they were reexamined to see if they may have merit with respect to today's conditions.



The following sections describe the alternatives previously considered, as well as the process used to determine which alternatives would be included for discussion in this document. The current FEIS alternatives are described in Section 3.3

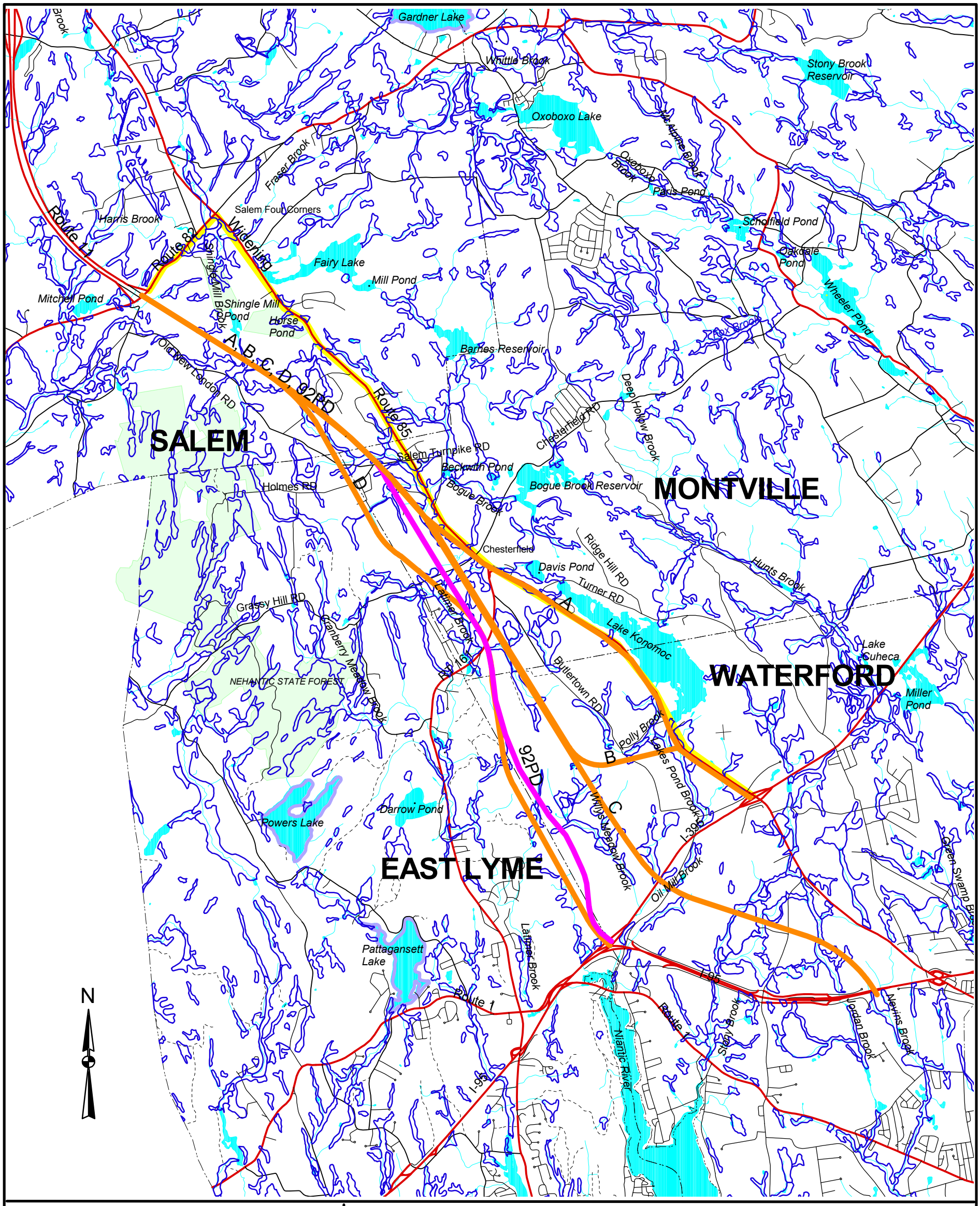
3.1.1 ALTERNATIVES CONSIDERED UNDER PREVIOUS STUDIES

Studies of various alternatives for the completion of Route 11 to I-95 were initiated in the 1970s and resulted in preparation of a DEIS in 1979. Due to funding constraints, this environmental documentation process was deferred until 1984, when studies were reinitiated. In 1986, another DEIS was published. Between publishing the 1986 DEIS and preparation of an Administrative Final Environmental Impact Statement (FEIS) in 1990, a preferred alternative for continuation of the Route 11 expressway was developed (Alternative C/D). The 1990 FEIS built on the prior documentation, taking the analysis to another level; however, the FEIS was never finalized, a Record of Decision (ROD) was not issued and state/federal permit applications for the C/D alternative were not prepared.

Alternatives considered in the previous environmental documents included the "no build" and "mass transit" alternatives, a "widening" alternative and various "new expressway" alternatives on new location. The "new expressway" alternatives included five alignments, A, B, C, D, and C/D, which ranged from a partial expressway to full expressway options connecting with I-395 and I-95. The previous widening alternative and alternatives A, B, C, D and C/D are described below and depicted in Figure 3-1.

3.1.1.1 *No Build Alternative*: The no build alternative represented a base condition where no projects, above and beyond presently programmed projects, would be carried out. Only routine programmed projects, maintenance and paving activities, that would not involve substantive capacity or operational improvements, would take place.

Future traffic demands that were done for the year 2005, showed that LOS on Routes 82, 85 and 161 would have been deficient with major sections experiencing LOS E and F. The no build alternative would not have provided any improvement of poor safety conditions on these two-lane arterials. Deteriorating traffic service and the associated safety concerns would have been a key factor limiting the municipalities' abilities to achieve planned development goals.



LEGEND

- 1990 FEIS Alternatives A, B, C, D
- 1992 PD Alignment
- RT 82/85 Widening Alternatives
- Waterbodies and Streams
- Wetlands
- DEP Owned Waterbody
- State Forest

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82/85/11
ENVIRONMENTAL IMPACT STATEMENT (EIS)

IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD

STATE PROJECT #120-81

1990 BUILD ALTERNATIVES

Notes:

Sources:
Hydrology: CTDEP Natural Resources Center GIS Database 1994
Alternatives: 1990 FEIS, and CTDOT

2500 0 2500 5000 Feet

500 0 500 1000 1500 Meters

August 1998

Figure 3-1

An accident analysis developed for the corridor in these early studies isolated the locations where accident rates were the highest. These locations corresponded with areas showing high traffic volumes and low LOS. At two locations, the Route 85/82 intersection and Route 85/161 intersection, accident rates would have been particularly high. Under the no build alternative, accident rates would be expected to increase over the years as traffic volumes increased and LOS worsened. Additionally, this alternative did not receive support from the public during the comment period of the process in the mid to late 1980s.

3.1.1.2 *Mass Transit Alternative*: The mass transit alternative examined commuter parking lots, regional bus service and ridesharing activities. Due to the relatively low population density of the corridor towns, ridesharing was the only form of mass transit with the potential for widespread use in the corridor. Ridesharing is most conducive to work related trips; employer cooperation and sufficient numbers of employees from a given area are required for its success. It was discovered in the previous study that most employers in the non-urban portion of the corridor were small and scattered and that trips, which exhibited the greatest volumes in the area, tended to be non-work related. It was considered unlikely that ridesharing within the corridor could have appreciably reduced the numbers of work trips to small employers beyond its effectiveness at the time. Bus service was not considered feasible since the use of this type of transit does not lend itself to the erratic nature of non-work related trips.

1986 Mass Transit Alternative

Due to the suburban/rural nature of the study area, the study concluded that it was unlikely that any type of mass transit could be sufficient to preclude the need for other types of improvements within the Route 82/85/11 corridor.

At the time of the 1986 DEIS publication, commuter parking facilities, vanpooling and carpooling were available throughout the region and within the study corridor. There were three commuter parking facilities within the study corridor: 1) in East Lyme at the intersection of I-95 and Route 161 (exit 74); 2) in East Lyme at the Maintenance Garage; and 3) in Waterford at the intersection of I-395 and Route 85. Vanpools were already quite active in the region. ConnDOT was providing a vanpool matching service for state employees and the Electric Boat Company was participating in a vanpool program for its employees. Also, there was a privately owned vanpool matching service operating in the southeast Connecticut region.

The Southeast Area Transit (SEAT) provided regularly scheduled, fixed route local and corridor service to Montville and Waterford. Groton trips had the greatest potential for continued express bus services due to the number of large employers and their close proximity to each other. Although New London and Waterford were home to a number of large shopping malls, the variable work schedules of retail employees made it difficult to apply a rigid bus schedule for their use.

Due to the suburban/rural nature of the study area, the study concluded that it was unlikely that any type of mass transit could be sufficient to preclude the need for other types of improvements within the Route 82/85/11 corridor.

3.1.1.3 *Route 82/85 Widening Alternative*: The widening alternative evaluated in the previous documents consisted of widening Route 82 from Route 11 to Route 85 at Salem Four Corners, and Route 85 south to I-395 in Waterford. Routes 82 and 85 would have been widened to four 3.6 m. (12 ft.) lanes with two 3 m. (10 ft.) shoulders, a 6.7 m. (22 ft.) median and turning lanes. The entire widening would have taken place within the 46 m. (150 ft.) right-of-way. This alternative also would have included widening I-95, providing one additional lane in each direction from the area of the I-95/I 395 interchange in East Lyme/Waterford approximately to the Waterford/New London town line. In addition, completion of frontage roads and revision of the I-95/Route 85 interchange was included. The proposed widening alternative was approximately 16.5 km. (10.3 mi.) long, and would have had an estimated construction, preliminary engineering and contingency cost of $80,800,000 (1990).

1986 Widening Alternative

The widening would have required the largest taking structures…. Also, this alternative would have affected two historic structures…. This alternative could also have had potential impacts on water supply resources… the most significant resource in this area being Lake Konomoc. This alternative would not have provided acceptable future traffic conditions in the corridor.

The widening of Route 85 would have had a number of notable impacts to the Route 82/85/11 corridor. The widening would have required the largest taking of residential and commercial structures, which included stores at Salem Four Corners and Chesterfield Center. Also, this alternative would have affected two historic structures and land associated with one historic resource. This alternative would not have provided acceptable future traffic conditions in the corridor. Future traffic volumes and LOS on Route 85 in the area of I-395 and I-95 and on Route 161 in the area of Route 85 and also the Montville/East Lyme town line would have been similar to those under the no build alternative. There would have been no improvements to traffic problems related to Route 161.

This alternative could also have had potential impacts on water supply resources located along Route 85, the most significant resource in this area being Lake Konomoc. Since the New London area had been noted in the past as having potential future water shortage problems, protection of this vital resource was an important consideration.

Due to the impacts on historic areas, Lake Konomoc, water supply watershed lands and aquifers, as well as the low future traffic benefits, the widening alternative was not considered a prudent alternative.

3.1.1.4 *New Expressway Alternatives*: Five alternatives involving a new section of expressway on new location were considered in the prior documents. Each expressway alternative began at the same location where Route 11 ends at Route 82. A Route 82 overpass was constructed in the early 1970s which connects to a graded, unpaved expressway section approximately 1.6 km. (1 mi.) in length beyond Route 82.

Alternatives A and B were combinations of a partial new expressway on new location and a widening of Route 85 south to I-395. Alternatives C, D, and C/D consisted of new expressways on new locations extending from Route 82 to I-395 and/or I-95.

ALTERNATIVE A

Alternative A was one of two partial-build expressway alternatives. As proposed, this alternative would have followed the same alignment as Alternative C from Route 82 to the area of Salem Turnpike, where it would have swung east and touched down on Route 85 approximately 30 m. (100 ft.) north of the Route 85/Grassy Hill Road intersection in Chesterfield.

1986 Alternative A

Alternative A was one of two partial-build expressway alternatives… DEIS studies in 1986 determined that this alternative would not meet future traffic service needs since it did not have full linkage to either of the existing interstates, I-395 and I-95. This alternative provided full expressway service to the point where it touched down on Route 85, however, at this point, the LOS decrease to that of the widening alternative, from that point south to I-395.

The expressway on new location would have had a 122 m. (400 ft.) right-of-way, from non-access line to non-access line, and been access-controlled and grade-separated from local roads. The roadway would have consisted of two 3.6 m. (12 ft.) lanes in each direction, with 3 m. (10 ft.) outside shoulders and 1.8 m. (6 ft.) inside shoulders. This four-lane divided expressway was also proposed with a median that varied in width, but was approximately 27 m. (90 ft.) wide. The median would have allowed for independent profile alignments for each barrel of the roadway, providing opportunities to reduce cuts, fills, and impacts on resources, and conservation of much of the median in its natural state. Improvements to Route 85, from the point where Alternative A reached Route 85 south to I-395, would have been the same as under the widening alternative for that section. Adding a lane in each direction to I-95 and completing the frontage roads would also have been included. Alternative A was approximately 6.3 km. (3.9 mi.) long on the new location, with approximately 6 km. (3.7 mi.) of existing Route 85 (south to I-395) widened.

1986 studies determined that this alternative would not meet future traffic service needs since it did not have full linkage to either of the existing interstates, I-395 and I-95. This alternative provided full expressway service to the point where it touched down on Route 85, however, at this point the LOS decreased to that of the widening alternative south to I-395. Alternative A would have had a LOS of E in some areas of Route 85 and I-95.

Wetland, floodplain, fisheries, water supply sources and watershed lands, historical, socioeconomic, and other resources would have been impacted by Alternative A. Approximately 16 ha. (40 ac.) of wetlands would have been impacted. The Alternative A alignment would have affected either Latimer Brook or an existing cemetery on the west side of Route 85, just north of Chesterfield, since there was not enough area between the two resources to accommodate the required 122 m. (400 ft.) right-of-way for the new expressway. If the expressway were aligned closer to Latimer Brook to avoid the cemetery, there would have been more than a 200 m. (700 ft.) longitudinal encroachment of the brook, requiring relocation of that portion of the brook. If the alignment were shifted to the east to avoid the brook, a portion of the cemetery would have to have been excavated to accommodate the expressway. Neither of these impacts was considered prudent or feasible.

From the point where Alternative A connected to Route 85, the impacts would have been the same as those under the widening alternative from that point south. Significant impacts to public water supply sources, such as Lake Konomoc, water supply watershed lands and aquifers along Route 85 through this stretch of road would have occurred. This alternative would have structurally displaced a total of thirty-three residential and five other buildings, including two historical structures.

1986 Alternative B

From the point where Alternative B connects to Route 85, the impacts would have been the same as under the widening alternative from that point south... This alternative would have involved property takings that would have displaced a total of 32 residential and three other structures, including one historical structure.

ALTERNATIVE B

Alternative B, the second of the proposed partial-build expressway alternatives, would also have followed the same alignment as Alternative C from Route 82; however, it would have touched down further south on Route 85 than Alternative A, just north of the Route 85/I-395 intersection. Route 85 would have been widened, as in the widening alternative described above, from that point to the Route 85/I-395 intersection. The I-95 improvements and frontage road completion were also included in Alternative B.

Future traffic estimates determined that this alternative, like Alternative A, would not meet projected traffic needs since it did not have full linkage to either of the existing interstates, I-395 and/or I-95. This

alternative provided full expressway service for a longer distance than Alternative A, however, at the point where this alternative touched down on Route 85, the LOS decreased to that of the widening alternative from that point south to I-395. Alternative B would have had a LOS of E in some areas of Route 85 and I-95.

Wetland, floodplain, fisheries, water supply, water supply lands, historical, socioeconomic, and other resources would be impacted by this proposed alternative. Alternative B would require the filling of approximately 20 ha. (50 ac.) of wetland. Alternative B would have had a significant adverse impact to the Latimer Brook system. It included a section that would have had a 400-500 m. (1,400-1,600 ft.) longitudinal encroachment along Latimer Brook, requiring the relocation of that portion of the brook. Since this brook is considered such a significant resource in the corridor, this impact was not considered acceptable.

From the point where Alternative B turned east, off the Alternative C alignment, and tied into Route 85, it would have crossed public water supply watershed lands associated with surface waters and a public water supply well. In addition to this, the City of New London noted in 1985 that the Alternative B alignment would have affected the water well owned and operated by the Waterford Speed Bowl, located east of Route 85, and north of I-395.

1986 Alternative C

...the Alternative C alignment would have passed directly through the "Wolf Pit Village" archaeological site, located south of Route 161 and west of Butlertown Road. Alternative C would also have impacted approximately 32 ha. (80 ac.) of wetland resources, including watercourses and emergent, forested and scrub-shrub wetlands. This alternative would have had major impacts to Latimer Brook in the Chesterfield area, with a longitudinal encroachment and relocation of 400-500 m. (1,400 -1,600 ft.) of the brook.

From the point were Alternative B connects to Route 85, the impacts would have been the same as under the widening alternative from that point south. Including the Route 85 widening, frontage road completion and I-95 widening, this alternative would have involved property takings that would have displaced a total of thirty-two residential and three other structures, including one historical structure.

In terms of historical resources, this alternative would have passed directly through what was believed to be the center of "Wolf Pit Village," a large area with significant archaeological value. This alternative would also have passed in close proximity to other historic resource areas, both on its overland route and in association with Route 85 widening activities south of the Alternative B tie-in point with Route 85.

ALTERNATIVE C

Alternative C would have extended Route 11 from Route 82 in Salem to I-95 in Waterford, at a point west of the Route 85/I-95 interchange. A full service interchange at Routes 161 and I-95, partial interchange with Cross Road, widening of I-95, the completion of the frontage road system,

and modifications to the Route 85/I-95 intersection would also have been part of the proposed improvements.

There were a number of serious impacts associated with Alternative C, especially along the alignment south of Route 161. Alternative C would have crossed three groundwater aquifers along its alignment south of Route 161 as well as a potential public water supply development site within the Waterford Triangle, located between Route 85, I-95 and I-395. Also, a section of the Town of Waterford's Aquifer Protection Zone would have been crossed by this alignment within the Waterford Business Triangle. In terms of historical resource impacts, the Alternative C alignment would have passed directly through the "Wolf Pit Village" archaeological site, located south of Route 161 and west of Butlertown Road. Alternative C would also have impacted approximately 32 ha. (80 ac.) of wetland resources, including watercourses and emergent, forested and scrub-shrub wetlands. This alternative would have had major impacts to Latimer Brook in the Chesterfield area, with a longitudinal encroachment and relocation of 400-500 m. (1,400-1,600 ft.) of the brook.

Although this alignment would have provided greater future traffic service than the A or B alternatives, studies indicated that Alternative C would have diverted less traffic off of Route 161 than Alternative D. Also, this alternative would have provided a LOS of E on I-95, which was considered unacceptable. Alternative C was approximately 17.2 km. (10.7 mi.) long, with a 1990 estimated design, construction and contingency cost of $259,600,000.

1986 Alternative D

Alternative D would have extended Route 11 on an alignment west of Alternative C… Alternative D would have had somewhat less wetland impact than Alternative C... This alternative would not have had major impacts to Latimer Brook, and no major encroachments were proposed.

ALTERNATIVE D

Alternative D would have extended Route 11 on an alignment west of Alternative C from Route 82 in Salem south to a I-95/I-395/Route 11 interchange in East Lyme/Waterford. As with Alternative C, a full service interchange at Route 161, widening of I-95 and completion of the frontage road system would have occurred. The I-395/I-95/Route 11 interchange would have provided service from Route 11 to northbound and southbound I-95 with the existing service being maintained. No service would have been provided from Route 11 to I-395 in either direction.

Generally, Alternative D would have had less resource impacts than Alternative C, south of Route 161. Alternative D would have crossed only one aquifer and would not have impacted the potential groundwater development site or water supply watershed lands that Alternative C would have. Alternative D would have had somewhat less wetland impact than

Alternative C, approximately 26 ha. (63 ac.) of impacted wetland areas, including water courses and emergent, forested and scrub-shrub wetlands. This alternative would not have had major impacts to Latimer Brook, and no major encroachments were proposed. This alternative would not have impacted any identified historical areas, although its alignment would have passed adjacent to what was thought to have been the perimeter of the "Wolf Pit Village" archaeological area.

Alternative D would have had acceptable LOS in all portions of the project. This alternative was approximately 16.4 km. (10.2 mi.) long, with an estimated construction, preliminary engineering and contingency cost of $181,400,000 (1990). Alternative D remained a potentially viable alternative and was, ultimately, improved upon and combined with elements of the C alignment, becoming the "C/D" Alternative.

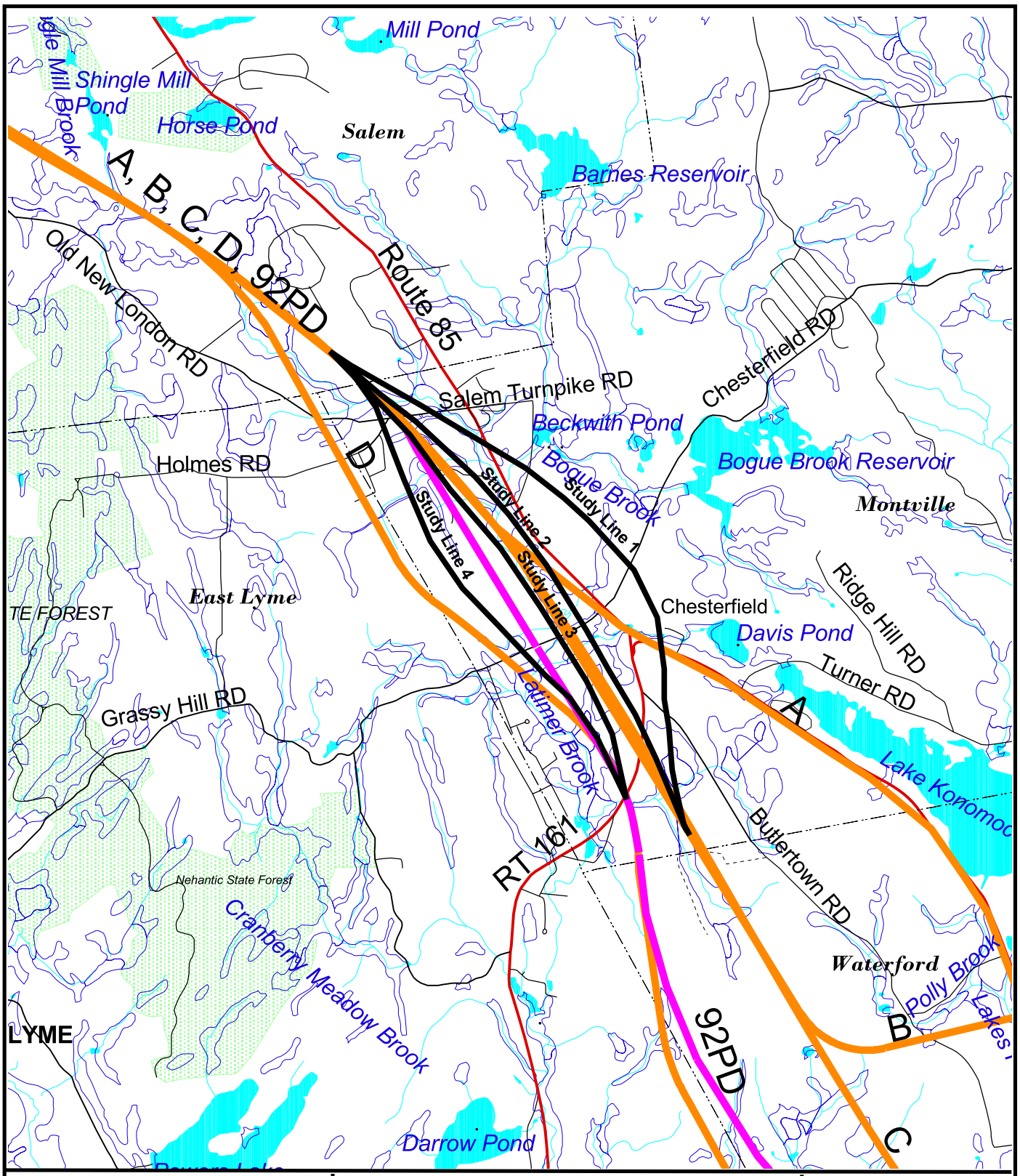
FORMER PREFERRED ALTERNATIVE - ALTERNATIVE C/D

Building on the findings of the 1986 DEIS, the 1990 document presented a preferred alternative, Alternative C/D. This alternative was a refinement and combination of Alternatives C and D that was derived from public input received on the DEIS, and subsequent additional engineering, historic, socioeconomic, and environmental analyses. It was developed after four additional alignments (Study Lines 1 through 4, shown on Figure 3-1a) for the crossover from Alternative C to Alternative D in Chesterfield were assessed.

1990 FORMER PREFERRED ALTERNATIVE C/D

Building on the findings of the 1986 DEIS, the 1990 document presented a preferred alternative, Alternative C/D. This alternative was a refinement and combination of Alternatives C and D that was derived from public input received on the DEIS, and subsequent additional engineering, historic, socioeconomic, and environmental analyses.

The C/D alternative would have extended Route 11 as a new expressway from the existing terminus of Route 11 at Route 82 in Salem on the Alternative C alignment, to the area of Salem Turnpike in Montville. At that point, the preferred alternative would have swung west to the Alternative D alignment and around Route 161 in Montville. The Alternative D alignment would then have followed from that area south to the full service I-95/I-395/Route 11 interchange in East Lyme/Waterford. Widening of I-95 and improvements to the frontage road system east to approximately the Waterford/New London town line were included as part of Alternative C/D. The connection of Alternatives C and D between Salem Turnpike and Route 161 was developed through the analysis of six potential alignments in the Chesterfield area, Alternatives C and D, and four other lines. They were analyzed in terms of their construction and permanent impacts on air, noise, traffic, length, state land usage, socioeconomic, historic/archaeological, wetlands, water quality, farmland, public water supply, and energy resources.



Legend

- 1990 FEIS Chesterfield Study Lines*
- 1990 Build Alternatives
- 1992 PD
- Wetlands
- Waterbodies and Streams
- State Forest

* Source: Chesterfield Study Lines Figure dated June 1988 from 1990 FEIS

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82/85/11
ENVIRONMENTAL IMPACT STATEMENT (EIS)

1990 FEIS CHESTERFIELD STUDY LINES

August 1998

1000 0 1000 2000 Feet

200 0 200 400 600 Meters

Figure 3-1a

The analysis revealed that Line 4 exhibited the best balance between social, economic, environmental and historic issues and concerns.

Alternative C/D in 1990 included no air quality standards violations; however, since it was an introduction of a new traffic source north of I-95, it resulted in a new noise source and eleven noise barriers were proposed. Twenty-nine residences would have been displaced, with subsequent local tax revenue reductions. There was the potential for impact to "Wolf Pit Village," however; there would have been no effect on Section 4(f) resources. Public water supply watershed land would not have been affected, and no impacts to the water quality of public water supplies were foreseen. One aquifer would have been crossed by the proposed alignment. Short-term fisheries impacts were noted, however no threatened or rare species were expected to have been affected. Like Alternative D, the preferred alternative would have affected approximately 26 ha. (63 ac.) of wetlands, with multiple stream crossings and floodplain encroachments required.

Alternative C/D was approximately 19.2 km. (11.9 mi.) long with an estimated construction, preliminary engineering and contingency cost of $229,500,000 (1990).

3.1.1.5 *Southern Terminus for a New Expressway*: Of the alternatives considered under the previous studies, four different southern termini were proposed. The proposed termini of Alternatives A and B would tie to two locations on Route 85, in Montville and Waterford, respectively. The proposed termini of Alternatives C, D and C/D would tie to two different locations on I-95.

The southern terminus of Alternative A was proposed on Route 85 approximately 30 m. (100 ft.) south of Grassy Hill Road in Chesterfield. It would have had a traffic signal on Route 85, with north and south access to Route 85. Alternative B would have also connected to Route 85 and included a traffic signal; however, this terminus would be located approximately 1.1 km. (0.7 mi.) north of I-395. Route 11 would have access to northbound and southbound Route 85. Based on future traffic forecasts, Alternatives A and B would not meet the minimum acceptable service criteria (LOS D) along Route 85 north of I-95.

The southern terminus proposed for Alternative C consisted of an interchange with I-95, approximately 900 m. (3,000 ft.) southwest of the Route 85/I-95 intersection. This terminus would have included a full service interchange with I-95 as well as widening I-95 from 2 lanes to 3 lanes in this area. Based on future traffic forecasts, this alternative would have achieved an LOS of D and E on I-95. Traversing the center of the

Business Triangle was strongly opposed by the town of Waterford

The proposed southern terminus of Alternative D consisted of an interchange at the intersection of I-395 and I-95, approximately 600 m. (2,000 ft.) north of the Route 1/I-95 intersection. This terminus would have included full service between Route 11 and I-95, in addition to the widening of I-95 from two lanes to three lanes in each direction from approximately 600 m. (2,000 ft.) west of the Route 161/I-95 intersection in East Lyme to approximately 600 m. (2,000 ft.) east of Oil Mill Road in Waterford. This southern terminus configuration would have exhibited a better LOS on I-95 than Alternatives A, B or C.

Alternative C/D would have utilized the same terminus as Alternative D, described above. Like Alternative D, this terminus would have exhibited acceptable LOS on I-95, as well as all other portions of the project resulting in a better LOS than any of the other alternatives under consideration.

Elimination of Former Alternatives

In the previous documents, Alternatives A and B were both eliminated early in the alternatives analysis given that neither alternative was expected to result in an acceptable LOS for portions of Route 85 and I-95... Neither Alternative C nor D were considered feasible due to their significant impacts to public water supply resources, fisheries, wetlands and historic resources, in addition to extensive relocation and channelization of Latimer Brook... Nevertheless, certain aspects of both of these alternatives had merit as potentially being the least environmentally damaging alignments that would substantially satisfy future traffic needs.

3.1.2 Summary: Rationale for Elimination of Former Alternatives

The previous environmental documents analyzed a number of alternatives to determine the alignment(s) which best met the needs of the Route 82/85/11 corridor. Based on the impacts of each alternative upon corridor resources, and the ability of each alternative to provide efficient and safe transportation service, it was determined that the widening alternative, with a median, and Alternatives A, B, C, and D should be dropped from further consideration.

The widening alternative (with median) would have widened Route 82 and 85 to four lanes with two 3 m.(10 ft.) shoulders, a 6.7 m. (22 ft.) median and turning lanes where necessary. This widening concept would have taken place within a 46 m. (150 ft.) right-of-way. The previous environmental documents did not recommend this widening concept because of potentially significant impacts to important public water supply areas, numerous residential and business properties and historical resources. This widening concept also did not significantly improve traffic and safety concerns at several key intersections along Route 85.

In the previous documents, Alternatives A and B were both eliminated early in the alternatives analysis given that neither alternative was expected to result in an acceptable LOS for portions of Route 85 and I-95. While either Alternative A or B would have posed notable impacts to wetlands (including Latimer Brook), fisheries, public water supply,

historic and socioeconomic resources, factors beyond the traffic and safety issues were not evaluated in great detail since future capacity and safety improvements within the corridor were the foundation of the purpose and need for the project.

Neither Alternative C nor D was considered feasible due to their significant impacts to public water supply resources, fisheries, wetlands and historic resources, in addition to extensive relocation and channelization of Latimer Brook. Further, Alternative C would have had an unacceptable LOS in one area. Nevertheless, certain aspects of both of these alternatives had merit as potentially being the least environmentally damaging alignments that would substantially satisfy future traffic needs.

Following substantial public input, a combination of Alternatives C and D was noted as the preferred alternative. This alternative, which became known as Alternative C/D, was developed to incorporate the most effective and least environmentally damaging elements of both the C and D alternatives. Alternative C/D generally had less impact on resources in the corridor than any of the other alternatives developed to date, while at the same time provided the most favorable balance between improved traffic and safety conditions and minimized impacts to the environment.

3.1.3 C/D Alternative - Preliminary Design

As a result of continuing Route 82/85/11 studies, the C/D Alternative was advanced to a preliminary design (PD) phase in the early 1990s. This was done in order to obtain a more precise idea as to whether this alternative expressway alignment was indeed feasible. During the PD process, more detailed information is developed; the generalized alignment illustrated on large-scale maps for the EIS is transformed into workable plans that are based on actual reference points on the face of the earth and reflect the application of more refined geometric criteria. A wetland field delineation was performed as part of the PD phase in order to be able to more accurately define the sensitive resource areas and reduce potential impacts.

The PD alignment for the Route 11 expressway continuation (that is, a refined version of the C/D alignment) utilized aerial and field mapping showing topographic features and delineated wetlands. Although the PD plans are only preliminary, quantification and evaluation of impacts is much more reliable based on these more detailed plans. This alignment is more fully described in Section 3.3.5.1 and its estimated resource impacts are discussed in the environmental impacts section of this document and compared against the other alternatives.

This further refinement of Alternative C/D will subsequently, in this document, be referred to as the 1992 Preliminary Design (92PD) alignment. A ROD was never issued for Alternative C/D or the 92PD alignment.

3.2 DEVELOPMENT AND SCREENING OF ALTERNATIVES

In the fall of 1997, renewed interest and on-going traffic concerns in the corridor prompted ConnDOT and FHWA to, again, explore corridor options and undertake the current study. The MIS Corridor AC, made up of representatives from federal agencies including FHWA, the Federal Transit Administration (FTA), the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (FWS) and ACOE; state agencies including the Connecticut Department of Environmental Protection (DEP), Connecticut Office of Policy and Management (OPM), and SHPO State Historic Preservation Officer (SHPO); local town governments; and SCCOG was established to aid in the decision-making process. The AC provides a forum for discussion of project concepts and issues, the exchange of information, and the solicitation of public and agency input.

A variety of alternatives have been discussed with the AC in order to develop the alternatives for the MIS and EIS. Discussions of the 92PD alignment and the concept of widening existing Routes 82 and 85 were taken to the Route 82/85/11 AC for their input and suggestions. Throughout the process, the AC has stressed the importance of minimizing impacts to both environmental and socioeconomic resources within the corridor, while promoting traffic improvement goals outlined in the project purpose and need statement (Section 2).

Through the recommendations of AC members as well as the comments received from other agency representatives, the general public and other interested parties during the information gathering process, additional alternatives were developed and have been included in this study. (This process is more fully detailed in Section 8). These additional alignments were developed in an effort to further avoid impacts to both the natural and built environment of the corridor. Although there has been substantial local interest in moving forward with construction of the continuation of Route 11, the requirements under state and federal law for evaluating a full range of alternatives have been stressed. In the interest of broadening the range of alternatives, with particular attention to those with the potential to minimize resource impacts, the federal and state agencies independently developed additional alternative concepts that they wanted to see considered in the study. To this end, several new alternatives were introduced.

3.3 DESCRIPTION OF ALTERNATIVES

The following pages describe each of the alternatives selected for consideration in the FEIS. These alternatives include the no build scenario, mass transit options, TSM options, Transportation Demand Management (TDM) options and several new construction, or "build" alternatives that involve either widening and upgrading existing routes or continuing

Route 11 as a limited access expressway (Figure 3-2). The alternatives considered are summarized as follows:

- NO BUILD — Continue routine maintenance practices and implement programmed safety improvements;
- WIDENING — Increase capacity and improve safety on Routes 82 and 85 by widening existing roadways; three separate widening alternatives are considered;
- TSM — Implement operational improvements without increasing roadway capacity;
- TDM/TRANSIT — Reduce volume/shift volume peaks by expanding bus or rail services and promoting ridesharing, alternate modes, staggered work hours, etc; and
- NEW LOCATION — Provide a new limited access route on a new location; four separate alignments, each with four-lane and two-lane variations are included

For each of the build alternatives (widening or new location) detailed below, development of the roadway cross section, location, design speed and horizontal and vertical alignments utilized AASHTO geometric design standards, according to the functional classification of each roadway alternative.

Selection of the alignments for each of the build alternatives was based upon these accepted roadway engineering standards. However, these standards were applied also with due consideration for minimizing impacts to environmental features, topography, residential and commercial properties, communities and neighborhoods and construction costs. These factors were considered equally as important as the geometric standards in establishing the various study alignments.

The costs of the alternatives were estimated in 1998 dollars. While costs in the year of expenditure would be higher, the costs provided remain valid for comparative purposes. A more detailed and updated cost estimate was performed for the preferred alternative and is provided in Section 3.4.4.

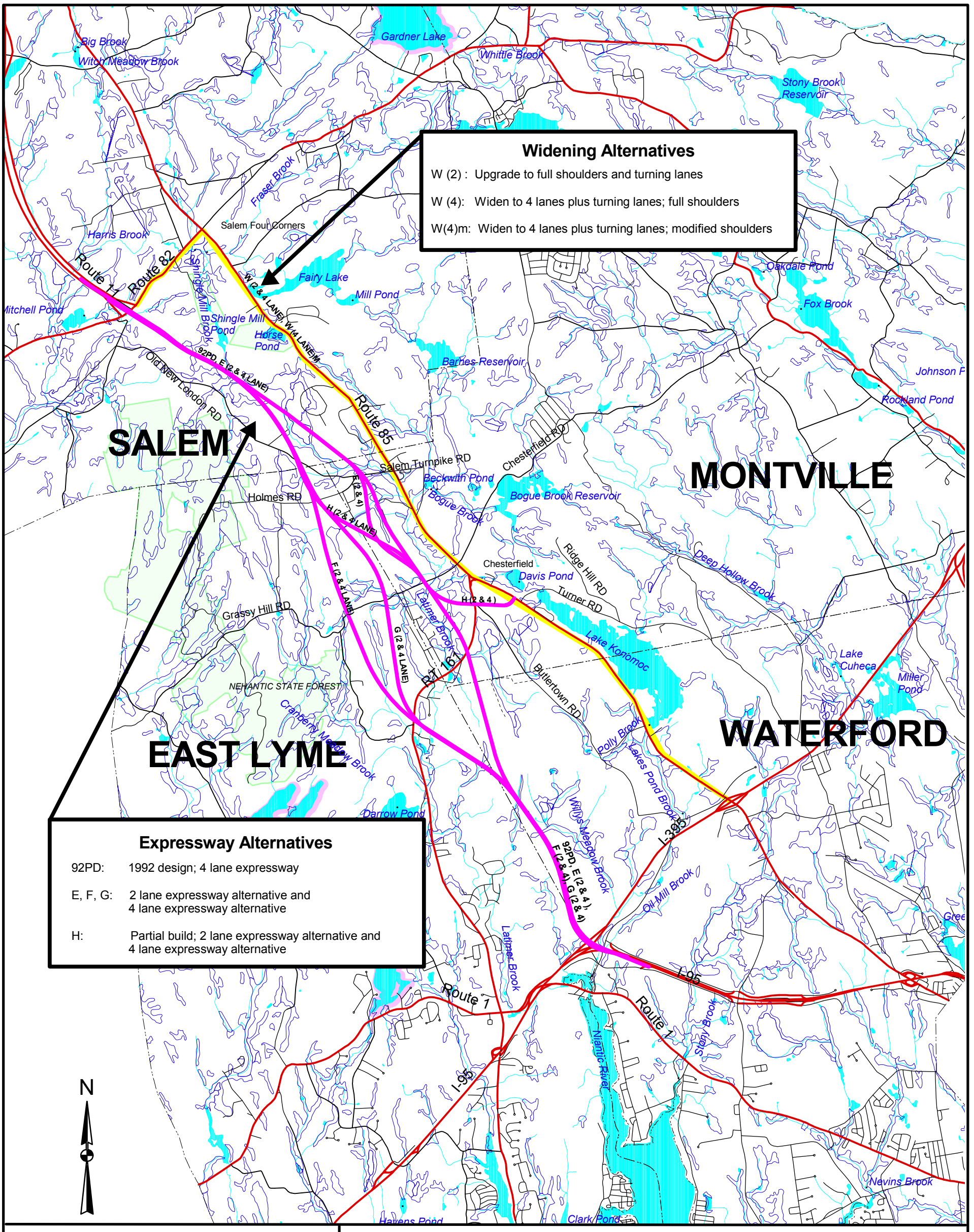

Widening Alternatives
W (2) : Upgrade to full shoulders and turning lanes
W (4): Widen to 4 lanes plus turning lanes; full shoulders
W(4)m: Widen to 4 lanes plus turning lanes; modified shoulders
Expressway Alternatives
92PD: 1992 design; 4 lane expressway
E, F, G: 2 lane expressway alternative and 4 lane expressway alternative
H: Partial build; 2 lane expressway alternative and 4 lane expressway alternative
SALEM
MONTVILLE
EAST LYME
WATERFORD
Big Brook
Witch Meadow Brook
Gardner Lake
Whittle Brook
Stony Brook Reservoir
Fraser Brook
Salem Four Corners
Harris Brook
Route 11
Route 82
Shingle Mill Brook
Fairy Lake
Mill Pond
Oakdale Pond
Fox Brook
Mitchell Pond
Shingle Mill Pond
Horse Pond
W (2 & 4 LANE), W(4 LANE)m
Barnes Reservoir
Johnson P
Rockland Pond
92PD, E (2 & 4 LANE)
Old New London RD
Route 85
Chesterfield RD
Salem Turnpike RD
Beckwith Pond
Bogue Brook
Bogue Brook Reservoir
Holmes RD
F (2 & 4)
H (2 & 4 LANE)
F (2 & 4 LANE)
Chesterfield
Davis Pond
Ridge Hill RD
Turner RD
Deep Hollow Brook
H (2 & 4)
Grassy Hill RD
Latimer Brook
G (2 & 4 LANE)
Lake Konomoc
Lake Cuheca
Miller Pond
RT 161
NEHANTIC STATE FOREST
Butlertown RD
Cranberry Meadow Brook
Polly Brook
Lakes Pond Brook
Darrow Pond
Willys Meadow Brook
92PD, E (2 & 4), F (2 & 4), G (2 & 4)
I-395
Oil Mill Brook
Latimer Brook
Route 1
I-95
Niantic River
Stony Hill Brook
Nevins Brook
Haynes Pond
Clark Pond
N
LEGEND
Alternatives:
Route 82/85 Widening/Upgrade
Expressway
Waterbodies and Streams
State Forest
Wetlands
State of Connecticut Department of Transportation
Federal Highway Administration
ROUTE 82/85/11
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
STATE PROJECT #120-81
1998 BUILD ALTERNATIVES
Notes:
Sources:
Hydrology: CTDEP Natural Resources Center GIS Database 1994
Alternatives: CTDOT and Maguire Group, Inc.
Wetlands: CTDEP/NRCS and aerial photos
2500 0 2500 5000 Feet
500 0 500 1000 1500 Meters
August 1998
Figure 3-2

Table 3-1 indicates the typical pavement cross sections used for each of the alternatives, and Table 3-2 provides a summary of the applicable AASHTO standards; a graphic presentation of these elements appears on a series of typical cross section drawings, Figures 3-3a through 3-3e. While these are the currently-accepted standards in Connecticut, legislation, PA 98-118 (effective October 1, 1998), authorized ConnDOT to develop guidelines that allow flexibility and innovation in highway design to reduce social, cultural, economic, and environmental impacts. This flexibility is encouraged in the ConnDOT Highway Design Manual, 2003 Edition. Impact minimization efforts undertaken during the development of the preferred alternative utilized flexible design standards; these are described in Section 3.4.

Impact minimization efforts will be an inherent part of any future design plans. Where flexibility in the existing AASHTO standards may be afforded as a result of flexible design standards , future design plans will reflect consideration of these standards.

3.3.1 NO BUILD

The no build alternative consists of continued use of existing roadways within the corridor with no roadway improvements implemented, other than presently programmed improvements. The no build scenario provides for continued regular routine maintenance and spot safety improvements, as necessary; however, no new major construction or capacity improvements would be initiated.

The primary existing roadways within the corridor consist of Route 11, Route 82, Route 85, I-395 and I-95. Currently, the Route 11 expressway terminates on Route 82 in Salem, an arterial highway. Route 82 extends in a westerly direction to Hadlyme, and in an easterly direction toward Norwich. From the terminus of Route 11, traveling east on Route 82 to Route 85, this roadway is three lanes in the vicinity of Route 11, then narrows to two lanes just before Shingle Mill Road. Route 85, a two-lane arterial highway, extends north to Colchester and south to Waterford and New London from this intersection point, known locally as Salem Four Corners. Traveling south on Route 85, the roadway is narrow, with many curb-cuts and driveways accessing commercial and residential properties.

For this project, the no build option considers, to the extent that it can, that currently planned and/or programmed improvements would have been put into effect. Currently, ConnDOT, in cooperation with Salem and Montville, is designing a project that would improve roadway safety at several intersections on Route 85.

TABLE 3-1
TYPICAL PAVEMENT CROSS SECTIONS

ALTERNATIVE	DESIGN CLASSIFICATION	LEFT SHOULDER		TRAVEL LANES		RIGHT SHOULDER	
		METRIC (m.)	ENGLISH (ft.)	METRIC (m.)	ENGLISH (ft.)	METRIC (m.)	ENGLISH (ft.)
$W_{(4)}$	Principal Rural/Urban Arterial	2.4	8	3.7	12	2.4	8
$W_{(4)}m$	Principal Rural/Urban Arterial	0.6	2	3.4	11-12	0.6	2
$W_{(2)}$	Principal Rural/Urban Arterial	2.4	8	3.7	12	3	6
92PD	Expressway - Principal Rural Arterial	1.2	4	3.7	12	3	10
$E_{(4)}$	Expressway - Principal Rural Arterial	1.2	4	3.7	12	3	10
$E_{(2)}^{(2)}$	Principal Rural Arterial	3	10	3.7	12	3	10
$F_{(4)}$	Expressway - Principal Rural Arterial	1.2	4	3.7	12	3	10
$F_{(2)}^{(2)}$	Principal Rural Arterial	3	10	3.7	12	3	10
$G_{(4)}$	Expressway - Principal Rural Arterial	1.2	4	3.7	12	3	10
$G_{(2)}^{(2)}$	Principal Rural Arterial	3	10	3.7	12	3	10
$H_{(4)}^{(1)}$	Expressway - Principal Rural Arterial	1.2 (2.4)	4 (8)	3.7 (3.7)	12 (12)	3 (2.4)	10 (8)
$H_{(2)}^{(1)(2)}$	Principal Rural Arterial	3 (2.4)	10 (8)	3.7 (3.7)	12 (12)	3 (2.4)	10 (8)

Sources: *Guidelines for Highway Design*, January 1990, ConnDOT
A Policy on Geometric Design of Highways and Streets, 1994, AASHTO
A Policy on Geometric Design of Highways and Streets, 1990, AASHTO

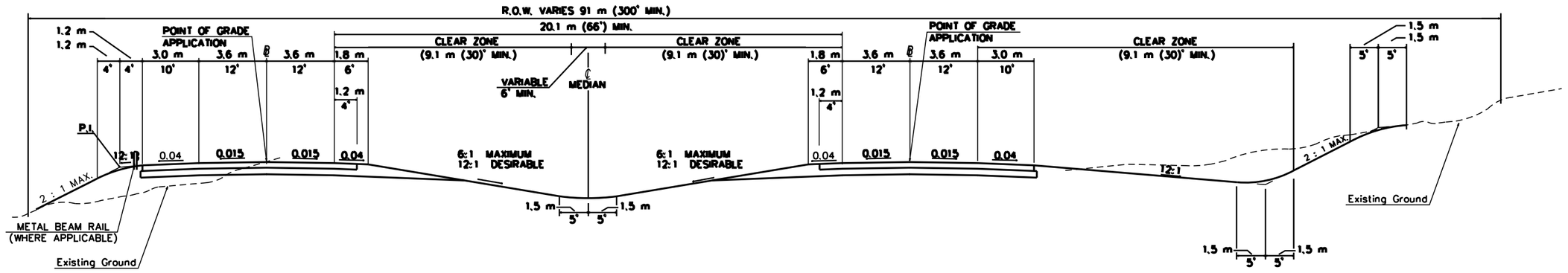
Notes: (1) This alternative has one segment that is a limited access expressway and another that is a four-lane undivided principal arterial. Data for the four-lane undivided principal arterial appears in parenthesis.
(2) These alternatives follow one lane (northbound or southbound) of the four-lane divided expressway.

TABLE 3-2
ROADWAY DESIGN CRITERIA (AASHTO STANDARDS)

ALTERNATIVE	DESIGN CLASSIFICATION	DESIGN SPEED		HORIZONTAL ALIGNMENT		VERTICAL ALIGNMENT		
		English (mph)	Metric (km/hr)	Min. Radius English (ft.)	Min. Radius Metric (m.)	Minimum Grade	Minimum Grade	Max. Rate of Superelevation
$W_{(4)}$	Principal Rural/Urban Arterial	60	100	1,528	490	0.50%	4.00%	4.00%
$W_{(4)}m$	Principal Rural/Urban Arterial	60	100	1,528	490	0.50%	4.00%	4.00%
$W_{(2)}$	Principal Rural/Urban Arterial	60	100	1,528	490	0.50%	4.00%	4.00%
92 PD	Expressway - Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$E_{(4)}$	Expressway - Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$E_{(2)}^{(2)}$	Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$F_{(4)}$	Expressway - Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$F_{(2)}^{(2)}$	Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$G_{(4)}$	Expressway - Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$G_{(2)}^{(2)}$	Principal Rural Arterial	70	110	2,083	560	0.50%	4.00%	6.00%
$H_{(4)}^{(1)}$	Expressway - Principal Rural Arterial	70 (60)	110 (100)	2,083 (1,528)	560 (490)	0.50%	4.00%	6.00% (4.00%)
$H_{(2)}^{(1)(2)}$	Principal Rural Arterial	70 (60)	110 (100)	2,083 (1,528)	560 (490)	0.50%	4.00%	6.00% (4.00%)

Source: *Guidelines for Highway Design,* January 1990, Connecticut Department of Transportation
A Policy on Geometric Design of Highways and Streets, 1994, AASHTO
A Policy on Geometric Design of Highways and Streets, 1990, AASHTO

Notes: (1) This alternative has one segment that is a limited access expressway and another that is a four-lane undivided principal arterial
(2) These alternatives follow one lane (northbound or southbound) of the four-lane divided expressway
See *Guidelines for Highway Design,* January 1990 for appropriate vertical clearances for the respective roadway classification.



NORMAL SECTION

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- ALTERNATIVE H(4) CONSISTS OF ONE SEGMENT THAT IS AN EXPRESSWAY AND ANOTHER THAT IS AN ARTERIAL (SEE ARTERIAL TYPICAL SECTION FOR ALTERNATIVE H(4))

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTION
ALTERNATIVES 1992 PD, E(4), F(4), G(4), H(4)*
NOT TO SCALE
Figure 3-3a

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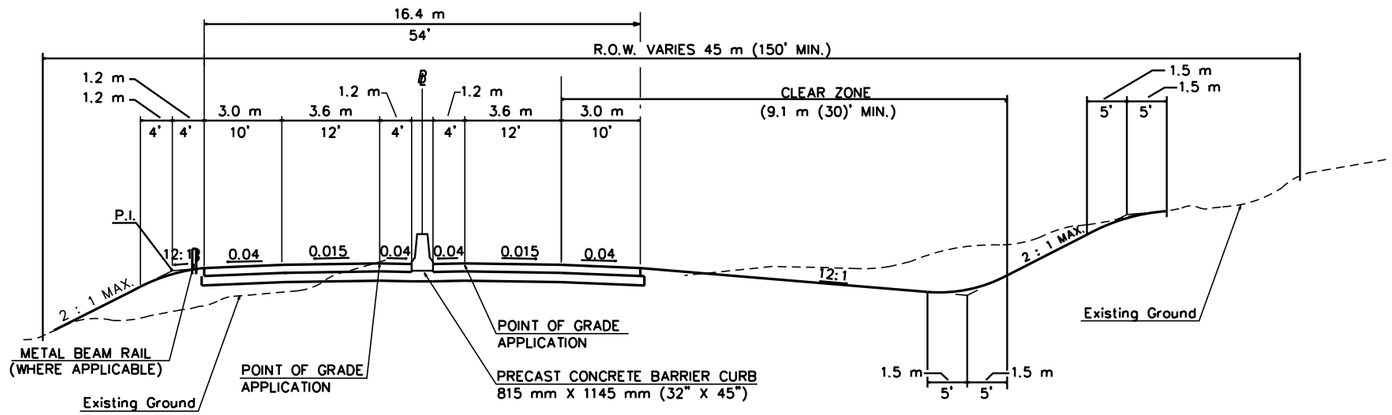

NORMAL SECTION

- ALTERNATIVE H(2) CONSISTS OF ONE SEGMENT THAT IS A LIMITED ACCESS ROADON A NEW LOCATION AND ANOTHER THAT IS AN ARTERIAL (SEE ARTERIAL TYPICAL SECTION FOR ALTERNATIVE H(2))

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTION
ALTERNATIVES E(2), F(2), G(2) & H(2)

NOT TO SCALE

Figure 3-3b

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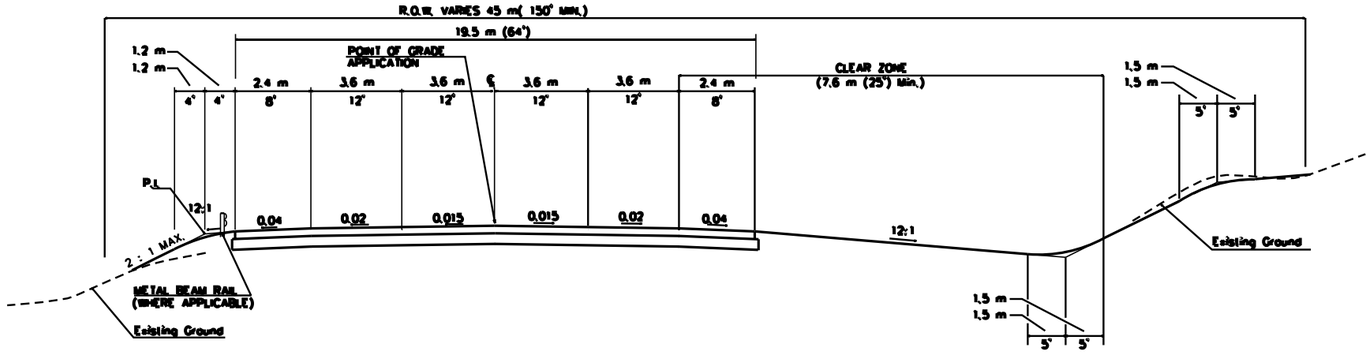

NORMAL SECTION

- ALTERNATIVE H(4) CONSISTS OF ONE SEGMENT THAT IS AN EXPRESSWAY AND ANOTHER THAT IS AN ARTERIAL (SEE EXPRESSWAY TYPICAL SECTION FOR ALTERNATIVE H(4))

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTION
ALTERNATIVE W(4) & H(4)*

NOT TO SCALE

Figure 3-3c

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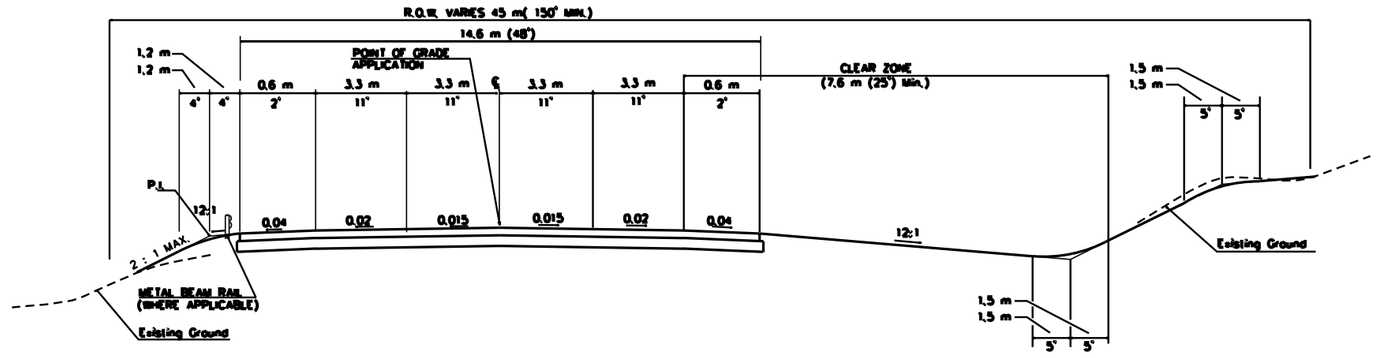

NORMAL SECTION

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State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTION
ALTERNATIVE W(4)m

NOT TO SCALE

Figure 3-3d

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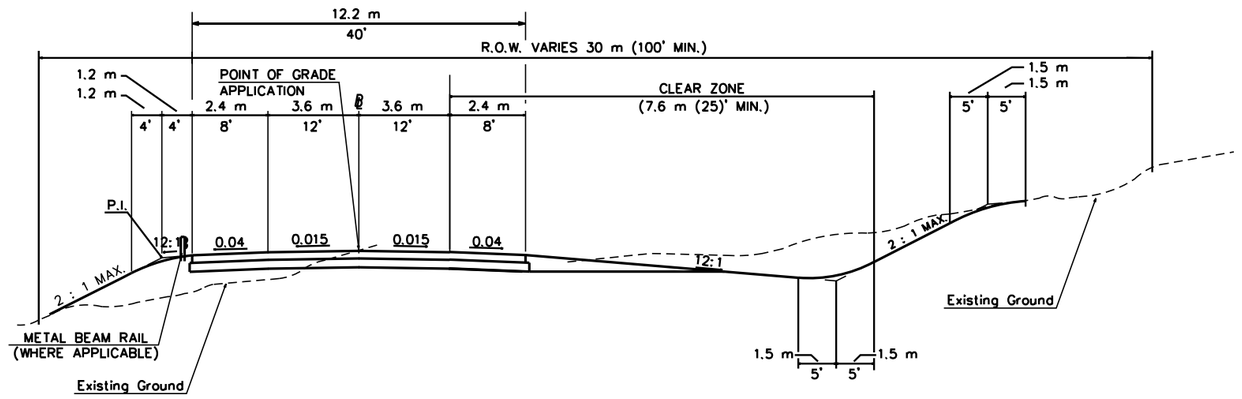

NORMAL SECTION

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	State of Connecticut Department of Transportation **Federal Highway Administration**	**ROUTE 82 /85 /11 CORRIDOR** **ENVIRONMENTAL IMPACT STATEMENT (EIS)** IN THE TOWNS OF EAST LYME, MONTVILLE, SALEM AND WATERFORD **TYPICAL SECTION** **ALTERNATIVE W(2)** NOT TO SCALE — **Figure 3-3e**

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Public input on preliminary plans has resulted in refinement of those plans. The currently programmed improvements include, in select locations, shoulder widening, reconfiguration to provide uniform lane widths (3.6 m. (12 ft.)), replacement of signal equipment, culvert replacement, sight line improvements and turning lanes at Salem Turnpike and Lakewood Drive. In this document, these improvements will be considered the existing condition, therefore, will be presumed to have taken place for the no build analysis.

Under existing conditions, the typical two-lane cross section of Route 82 has two 3.6 m. (12 ft.) lanes and two 2.4 m. (8 ft.) shoulders. It does, however, have some variation from this cross section; for example, at the Harris Brook crossings the roadway narrows to pass over the narrower bridges. The cross section of Route 85 is quite variable throughout the corridor due to the great number of spot improvements completed over the life of the road. Typically, however, the roadway has two 3.3 m. (11 ft.) lanes with 0.4-1m. (1-3 ft.) shoulders. Segments of Route 85 road have been improved to two 3.6 m. (12 ft.) lanes with 2.4 m. (8 ft.) shoulders. There are a number of bridge structures located along Routes 82 and 85.

3.3.2 ROUTE 82/85/11 WIDENING ALTERNATIVES

These alternatives provide for the widening of Route 82 from Route 11 to Route 85, and the widening of Route 85 from Route 82 to I-395 in the Towns of Salem, Montville and Waterford, for a distance of 15 km.(9.3 mi). The FEIS considers three separate cross-section options for the widening alternative: $W_{(4)}$, a full four-lane section, designed to conform to accepted roadway standards (AASHTO); $W_{(4)}$m, a modified four-lane section with reduced shoulder widths and other location-specific modifications designed to reduce impacts to certain resource features; and $W_{(2)}$, an upgrade of the existing two-lane roadway to provide a uniform roadway cross section conforming to AASHTO standards.

The proposed roadway would be classified as a principal rural arterial. The design speed for the widening is 100 kph (60 mph). As part of the widening improvements, TSM improvements, such as signalization and adding turn lanes, may be implemented.

A closed drainage system would be utilized, as necessary, in the vicinity of Lake Konomoc, Fairy Lake, and other important resource areas to protect the water supply. This system would incorporate the use of grassed swales and ditches to intercept runoff prior to reaching the roadway. This would reduce sediments and toxins from the roadway from mixing with this "clean" runoff. A closed drainage system consisting of a series of catch basins with deep sumps would be used within the watershed to collect roadway runoff and trap sediment. The runoff would then be routed to a gross particle/oil water separator to remove any oils and fine sediment. In addition, the flow would then be directed through a sedimentation pond to further

remove any pollutants. This would provide interaction with a grassed surface to absorb some of these contaminants. The "treated" runoff would then flow to the reservoir. This system would be constructed similarly for each of the widening alternatives.

3.3.2.1 *Alternative $W_{(4)}$ (Full Four-Lane Cross section)*: Alternative $W_{(4)}$ focuses on use of the existing roadway to provide greater capacity and improve safe operation; to achieve this goal, this alternative calls for widening Routes 82 and 85 to four 3.6 m. (12 ft.) lanes following the same alignment as the existing Route 82 and Route 85 with widening occurring approximately equally on both sides of the centerline.

In some areas, a greater portion of the widening occurs on one side relative to of the original centerline alignment to avoid properties or wetlands or to improve the horizontal curvature of the road. This occurs at the horizontal curve 450 m. (1,475 ft.) east of Route 11 on Route 82, where the curve will be flattened by realigning the roadway on the south side of Route 82. Along Route 85, between Woodlawn Drive and Forsyth Road, the road would be widened to the east to avoid properties on the west side and past Forsyth Road, the road would be widened to the west to avoid properties and wetlands on the east side of Route 85.

Two additional deviations from existing alignment occur to flatten existing horizontal curves. The first is north of Horse Pond Road, where Route 85 will be widened to the east. The second is north of Woodchuck Road, where Route 85 will be widened to the west. To avoid wetlands, the roadway will be widened to the east 200 m. (655 ft.) south of the Salem Turnpike and 100 m. (330 ft.) north of Chesterfield Road. Between 100 m. (330 ft.) north and 100 m. (330 ft.) south of the intersection with Route 161, Route 85 will be widened to the east to flatten a horizontal curve and avoid a property. In order to avoid properties on the west side of Route 85, the roadway will be widened to the east between 400 m. (1,310 ft.) north and 400 m. (1,310 ft.) south of Lakewood Drive. Finally, near Lake Konomoc, the road will be widened to the east to avoid properties on the west side.

The typical cross section for this alternative consists of two 3.6 m. (12 ft.) lanes in each direction with 2.4 m. (8 ft.) shoulders. A maximum of 2:1 (horizontal:vertical) slopes will be utilized to minimize potential safety impacts. The right-of-way will be widened in some areas to 46 m. (150 ft.) where the existing right-of-way is narrow.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies of the $W_{(4)}$ alternative is $41,000,000 (1998).

3.3.2.2 *Alternative $W_{(4)}$m (Modified Four-Lane Cross section*): This alternative is intended to fulfill the same transportation objectives as the $W_{(4)}$ alternative; however, incorporating modifications to the roadway footprint, as necessary, to avoid adversely impacting sensitive resource areas.

In order to minimize impacts to the properties and wetlands adjacent to Routes 82 and 85, this alternative calls for widening to four 3.3 m. (11 ft.) lanes with narrow shoulders. While 3.3 m. (11 ft.) lanes are the minimum acceptable under the AASHTO, this represents a deviation from the *desired* lane width of 3.6 m. (12 ft.). This reduction in width is being considered because of the sensitive areas, particularly public water supply lands, surrounding the project area. As in the $W_{(4)}$ alternative, the widening follows the same alignment as the existing Route 82 and Route 85 with equal widening occurring on both sides of the centerline, with the exception of the areas mentioned under Alternative $W_{(4)}$.

The typical cross section for this alternative consists of two 3.3 m. (11 ft.) lanes in each direction with 0.6 m. (2 ft.) shoulders. A maximum of 2:1 (horizontal:vertical) slopes will be utilized to minimize potential safety impacts. The right-of-way would be widened in some areas to 46 m. (150 ft.) where the existing right-of-way is narrow.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies of the $W_{(4)}$m alternative is $33,000,000 (1998).

3.3.2.3 *Alternative $W_{(2)}$ (Two-Lane Cross section with Improvements)*: This alternative calls for widening the lane width and shoulders of Routes 82 and 85 to conform to current design standards. The existing lane widths on Route 85 are typically 3.3 m. (11 ft.) with 0.3 - 0.9 m. (1 - 3 ft.) shoulders. Route 82 and small sections of Route 85 have been improved to two 3.6 m. (12 ft.) lanes with 2.4 m. (8 ft.) shoulders. This widening would follow the existing alignment of Routes 82 and 85, with the same deviations from the existing centerline as discussed under Alternative $W_{(4)}$.

The typical cross section for this alternative consists of one 3.6 m. (12 ft.) lane in each direction with 2.4-3.0 m. (8-10 ft.) shoulders. A maximum of 2:1 (horizontal:vertical) slopes will be utilized to minimize potential safety impacts. The right-of-way will be widened in some areas to 30 m. (100 ft.) where the existing right-of-way is narrow.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies of the $W_{(2)}$ alternative is $31,100,000 (1998).

3.3.3 TSM INITIATIVES

The TSM alternative examines operational improvements, such as intersection upgrades and signal modifications, directed toward improving safety and easing the traffic flow within the Route 82/85/11 corridor. These types of traffic operational improvements can be employed to effect moderate improvements in traffic flow at specific intersections and along arterial segments in which traffic flow is impeded by vehicle movement at signalized and/or unsignalized intersections rather than by traffic volume alone. Such improvements consist of changes in signal timing and phasing, changes in signal actuation, coordination of signals, new signalized intersections, and increased storage bay length for turning lanes. There are currently 13 signalized and 15 unsignalized intersections along Routes 82 and 85. The locations of signalized and unsignalized intersections, together with the existing LOS and delay time at each intersection, are shown in Section 4.1 on Tables 4-10 and 4-11 and on associated Figures 4-11 and 4-12.

Signal timing changes can be employed where existing signal timing and phasing is not optimized for existing traffic. For example, increased time may be needed for left turn signals to allow these vehicles to move through the intersection. This may improve the overall intersection LOS. In some cases the phasing can be changed to affect the same result. Phasing involves the allowance of several non-conflicting movements to occur within a cycle. Signal coordination can be important in optimizing traffic flow along segments that contain more than one signalized intersection. Coordination of signals may be possible when there is minimal distance between the signals and often results in better traffic flow along the main arterial.

Signals can be of several types. A fully actuated signal is one in which detectors are present at all approaches. Semi-actuated signals are signals in which detectors are present at one or more approaches but not all. For example, a collector that intersects with a main arterial only stops when a vehicle on the side street approaches the intersection. If no vehicle is present on the side street, the main arterial traffic is uninterrupted. Pre-timed signals involve set timings for the various approaches which are usually set to move flow through peak hours. Traffic calming can be achieved by employing pre-timed signals so that speeds along the main arterial are reduced. However, semi- and fully-actuated signals usually foster better overall traffic flow and improved LOS.

Another TSM strategy may be to conduct a signal warrant analysis study. For new signalized intersections, a signal warrant analysis involves the evaluation of several factors including traffic volumes on major and minor street, pedestrian volume, school crossing proximity, accident experience, peak hour delay and peak hour volume to determine whether addition of a signal could alleviate intersection problems.

Implementation of any one or a combination of these TSM strategies could be applied to existing signalized and/or unsignalized intersections along Routes 82 and 85 that are identified in Section 4.1 as having an unacceptable future (2020) LOS for the no build condition. TSM measures could be implemented either on their own or in conjunction with any of the other alternatives. For purpose of comparing potential costs and impacts of the TSM initiatives to the other alternatives under consideration, a possible scenario that includes signalization at the Route 11/Route 82 off-ramp and spot improvements along Route 82/85, is outlined in Section 4. The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies to implement the TSM initiatives is $1,700,000 (1998).

3.3.4 TDM/TRANSIT INITIATIVES

The TDM/Transit alternative addresses efficiency improvements that are directed toward making the most efficient use of the existing roadway system rather than increasing roadway capacity. Strategies such as mass transit use, spreading out peak hours, encouraging increased vehicle occupancy or ridesharing programs are considered under the TDM alternative. Success of TDM programs generally requires a change in people's behavior; consequently, incentives or disincentives are often necessary to make these shifts in behavior attractive to the commuter (USDOT, 1993). Mass transit is generally regarded as a means for relieving traffic congestion; however, transit services also benefit the segment of the population that is unable to drive or has no vehicle available.

Mass transit and ridesharing were evaluated in the previous studies to determine whether these options could provide the relief needed in the corridor. ConnDOT, SCCOG, and major employers in the southeastern Connecticut region have encouraged the use of ridesharing and mass transit, nevertheless, the availability of ridesharing and mass transit opportunities through the Route 82/85/11 corridor and throughout the region is not substantial.

3.3.4.1 *TDM/Ridesharing*: TDM includes strategies that seek to reduce peak hour vehicular travel and increase overall mobility. These measures may include: the regional ride share programs; collection of parking fees at work sites; the payment of a flexible transportation allowance in place of employer-paid parking; priority treatments for High Occupancy Vehicles (HOV's) to encourage ridesharing or transit use; increased or redesigned transit service; revised development standards for parking, building density, and on-site commercial development to foster greater utilization of transit, bicycles and walking; and the encouragement of flexible work hours and telecommuting.

For the purpose of this analysis, only one TDM strategy holds promise of meaningful benefit – Regional Rideshare. The purpose is to guide motorists toward cost efficient and environmentally friendly transportation decisions. Some programs may be administered on an employer basis, but these have been shown to be less effective than a coordinated overall regional approach. The Rideshare Company administers the statewide vanpool program, Easy Street. The Rideshare Company coordinates vanpool matching and lease administration throughout the state. Based on past regional and nationwide experience, the adoption of a high-profile TDM initiative at an individual employer can result in an increase in use of High Occupancy modes of up to 20%. Because HOV travel still represents a minority of travel in most work sites (especially for suburban and non-central business district locations), the total impact on congestion or modal split would be proportionately lower. A voluntary employer-based program implies that participation will be substantially less than 100%. Current corporate participation rates (the number of firms participating versus the total number of area businesses) are in the range of 1% of all employers and 10% of all employees.

Regional Promotional Programs for Carpool/Vanpool Participants: These TDM strategies are directed at reducing the number of vehicles that use the highways especially during peak periods. These programs may supplement broader employer-based TDM strategies that encourage ride sharing. Advantages for participants in regional rideshare programs include reduced cost of commuting such as vehicle operating costs - fuel, insurance, maintenance, and purchase - and parking costs. Program attributes may include carpool matching, guaranteed ride home and others. Strategically located commuter lots may aid in the encouragement of ridesharing. Commuter lots may also be convenient origins and destinations for peak-hour bus services.

The Route 82/85/11 corridor serves a wide array of origins and destinations principally from Rhode Island on the east to Hartford on the west and Massachusetts on the north. In most portions of the study area including New London and Waterford, the existing pattern of land use and the relative availability of parking favor the use of single-occupant vehicles (SOVs). Even workers within the areas of employment concentration utilize an SOV more commonly than any other mode. Especially for outlying employment centers served by the study corridor, the proportion of commuters using SOVs exceeds 90% according to information from the 1990 and 2000 Census Journey-to-Work data; over 80% of those commuters drive alone.

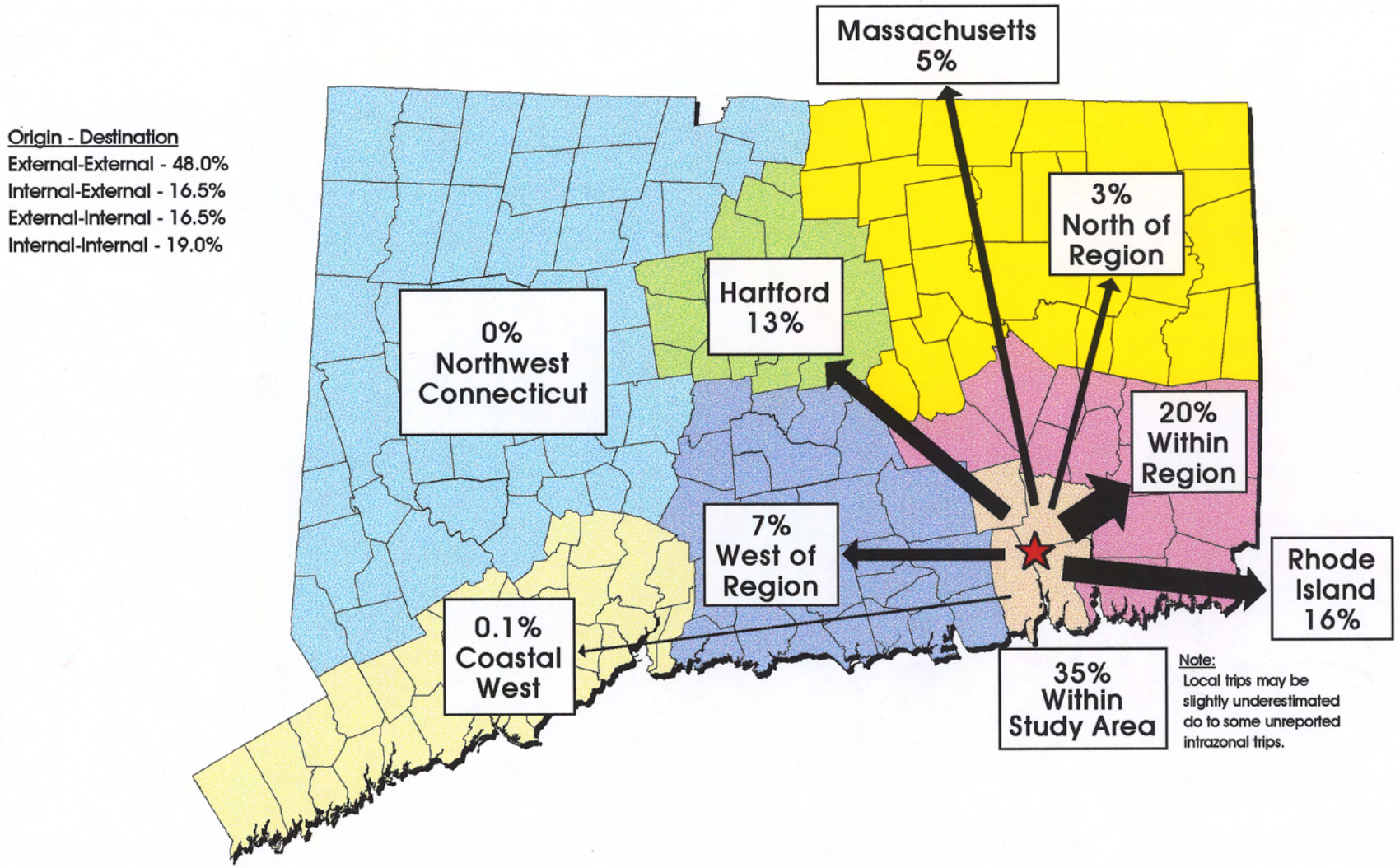
In addition to designated park and ride lots, there are locations in and near the corridor that serve as informal commuter lots. Lots currently exist in the

southern portion of the corridor near the intersection of Route 161 and I-95 in East Lyme and on Route 85 near its interchange with I-395 in Waterford. The transportation facilities map in Section 4 (Figure 4-1) shows the location of these facilities. This latter lot contains 60 spaces and it was typically half full in 1997. There is no bus service to or from this lot. In the northern portion of the corridor, a park and ride lot exists off exit 6 on Route 11 in Colchester. There are 220 spaces in this lot and use in 1997 was typically 75 cars. This lot is also the southern terminus of CT Transit's Route 14 to Hartford. To further facilitate ridesharing and express bus service, another logical location for a park and ride lot may be near the current terminus of Route 11 at Route 82 in Salem.

As noted in Figure 3-4, for either the widening or no build alternative, 48% of the vehicle trips using Route 85 have trip ends that are outside of the designated towns that make up the study area (external-external trips). Approximately, 33% have either one trip end or the other in the study area (internal-external or external-internal). Interestingly less than 19% are purely local trips with both origin and destination within the study area towns. This wide dispersion of vehicle and person trips makes regional ride share programs difficult to implement. Of the external trips ends either origin or destination, 20% can be attributed to locals within the Southeast Connecticut Region. Sixteen percent may be attributed to Rhode Island and thirteen percent to Hartford. The dispersion of the trips ends makes implementation of TDM strategies difficult at best.

3.3.4.2 *Mass Transit*: The transit alternative has been considered both with no improvements to the Route 82/85/11 corridor and with TSM improvements. The scope of the TSM improvements would not have a consequential effect on the attractiveness of transit relative to the existing conditions.

To estimate the effectiveness of the transit alternative in the Route 82/85/11 corridor, an expansion of existing regional bus service, provided by SEAT, was evaluated. SEAT does not currently provide service through the study corridor, but service has been mentioned as part of a regional transit expansion, although, to date, the plan has not been implemented. This planned expansion route is called the "Route 85/West Corridor", or "Route W" corridor.



State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82/85/11
ENVIRONMENTAL IMPACT STATEMENT (EIS)

IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD

DISTRIBUTION OF TRIP ENDS

Figure 3-4

The proposed Route W would operate between Colchester and New London via Routes 11, 82, and 85. In Colchester, the route would begin at ConnDOT's Exit 18 Park and Ride Lot, and terminate at a proposed new transportation center in New London. The route would operate through Salem, Montville, and Waterford. Major points along the route would be Salem Four Corners and the Crystal Mall. In New London, connections could be made to SEAT's local New London routes, commuter rail, Amtrak, and ferries. At the Colchester end of the route, connections could be made to CT Transit commuter service to Hartford. The Route W transit alternative would operate regular bus service on weekdays between 5:00 am and 1:00 am at 30 minute headways during peak periods (7:00 to 9:00 am and 4:00 to 6:00 pm) and 60 minute headways during the rest of the day. Route W would serve four primary travel markets:

- Local travel in the Route 85 corridor
- Travel to and from Hartford
- Local travel in New London
- Travel to and from other public transportation services in New London

To implement this expansion plan, a number of hurdles must be overcome. Most importantly, SEAT would need large increases in state funding (the capital cost of the regional expansion plan is $32,000,000 and annual operating costs would increase by $17,200,000, or 660%, from a current level of $2,600,000 to $19,800,000). Capital costs required to implement the Route W portion of the regional plan, which would operate within the study corridor, are estimated to be $1,400,000, and annual operating costs would be $700,000. To date, the state legislature has been unwilling to provide the required funding. Increases in local funding would also be needed, at least in the short-term, and an expansion of the SEAT district would require addition of six new towns.

3.3.5 NEW LOCATION - FULL BUILD ALTERNATIVES

The seven alignments evaluated under the full build expressway alternative (92PD, $E_{(4)}$, $E_{(2)}$, $F_{(4)}$, $F_{(2)}$, and $G_{(4)}$, $G_{(2)}$) are proposed as a completion of Route 11 from its current point of termination in Salem to the junction of I-95/I-395. Each alternative would follow along the same alignment through the northern and southern portions of the corridor, but follow different overland routes through the central part of the study area.

For each of the selected alternative alignments on a new location (except the 92PD), both four-lane and two-lane versions were evaluated. The rationale for this approach is to examine to what extent the project purposes and needs may be met (or not met)

utilizing the more standard four-lane expressway footprint as compared against a minimal roadway footprint (the two-lane variation) in similar alignment. This exercise is intended to reveal whether the transportation objectives would be met by such an alignment, and also whether an appreciable reduction in environmental impact could be realized by constructing a narrower alignment. Regardless of alignment or configuration (four- or two-lane), the new roadway would be constructed as a limited access facility.

Transportation-related factors for the new expressway alignments would vary between the two-lane and four-lane configurations, yet the precise path of the alignment would have little effect on issues of volume, capacity and safety. Therefore, the discussion of transportation issues in this document assumes that all of the four-lane alternatives and all of the two-lane alternatives would perform similarly.

By contrast, physical location and specific roadway alignment are critical in the evaluation of environmental factors. Evaluation of the two "extremes" within a given alignment provides a clearer indication of which resource impacts potentially can or can not be avoided in final design, then ultimately, of the impact reduction that may be able to be realized through modification of the roadway geometry. To provide a balanced analysis, both "extremes" (typical sections of 91 m. (300 ft.) for the four-lane and 45 m. (150 ft.) for the two-lane configurations, except in areas of deep cuts and fills and at intersections and transition areas) were considered for all expressway alternatives.

Conceptual plans for all of the full build alternatives on new alignment include a full interchange at Route 161 in Montville. At the proposed southern terminus of the full build alternatives, the existing interchange at I-95 and I-395 would be reconstructed as depicted in Figures 3-5 and 3-6. Sections of Oil Mill Road and Parkway North would be relocated and reconstructed.

The structures associated with the connection between Route 11 and I-95 would include a flyover ramp from Route 11 southbound to I-95 northbound, three structures to carry a ramp from I-95 southbound to Route 11 northbound traversing Oil Mill Road and both the northbound and southbound lanes of I-395, and a ramp and a structure over Oil Mill Brook to connect the I-395 northbound ramp to Route 11 northbound.

In addition to the interchange modifications and turning movements outlined above, the conceptual engineering of the four-lane full build expressway alternatives (92PD, $E_{(4)}$, $F_{(4)}$, and $G_{(4)}$) would include the relocation and reconstruction of approximately 5.14 km. (3.19 mi.) of I-95 from approximately 1.6 km. (1 mi.) south of Route 161 to approximately 1.6 km. (1 mi.) north of the interchange with I-395. Impacts associated with the four-lane alternatives include impacts resulting from the relocation of I-95;

SCALE IN FEET

1200 600 0 1200

SCALE IN METERS

360 240 120 0 360

ROUTE 11 S.B.

ROUTE 11 N.B.

I-395 N.B.

I-395 N.B.

CONNECTICUT COORDINATE GRID

RAMP
I-395 S.B. TO I-95 S.B.

RAMP
I-95 S.B. TO RTE. 11 N.B.

RAMP
I-395 N.B. TO RTE. 11 N.B.

I-95 S.B.

I-95 N.B.

RAMP
RTE. 11 S.B. TO I-95 S.B.

RAMP
RTE. 11 S.B. TO I-95 N.B.

RAMP
I-95 N.B. TO I-395 N.B.

RELOCATED I-95

I-95 S.B.

I-95 N.B.

LEGEND

ROADWAY LEGEND

- EDGE OF PAVEMENT
- PROPOSED R.O.W. LINE
- APPROXIMATE SLOPE LIMITS
- EXISTING R.O.W. / PROPERTY LINE

State of Connecticut Department of Transportation
Federal Highway Administration
ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
ALTERNATIVES 1992 PD, E(4), F(4) & G(4)
ROUTE 11 /I-95 /I-395 INTERCHANGE

SCALE: 1" = 600'

Figure 3-5

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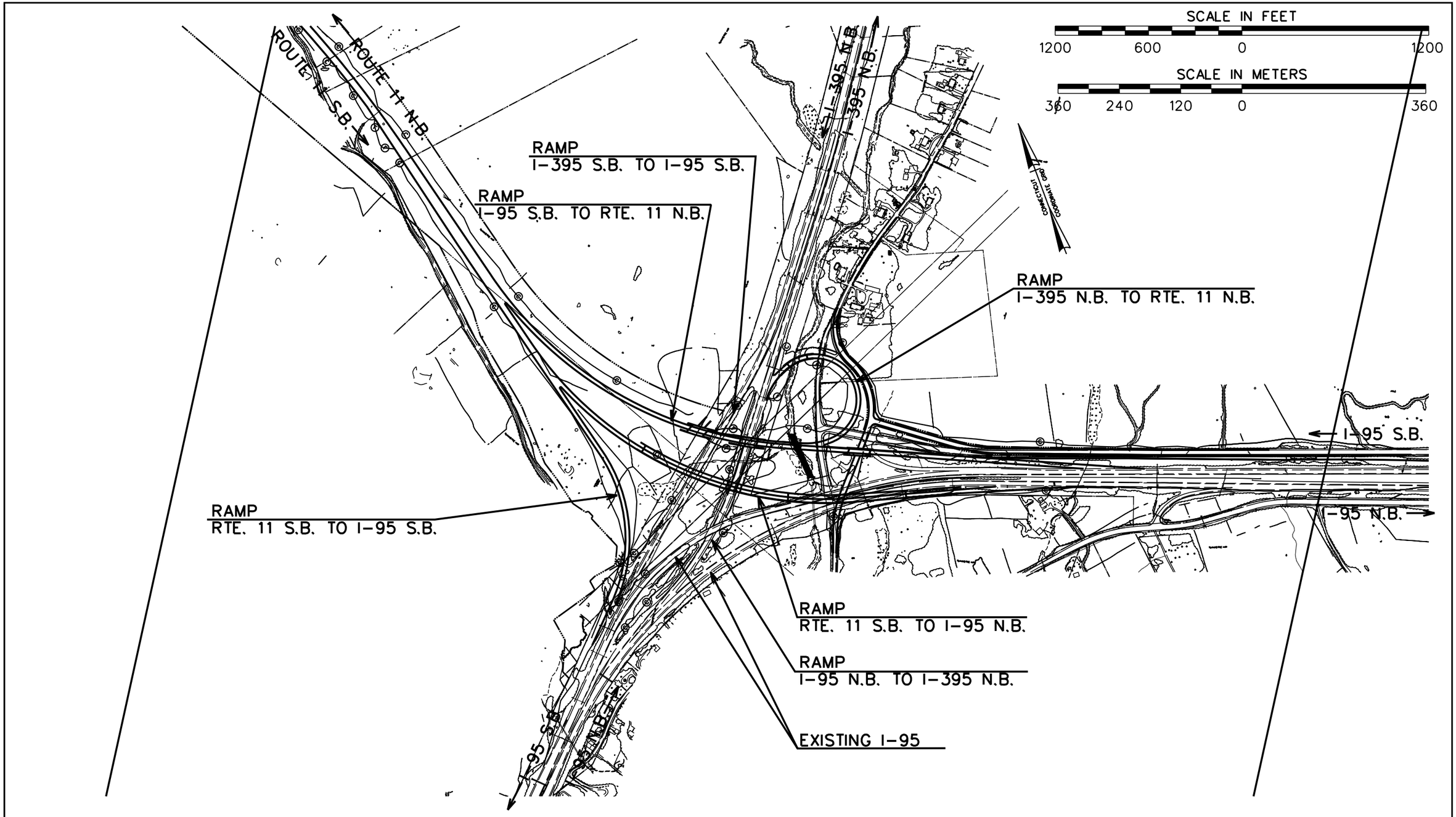


LEGEND

ROADWAY LEGEND

- EDGE OF PAVEMENT
- PROPOSED R.O.W. LINE
- APPROXIMATE SLOPE LIMITS
- EXISTING R.O.W. / PROPERTY LINE

State of Connecticut Department of Transportation
Federal Highway Administration
ROUTE 82 /85 /11 CORRIDOR
ENVIRONMETAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
ALTERNATIVE E(2), F(2) & G(2)
ROUTE 11 /I-95 /I-395 INTERCHANGE

SCALE: 1" = 600'

Figure 3-6

...\H\UST\RT11\E(2)\689E2401.DGN 8/30/2006 9:20:04 AM

these are impacts that are not presumed for the two-lane scenarios. The improvements include pavement reconstruction and widening, relocation of I-95 in the vicinity of the I-395 interchange, reconfiguration of the ramps associated with I-95/I-395 for all approaches and exits, construction of new ramps at Route 161, and elimination of ramps to and from Boston Post Road. The existing I-395 off-ramp located on the left side of existing I-95 northbound lanes would be reconfigured to create an off-ramp located on the right side of the relocated I-95 northbound lanes.

The I-95 improvements for the four-lane expressway alternatives would include construction of new structures to carry I-95 over Route 161 and to carry Boston Post Road over I-95. New structures would also be placed over the Pattagansett River and Latimer Brook. In addition, a retaining wall would be utilized in the vicinity of Latimer Brook and I-95 northbound to minimize wetland impacts.

The typical section of the reconstructed portion of I-95 would consist of three 3.6 m. (12 ft.) lanes in each direction and 3.6 m. (12 ft.) inside and outside shoulders separated by a precast concrete barrier curb (PCBC), commonly referred to as a "Jersey" barrier, in the median. The PCBC height and width would be 1145 millimeters (mm.) (45 in.) and 815 mm. (32 in.), respectively.

3.3.5.1 *92PD Alternative*: This alternative represents a refinement of the C/D alternative introduced in prior studies (Sections 3.1.1.4 and 3.1.3). Public input, social, economic, historic and environmental concerns were the basis for the development of this alternative. The alignment would extend the existing Route 11 expressway from its existing terminus at Route 82 in Salem through Montville, East Lyme and Waterford and end at the junction of I-95 and I-395 in the Town of Waterford for a total length of 13.72 km. (8.52 mi.) (Figure 3-2). Approximately 5.14 km. (3.19 mi.) of I-95 would also be reconstructed to provide an adequate interchange with the new expressway and I-95 and I-395.

The alignment begins in the Town of Salem at the existing terminus of Route 11 approximately 366 m. (1200 ft.) north of Route 82 and advances southeast along the previously excavated section of Route 11 bridging the narrowest portion of Shingle Mill Brook and its surrounding wetlands. Upon crossing Shingle Mill Brook, the alignment proceeds in a southeasterly direction between Beckwith Hill Drive and Fawn Run into the Town of Montville approximately 244 m. (800 ft.) away from each of these subdivisions. After crossing Salem Turnpike approximately 76 m. (250 ft.) east of the intersection of Salem Turnpike and Holmes Road, the alignment progresses in a more southerly direction through the Daisy Hill subdivision

(which had not yet been developed at the time that the 92PD was being designed) and over Grassy Hill Road approximately 427 m. (1,400 ft.) east of Pruett Place. Just south of the end of Daisy Hill Drive, the expressway would then cross under Northeast Utilities High Voltage Transmission Towers (Connecticut Light & Power). Latimer Brook is then bridged approximately 122 m. (400 ft.) south of Grassy Hill Road. The alignment then crosses Route 161 in the Town of Montville approximately 183 m. (600 ft.) east of the intersection of Route 161 and Silver Falls Road with a full interchange and proceeds almost due south into Waterford. Approximately 2.4 km. (1.5 mi.) south of the interchange at Route 161, the alignment bridges a wetland system and crosses into the Town of East Lyme. The expressway then continues southeast along the East Lyme/Waterford town line to the junction of I-95 and I-395.

A number of structures are incorporated as part of the conceptual engineering plan in order to minimize impacts to wetlands and watercourses in the corridor. Bridges would be required over wetlands north of Shingle Mill Brook, Shingle Mill Brook, Latimer Brook, and wetlands in the vicinity of Pember Road in Waterford. In addition, structures would also be required to carry the new expressway over local and state roads. Road crossings would be necessary at Salem Turnpike, Grassy Hill Road, Route 161 and in the vicinity of the terminus of the new expressway at I-95 and I-395. It is anticipated that at a minimum, some construction and rehabilitation would be required on the existing structures of Route 11 over Route 82.

The typical cross section for the 92PD alternative consists of two 3.6 m. (12 ft.) lanes in each direction, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders with a 20 m. (66 ft.) median width between the edges of pavement (Figure 3-3a). A 20 m. (66 ft.) median is considered the minimum width required, according to current safety standards. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. The highway would be limited access and grade separated from local roads. A maximum of 2:1 (horizontal:vertical) fill slope with metal beam rail (MBR) would be utilized to minimize potential safety impacts.

The current estimated right-of-way and construction costs, including preliminary engineering and contingencies, for 92PD is $255,600,000 (1998).

3.3.5.2 *$E_{(4)}$ Alternative*: This alternative was developed as a modification of the 92PD alternative. The objective of Alternative $E_{(4)}$ is to substantially follow the 92PD alignment, but to further minimize property and natural resource impacts where feasible. Alternative $E_{(4)}$ would have a total length of 13.80

km. (8.57 mi.) and would include the reconstruction of approximately 5.14 km. (3.19 mi.) of I-95, as for the 92PD alternative.

Alternative $E_{(4)}$ follows the same alignment as the 92PD from the existing terminus of Route 11 to a point approximately 305 m. (1000 ft.) north of Salem Turnpike. $E_{(4)}$ then progresses in a more southerly direction crossing Salem Turnpike 61 m. (200 ft.) east of the intersection of Salem Turnpike and Holmes Road in the Town of Montville. The alignment continues between Daisy Hill Drive and Birch Terrace and then proceeds southeast and rejoins the 92PD alternative approximately 76 m. (250 ft.) north of the structure over Grassy Hill Road. Alternative $E_{(4)}$ then follows the same alignment as the 92PD from the above mentioned point south to the proposed terminus of the expressway. The same improvements to I-95 and I-395 included in the 92PD alternative are part of $E_{(4)}$ as well.

This alignment was developed in an attempt to minimize impacts to recently-developed areas (post-1992), notably, the Daisy Hill Drive subdivision and the wetland area west and northwest of Daisy Hill. In addition, the possibility of shifting the 92PD alignment in the vicinity of Route 161 and Latimer Brook was studied under Alternative $E_{(4)}$ to further reduce potential wetland impacts. However, it was determined that the location of the 92PD alignment could not be shifted further west due to the proximity of Latimer Brook and surrounding wetlands. It was further determined that the $E_{(4)}$ alignment could not be shifted east. A larger area of wetland is located just east of the 92PD alignment. In addition, shifting the alignment east would result in a sharper skew angle between the expressway and Route 161 which would require a ramp configuration that would impose additional wetland and right-of-way impacts.

A number of structures are incorporated as part of the conceptual engineering plans to minimize wetland impacts associated with Alternative $E_{(4)}$. Structures would be necessary to cross wetlands north of Shingle Mill Brook, Shingle Mill Brook, Latimer Brook, and wetlands in the vicinity of Pember Road. In addition, structures are also required to carry the new expressway over local and state roads including Salem Turnpike, Grassy Hill Road, Route 161, and I-95 and I-395 in the vicinity of the terminus of the new expressway.

The typical cross section for Alternative $E_{(4)}$ is the same as utilized for the 92PD alignment, consisting of two 3.6 m. (12 ft.) lanes in each direction, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders with a 20 m. (66 ft.) median width between the edges of pavement. A 20 m. (66 ft.) median is considered the minimum width required, according to current safety standards. In addition, a 3.6 m. (12 ft.) climbing lane is used where

required. The highway would be a limited access roadway and grade separated from local roads. A maximum of 2:1 (horizontal:vertical) fill slope with MBR would be used to minimize safety impacts.

Estimated right-of-way acquisition, construction, preliminary engineering and contingency costs associated with Alternative $E_{(4)}$ are $255,200,000 (1998).

3.3.5.3 *$E_{(2)}$ Alternative*: Alternative $E_{(2)}$ is a variation of Alternative $E_{(4)}$ which would be constructed as a limited access, two-lane roadway, utilizing the $E_{(4)}$ southbound lanes, as described above. This alternative would meet the existing I-95 near the junction of I-95 and I-395. Ramps would be provided from Route 11 southbound to I-95 northbound, I-95 southbound to Route 11 northbound, and from I-95/I-395 northbound to Route 11 northbound. Alternative $E_{(2)}$ would have a total length of 13.80 km. (8.57 mi.).

The typical cross section for this alternative consists of one 3.6 m. (12 ft.) lane in each direction with PCBC, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders. The PCBC height and width would be 1,145 mm. (45 in.) and 815 mm. (32 in.), respectively. In addition, a 3.6 m. (12 ft.) climbing lane would be used where required. A maximum of 2:1 (horizontal:vertical) fill slope with MBR would be utilized to minimize potential safety impacts.

The estimated cost for right-of-way acquisition, construction, preliminary engineering and contingencies for Alternative $E_{(2)}$ is $154,700,000 (1998).

3.3.5.4 *$F_{(4)}$ Alternative*: Alternative $F_{(4)}$ was suggested by federal regulatory agency representatives (EPA, and FWS) as an alternative that may have the potential to reduce environmental impacts, as compared with the 92PD alignment, by shifting the alignment to the west by approximately 900 m. (3,000 ft.). The total length of Alternative F is 13.73 km. (8.53 mi.), and the reconstruction of approximately 5.14 km. (3.19 mi.) of I-95 described in the previous four-lane expressway alternatives is also included in $F_{(4)}$.

Alternative $F_{(4)}$ follows the same alignment as the 92PD from the existing terminus of Route 11. Just north of Fawn Run, the alignment moves in a southerly direction through the end of Fawn Run, and over Salem Turnpike approximately 550 m. (1,800 ft.) east of the intersection of Fawn Run and Salem Turnpike. The alignment continues south through the Town of East Lyme approximately 400 m. (1,300 ft.) west of the East Lyme/Montville town line, avoiding wetlands and neighboring subdivisions. Approximately 335 m. (1,100 ft.) north of the intersection of Grassy Hill Road and Walnut Hill, the expressway would cross over Grassy Hill Road.

Advancing in a southeasterly direction, Alternative $F_{(4)}$ would cross over Route 161 with a full interchange located approximately 91 m. (300 ft.) north of the existing intersection of Route 161 and Walnut Hill Road. Walnut Hill Road would be relocated approximately 61 m. (200 ft.) to the south to accommodate the location of the southbound off-ramp. The $F_{(4)}$ alignment then continues in a southeasterly direction and rejoins the 92PD alignment approximately 2,000 m. (6,600 ft.) south of the Montville/Waterford town line. Alternative $F_{(4)}$ follows the same alignment as the 92PD from this point south to the proposed terminus of the expressway. The same improvements to I-95 and I-395 are included in Alternative $F_{(4)}$ as well.

To minimize wetland and watercourse impacts, a number of structures are incorporated as part of this conceptual engineering plan. Structures required for the 92PD and E alignments to cross wetlands north of Shingle Mill Brook, Shingle Mill Brook, Latimer Brook and wetlands in the vicinity of Pember Road would also be necessary for Alternative $F_{(4)}$. In addition, structures are also required to carry the new expressway over local and state roads including Salem Turnpike, Holmes Road, Grassy Hill Road, Route 161, and I-95 and I-395 in the vicinity of the terminus of the new expressway.

The typical cross section for Alternative $F_{(4)}$ consists of two 3.6 m. (12 ft.) lanes in each direction, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders with a 20 m. (66 ft.) median width between the edges of pavement. A 20 m. (66 ft.) median is considered the minimum width required, according to current safety standards. The right-of-way would generally be 91 m. (300 ft.) along the alignment except in areas that require significant excavation due to severe terrain. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. The highway would be limited access and grade separated from local roads. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is utilized to minimize potential safety impacts.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies for Alternative $F_{(4)}$ is $329,700,000 (1998).

3.3.5.5 *$F_{(2)}$ Alternative*: Alternative $F_{(2)}$ is a variation of Alternative $F_{(4)}$. It would be a limited access, two-lane roadway that follows the alignment of the northbound direction of $F_{(4)}$ and would have a length of 13.73 km. (8.53 mi.). In the vicinity of the junction of I-95 and 395, this alternative would meet the existing location of I-95. Ramps would be provided from Route

11 southbound to I-95 northbound, I-95 southbound to Route 11 northbound, and from I-95/I-395 northbound to Route 11 northbound.

The typical cross section for the alternative consists of two 3.6 m. (12 ft.) lanes, PCBC, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. A maximum of 2:1 (horizontal:vertical) fill slope with MBR would be utilized to minimize potential safety impacts.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies for Alternative $F_{(2)}$ is $213,100,000 (1998).

3.3.5.6 *$G_{(4)}$ Alternative*: Like Alternative $F_{(4)}$, Alternative $G_{(4)}$ was also suggested by the federal regulatory agency representatives (EPA and FWS) as an alternative that may have the potential to reduce some environmental impacts, as compared against the 92PD alternative. This would be accomplished by shifting the 92PD alignment to the west by approximately 900 m. (3000 ft.). The total length of the $G_{(4)}$ alternative is 13.77 km. (8.55 mi.), and the reconstruction of approximately 5.14 km. (3.19 mi.) of I-95 described in the previous four-lane, full build expressway alternatives is also included in $G_{(4)}$.

Alternative $G_{(4)}$ follows the same alignment as the 92PD from the existing terminus of Route 11 before branching to the south in the same manner as Alternative $F_{(4)}$. Just north of Fawn Run, the $G_{(4)}$ alignment moves in a southerly direction through the end of Fawn Run, and over Salem Turnpike approximately 550 m. (1800 ft.) east of the intersection of Fawn Run and Salem Turnpike. In the vicinity of the Salem/East Lyme town line, approximately 580 m. (1900 ft.) north of Holmes Road, Alternative $G_{(4)}$ travels southeast between existing residential dwellings and east of a wetland system. Approximately 122 m. (400 ft.) north of Grassy Hill Road, the expressway would proceed south over Grassy Hill Road 274 m. (900 ft.) west of the intersection of Grassy Hill Road and Pruett Place. Continuing in a southerly direction, about 274 m. (900 ft.) west of Cardinal Road the $G_{(4)}$ alignment then crosses Route 161 with a full interchange approximately 183 m. (600 ft.) west of the intersection of Route 161 and Walnut Hill Road. Walnut Hill Road would require relocation 61 m. (200 ft.) south of its existing location in this vicinity as well. South of the Route 161 crossing, $G_{(4)}$ rejoins the $F_{(4)}$ alignment and follows the same path until joining the alignment of the 92PD alignment where it continues south to the terminus of Route 11.

A number of structures are incorporated as part of this conceptual engineering plan to minimize impacts to wetlands and watercourses as well.

Structures are planned to cross wetlands north of Shingle Mill Brook, Shingle Mill Brook, Latimer Brook, and wetlands in the vicinity of Pember Road. In addition, structures are also necessary to carry the new expressway over local and state roads including Salem Turnpike, Holmes Road, Grassy Hill Road, Route 161 and I-95 and I-395 in the vicinity of the terminus of the new expressway.

The typical cross section for Alternative $G_{(4)}$ consists of two 3.6 m. (12 ft.) lanes in each direction, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders with a 20 m. (66 ft.) median width between the edges of pavement. A 20 m. (66 ft.) median is considered the minimum width required, according to current safety standards. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. The highway would be limited access and grade separated from local roads. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is utilized to minimize potential safety impacts.

The estimated cost for right-of-way acquisition, construction, preliminary engineering and contingencies of Alternative $G_{(4)}$ is $344,800,000 (1998).

3.3.5.7 *$G_{(2)}$ Alternative*: Alternative $G_{(2)}$ is a variation of $G_{(4)}$. It would be a limited access two-lane roadway following the alignment of the northbound portion of $G_{(4)}$. The total length of the $G_{(2)}$ alternative is also 13.77 km. (8.55 mi.). Similar to the other two-lane expressway alternatives, Alternative $G_{(2)}$ would meet the existing location of I-95 in the vicinity of the junction of I-95 and I-395. Ramps would be provided from Route 11 southbound to I-95 northbound, I-95 southbound to Route 11 northbound, and from I-95/I-395 northbound to Route 11 northbound.

The typical cross section for this alternative consists of two 3.6 m. (12 ft.) lanes, PCBC, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is utilized to minimize potential safety impacts.

The estimated cost for right-of-way acquisition, construction, preliminary engineering and contingencies of Alternative $G_{(2)}$ is $224,600,000 (1998).

3.3.6 NEW LOCATION - PARTIAL BUILD ALTERNATIVES

The alignments that constitute the two- and for-lane partial build alternatives, $H_{(4)}$ and $H_{(2)}$, were developed at the request of the federal resource agencies in an effort to further reduce impacts to wetlands and other resources. The $H_{(4)}$ and $H_{(2)}$ alternatives

include a limited access expressway segment as well as a segment that would be upgraded in the manner described for the $W_{(4)}$ and $W_{(2)}$ widening options (Section 3.3.2). A four-lane widening would accompany the four-lane limited access roadway alternative, and the two-lane widening scenario would be included if a two-lane limited access roadway is the selected alternative.

3.3.6.1 *$H_{(4)}$ Alternative*: Alternative $H_{(4)}$ was developed through coordination with the federal regulatory agencies as an option to minimize environmental impacts by shifting the location of the 92PD alignment to the west by approximately 900 m. (3000 ft.) in the vicinity of Salem Turnpike and then proceed east towards Route 85. $H_{(4)}$ would then intersect with Route 85 south of the intersection of Route 85 and Route 161; this would be the terminus of the new segment of the expressway. From this point south to the junction of I-395 and Route 85, the Route 85 roadway would be a four-lane, undivided, principal arterial, widened and/or upgraded, as appropriate. Alternative $H_{(4)}$ would have a total length of 13.23 km. (8.22 mi.) including 8.39 km. (5.21 mi.) of expressway on a new location and 4.85 km. (3.01 mi.) of widening along Route 85.

Alternative $H_{(4)}$ would extend the existing Route 11 expressway from its existing terminus and generally follow the alignment of Alternatives $F_{(4)}$ and $G_{(4)}$ to a point just north of Holmes Road. The $H_{(4)}$ alignment would then move east over the East Lyme/ Montville town line and rejoin the 92PD alignment north of Grassy Hill Road. Proceeding in a southeasterly direction over Grassy Hill Road, $H_{(4)}$ would then cross over Route 161 approximately 427 m. (1,400 ft.) west of the intersection of Route 85 and Route 161 and continue east toward Route 85. Just west of Route 85 and approximately 122 m. (400 ft.) north of Turner Road, the expressway would terminate at Route 85 with an at-grade intersection. Butlertown Road would be relocated approximately 91 m. (300 ft.) to the west along Rote 161. The alternative would then proceed south generally along the existing location of Route 85 as a four-lane, undivided, principal arterial to the junction of Route 85 and I-395.

This conceptual engineering plan incorporates a number of structures to minimize wetland and watercourse impacts. They include structures over wetlands north of Shingle Mill Brook, Shingle Mill Brook, Latimer Brook, and wetlands in the vicinity of Pember Road. In addition, structures are also required to carry the new expressway over local and state roads including Route 82, Salem Turnpike, Grassy Hill Road, and Route 161. Like the three widening alternative described, plans include construction of a closed drainage system and spill containment equipment near the reservoirs and public water supply watershed lands.

The typical cross section for the limited access expressway segment of Alternative $H_{(4)}$ consists of two 3.6 m. (12 ft.) lanes in each direction, 1.2 m. (4 ft.) inside shoulders and 3 m. (10 ft.) outside shoulders with a 20 m. (66 ft.) median width between the edges of pavement. A 20 m. (66 ft.) median is considered the minimum width required, according to current safety standards. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. The right-of-way width would generally be 91 m. (300 ft.) along the alignment except in areas that require significant excavation due to severe terrain. The highway would be limited access and grade separated from local roads. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is utilized to minimize any potential safety impacts.

The typical cross section for the four-lane, undivided, principal arterial segment of Alternative $H_{(4)}$ along Route 85 consists of four 3.6 m. (12 ft.) lanes and 2.4 m. (8 ft.) paved shoulders. The right-of-way width would generally be 46 m. (150 ft.) along this portion of the alignment except in areas that require significant excavation due to severe terrain. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is also utilized to minimize potential safety impacts.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies of Alternative $H_{(4)}$ is $113,600,000 (1998).

3.3.6.2 *$H_{(2)}$ Alternative*: Alternative $H_{(2)}$ is a variation of Alternative $H_{(4)}$. The expressway portion of this alignment would consist of a limited access, two-lane roadway that follows the alignment of the northbound portion of $H_{(4)}$. Alternative $H_{(2)}$ would then proceed south along the existing location of Route 85 as a four-lane, undivided, principal arterial to the junction of Route 85 and I-395. Alternative $H_{(2)}$ would have a total length of 13.23 km. (8.22 mi.) including 8.39 km. (5.21 mi.) of new expressway and 4.85 km. (3.01 mi.) of widening along Route 85.

The typical cross section for the expressway consists of two 3.6 m. (12 ft.) lanes, PCBC, 1.2 m. (4 ft.) inside shoulders and 2.4 m. (8 ft.) outside shoulders. In addition, a 3.6 m. (12 ft.) climbing lane is used where required. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is utilized to minimize potential impacts. The typical cross section for the four-lane, undivided, principal arterial segment of Alternative $H_{(2)}$ along Route 85 would also consist of four 3.6 m. (12 ft.) lanes and 2.4 m. (8 ft.) paved shoulders. A maximum of 2:1 (horizontal:vertical) fill slope with MBR is also utilized on both sections of Alternative $H_{(2)}$ to minimize potential safety impacts.

The estimated cost of right-of-way acquisition, construction, preliminary engineering and contingencies of Alternative $H_{(2)}$ is $81,900,000 (1998).

3.3.7 NEW LOCATION - INNOVATIVE DESIGN ALTERNATIVE

Several AC members and the general public have suggested the development of an innovative roadway concept that would be located on a new location as an extension of Route 11 from Salem to Waterford. The concept would have lower design speeds than a limited access highway. The concept could be designed as an arterial roadway; however, land access would be controlled to preserve open space and to eliminate conflicts between through trips and local trips. This roadway concept would have a narrower cross section than a limited access highway and, if possible, have greater horizontal and vertical curvature to avoid impacts to natural features and private properties. For safety reasons, an alternative concept of this type would likely be designed and constructed as a barrier separated roadway.

The reduced cross section or "footprint" of an arterial roadway as compared with a limited access highway would be the dominant factor in reducing impacts. The typical cross section for the four-lane expressway is 41 m. (134 ft.); the cross section for a typical four-lane arterial is 20 m. (64 ft.), excluding side slopes. Given the presence of numerous unavoidable wetland systems in the Route 82/85/11 corridor, this reduced "footprint" could translate to as much as a 25 to 30 percent reduction in impacts to wetlands for these comparable four-lane options. The two-lane expressway alternative illustrates this reduced impact effect as the pavement cross section for this latter option is 16.7 m. (55 ft.) and impacts are substantially reduced as compared with the four-lane expressway option for each of the alternatives on new location (Table 5-26).

The ability to alter the horizontal and vertical curvature for a reduced design speed option may not substantially reduce impacts to the natural and built environment. The alignments on new location have already been configured to avoid impacts as much as possible. Given the configuration of most wetland systems, rough terrain and developed properties, any additional alteration of these alignments would only result in minimal changes to impacts without jeopardizing roadway safety.

This reduced speed design concept has many concerns. Route 11, as a limited access highway, has a design speed of 110 kph (70 mph). Southbound, the existing expressway would transition to an arterial with much less width and lower design speed. This could pose serious safety concerns. How would the traveling public change their driving? Without a traffic signal or exit ramp to signify a change in roadway characteristics, would motorists tend to continue to travel at high rates of speed; greater than the innovative arterial could safely handle? Would the same difficulty of transition occur at the southern end of the project where motorists may

tend to continue at high rates of speed from I-95 ramps to a limited access arterial connection to a limited access highway?

Following publication of the DEIS and receipt of comments from the public and resource agencies, it was deemed prudent to pursue this innovative concept further. The subsequent analysis of this concept is discussed in Section 3.4.

3.3.8 ESTIMATED CONSTRUCTION SCHEDULE

The following provides a generalized estimate of the time required to undertake permitting, preliminary design, right-of-way acquisition, final design and construction for the various alternatives.

Route 82/85 Widening (Minimum Project/Two-Lane): Following completion of the FEIS and issuance of a Record of Decision (ROD), roadway design and right-of-way acquisition could be expected to take two years. Much of this time would be spent in relocating property owners along the right-of-way. Construction could be expected to take about another two years (assuming that the entire project is undertaken as one project) for a total of four years.

Route 82/85 Widening (Full Four-Lane): As with the two-lane widening, design and right-of-way acquisition would take approximately two years following completion of the FEIS and issuance of a ROD. Anticipated construction time would be about four years for a total of six years.

New Location: It is anticipated that a project of this size would be split into three separate projects to be undertaken concurrently; this strategy would allow design and right-of-way acquisition to be accomplished within a four-year time frame from issuance of a ROD. Construction of the three roadway segments would likely be staggered to minimize construction impacts and take place over a four-year period to coincide with funding programming. A total of eight years could be expected until construction is completed.

3.3.9 DEIS ALTERNATIVES' ABILITY TO MEET PROJECT PURPOSES AND NEEDS

All alternatives were assessed as to whether they met the purposes and needs discussed in Section 2. Due to the size of the corridor, the broad range of alternatives being investigated and the complexity of resources and issues being considered, all alternatives would partially meet the purposes and needs identified. After the DEIS/MIS had undergone extensive public distribution and review, and formal public input was received, more definitive analysis could be made as to which of the alternatives under consideration best meets the purposes and needs identified.

3.3.9.1 *No Build Alternative*: The no build alternative would not meet the **Highway System Linkage** purpose. It would not meet the **Safety and Accident Reduction** purpose, as it would not be likely to reduce accident occurrence nor accident rates. It would not reduce the hazards present along the roadway. The no build alternative would not meet the **Function and Use** purpose due to not separating through and local traffic and not reducing roadway conflicts. The no build alternative would not meet the **Roadway Capacity** purpose. The alternative would not meet the future traffic demand, and low levels of service (less than LOS D) would continue. This alternative partially meets the **Compatibility with Plans of Development** and **Regional Growth and Development** purposes. Some towns have stated that the no build alternative would not meet local needs, and the alternative does not appear consistent with local plans of development. This alternative is consistent with some portions of the Policies Plan. The no build alternative would leave the character of Route 82/85 as is physically, and the undeveloped lands to the west of Route 85 (where the build alternatives are being studied) would sustain their natural character. Traffic volumes would, however, increase in the study area, over time adversely affecting the community character.

3.3.9.2 *Route 82 and Route 85 Widening Alternatives*: The widening alternatives do not meet the **Highway System Linkage** purpose. They would meet the **Safety and Accident Reduction** purpose more so than the no build alternative. However, the four lane widening alternatives would likely have a higher accident rate than the no build, although these alternatives, due to the improved physical layout through a widening, would substantively reduce the hazards along the road. The two lane widening alternative would likely result in a negligible change in safety and traffic volume from the no build. The widening alternatives would partially meet the **Function and Use** purpose. The widening alternatives would not separate through and local traffic; the conflicts, however, would be reduced through fewer curb cuts due to the removal of structures along Routes 82/85 and improved access control over the no build. Additional traffic signals may reduce the conflicts over the no build. Conflict reduction with $W_{(2)}$ would be minimal, through fewer curb cuts. The widening alternatives would partially meet the **Roadway Capacity** purpose. The four lane widening alternatives would meet the future demand on Route 82 through the study area, Route 85 from north of Salem Four Corners to I-395, and Route 161 between Walnut Hill Road and Route 85. In those areas, however, certain intersections would not meet demand. The $W_{(2)}$ alternative would meet less of the study area future demand than the four lane widenings (on Route 82 through the study area, Route 85 north of Salem Four Corners and Route 161 between Walnut Hill Road and Route 85), and certain intersections would not meet demand in

the study area. The widening alternatives would partially meet the **Compatibility with Plans of Development** purpose. Some towns have stated these alternatives would not meet local needs, and the widening alternatives are do not appear consistent with local plans of development. The widening alternatives are not in the TIP at this time. These alternatives are, however, consistent with some portions of the Policies Plan. The widening alternatives would partially meet the **Regional Growth and Development** purpose. With the four lane widening alternatives, Routes 82/85 would physically look very different and its character would not be sustained. The undeveloped lands to the west of Route 85 (where the build alternatives are being studied) would, however, sustain their character. Traffic volumes would increase in the study area, adversely affecting community character over time. The $W_{(2)}$ alternative would physically look somewhat different, though not to the degree of the four lane widening alternatives, and its character would be partially altered, though not substantially. The ability of a widening alternative to meet the purposes and needs was explored further in a special study of a community-sensitive upgrade of Routes 82 and 85. This study is discussed in Section 3.4.

3.3.9.3 *TSM and TDM/Transit Alternative*: The TSM and TDM/Transit alternatives do not meet the **Highway System Linkage** purpose. The TSM and TDM/Transit alternative would likely result in a negligible change in **Safety and Accident Reduction** from the no build, and there would be no reduction in roadside hazards. The TDM/Transit alternative would not meet the F**unction and Use** purpose, and the TSM alternative would partially meet it. Neither would separate through and local traffic. The TDM/Transit alternative would not result in any physical changes resulting in conflict reduction. For the TSM alternative, the conflicts would, however, be minimally diminished through a reduction in curb cuts due to the removal of structures along Routes 82/85 and improved access control over the no build. Additional traffic signals may reduce the conflicts over the no build. The TSM and TDM/Transit alternatives would partially meet the **Roadway Capacity** purpose. They would meet the future demand on Route 82 through the study area, Route 85 north of Salem Four Corners and Route 161 between Walnut Hill Road and Route 85. Certain intersections would not, however, meet demand elsewhere in the study area. The TSM and TDM/Transit alternatives would partially meet the **Compatibility with Plans of Development** purpose. The TSM and TDM/Transit alternatives do not appear to be consistent with local plans of development, and the TSM and TDM/Transit alternatives are not in the TIP at this time. These alternatives are, however, consistent with some portions of the Policies Plan. The TSM and TDM/Transit alternatives would partially meet the **Regional Growth and Development** purpose. For both of these, the undeveloped lands to the west of Route 85 (where the build alternatives are

being studied) and the study area roadways would sustain their character and look. (The TSM alternative would involve minor physical changes, but these may still affect community character in the area of changes.) Traffic volumes would increase throughout the study area, over time adversely affecting the community character for the area.

3.3.9.4 *New Location Full Build Alternatives*: The full build alternatives do meet the **Highway System Linkage** purpose. The full build alternatives would partially meet the **Safety and Accident Reduction** purpose. More than other alternatives, the full build alternatives would likely improve safety on Routes 82/85, primarily due to reductions in traffic volumes. Safety would not likely be improved in the Routes 1/161/I-95 area, as volumes will not be reduced there with these alternatives. These alternatives will not remove any roadside hazards (that exist with the no build alternative) along Routes 82 and 85. The full build alternatives would partially meet the **Function and Use** purpose. The full build alternatives would do the best job of separating through and local traffic. For all of these, however, the physical situation on Routes 82/85 and other roads in the study area would not be modified; therefore, the conflicts would not be reduced over the no build alternative. The traffic mix on existing routes, however, would be more locally oriented, and would be more compatible with the land access function of the roads. The full build alternatives would partially meet the **Roadway Capacity** purpose, by meeting future demand for most, though not all, of Routes 82/85 in the study area. The future demand would not be met in the Route 1/161/I-95 area. In addition to this, for Alternatives E, F, G and H, the two lane alternatives would meet some demands, though fewer demands than the four lane alternatives. The full build alternatives would partially meet the **Compatibility with Plans of Development** purpose. The full build alternatives appear to be consistent with local plans of development. Some towns have stated these alternatives would meet local needs, although one town has stated that the F and G alternatives would not meet local needs. None of these alternatives is in the TIP at this time. SCCOG has stated its support of the completion of Route 11, but is not supportive of Alternatives F and G, in particular. These alternatives are consistent with some portions of the Policies Plan. The full build alternatives would partially meet the **Regional Growth and Development** purpose, since these alternatives would result in Routes 82/85 sustaining their present character. The undeveloped, natural land where the build alternatives are located, however, would look very different and would not sustain its character. Traffic volumes would be reduced on much of Routes 82/85, though the volumes would continue to rise in other areas to the south, especially in the Routes 1/161/I-395 area.

3.3.9.5 *New Location Partial Build Alternatives*: The partial build alternatives would not meet the **Highway System Linkage** purpose. The partial build alternatives would partially meet the **Safety and Accident Reduction** purpose. The partial build alternatives would reduce volumes on Routes 82/85 in the northern end of the study area, but not in the southern end of the study area. Accident rates may increase in the southern, widened portion of Route 85, and roadside hazards in the northern section will not be reduced. With these alternatives, safety concerns will not be reduced in the Routes 1/161/I-95 and the Route 85/I-395 areas as volumes will not be reduced there. The partial build alternatives would partially meet the **Function and Use** purpose. The partial build alternatives would separate the through and local traffic in the northern part of the corridor, though not in the southern part. Due to the widening of Route 85 done in the south, the conflicts may be reduced in that area, though not in the northern part of the study area on Routes 82/85. The full build alternatives would partially meet the **Roadway Capacity** purpose. The partial build alternatives would meet the capacity needs the same as the other build alternatives, except that, for the partial builds, the needs would also not be met in the Route 85/I-395 area. In addition to this, for Alternatives E, F, G and H, the two lane alternatives would meet some demands, though fewer, than the four lane alternatives. The partial build alternatives would partially meet the **Compatibility with Plans of Development** purpose. The partial build alternatives appear to be consistent with local plans of development. None of these alternatives is in the TIP at this time, although SCCOG has stated its support of the completion of Route 11 (but not of Alternatives F and G). The partial build alternatives are consistent with some portions of the Policies Plan. The partial build alternatives would partially meet the **Regional Growth and Development** purpose. The partial build alternatives would result in Routes 82/85 sustaining their present character in the northern part of the study area. Routes 82/85 in the southern part of the study area would look very different physically and its character would not be sustained. The undeveloped land where the build alternatives are located would look very different in that northern area, and would not sustain its natural character there. The character would be sustained in the southern portion of the study area. The converse would be true with regard to traffic volumes affecting community character. Traffic volumes would be reduced on the northern part of Routes 82/85, though they would continue to rise in other areas to the south, especially in the Routes 1/161/I-395 area.

3.4 DEVELOPMENT OF THE PREFERRED ALTERNATIVE

Two public hearings were held in April 1999, and the public comment period for the DEIS closed on May 21, 1999. Public comments, as well as comments received from local officials during the comment period, overwhelmingly supported extension of Route 11 on a new location along the alignment identified as $E_{(4)}$ in the DEIS. However, many comments noted substantial interest in the Innovative Design Alternative, noting the potential to reduce impacts to private properties and sensitive natural resource features.

Comments from the regulatory agencies also expressed concern about the extent of the natural resource impacts associated with construction using the standard expressway cross section. Several agency representatives called for further examination of ways in which impacts might be reduced, specifically, by reducing the roadway cross section through application of the modified arterial standard (Innovative Design Alternative) introduced in the DEIS.

Given the focus of the commentary and the apparent support for a reduced cross section alternative, a subsequent study was undertaken following the close of the DEIS comment period. In June 1999, the ConnDOT published the report *Impact Minimization Study, Evaluation of Arterial Design Options for the Route 82/85/11 Corridor*.

In other comments submitted by the EPA, it was suggested that the existing roadway (Route 85) could be upgraded in a "community sensitive" manner, while still fulfilling capacity and safety needs. An additional study, the *Community-sensitive Upgrade Study*, was specifically undertaken to evaluate EPA's suggestion.

The additional studies performed, and the process undertaken in the development and selection of the preferred alternative, are discussed below followed by a description of the preferred alternative. Copies of the studies may be obtained by contacting: Mr. Edgar T. Hurle, Director of Intermodal and Environmental Planning, Connecticut Department of Transportation, 2800 Berlin Turnpike, Newington, CT 06131-7546.

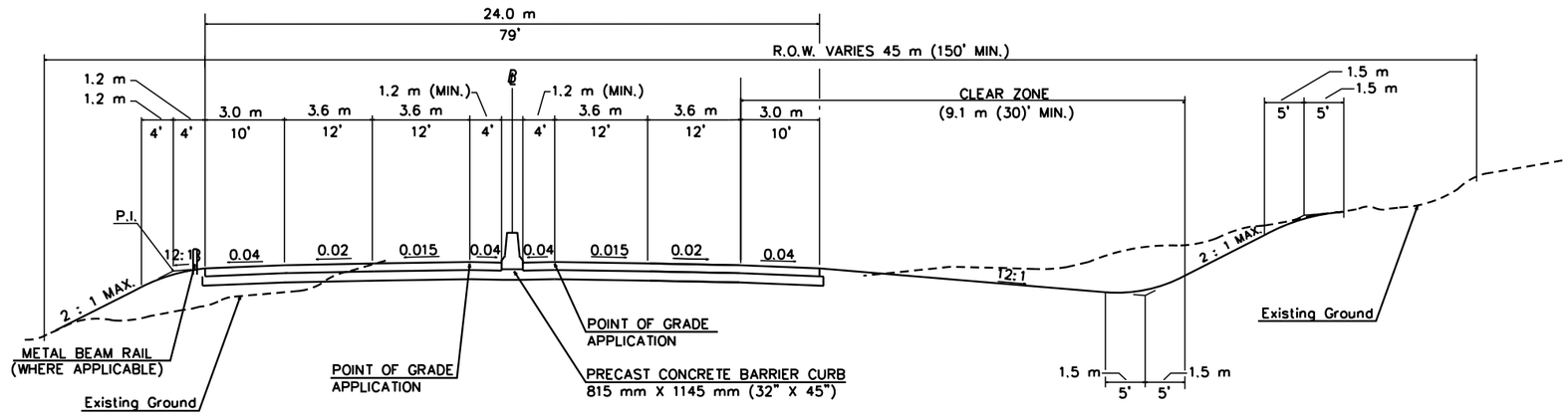
3.4.1 IMPACT MINIMIZATION STUDY

Of the alternatives presented in the DEIS, the $E_{(4)}$ alignment garnered the most support from local officials, regulatory agencies and the general public. Therefore, the focus of the Impact Minimization Study was on this alternative and the impact of applying the flexible standards to this alignment. Flexible standards were also applied to two partial build alignments, $H_{(4)}m$ and $EH_{(4)}m$. These minimization alternatives included widening of Route 85 and were rejected by the AC as being too destructive

to the community (see Section 3.4.3). Additional options for widening in a manner that would be sensitive to the community are discussed in the following section.

In applying the innovative design concept to the $E_{(4)}$ alignment, both the horizontal and vertical roadway geometry typical for an expressway were modified to more closely approximate arterial roadway geometrics, while remaining within the established principles of sound roadway design. ConnDOT utilized principles that allow flexibility and innovation in highway design to reduce social, cultural, economic, and environmental impacts. In evaluating the modified $E_{(4)}$ alignment (hereafter, $E_{(4)}m$), arterial roadway standards were used to reduce the area of impact, where practicable, without compromising safety. A narrower cross section was used in some locations, as shown in Figure 3-7 (compare with Figure 3-3a), and roadway grades of 5% rather than 4% were applied. Although the design guidelines allow a reduction in design speed from 70 mph to 60 mph, and minimum curve radius of 340m. (1,115 ft.) rather than 565 m. (1,850 ft.), the standards for limited access highway design were, nevertheless, observed. Like a typical expressway, land access under the $E_{(4)}m$ scenario would be controlled to preserve open space and to eliminate conflicts between through trips and local traffic. Like the $E_{(4)}$ alignment, the $E_{(4)}m$ alignment extends from the I-95/I-395 interchange in Waterford and East Lyme to the existing terminus of Route 11 near Route 82. $E_{(4)}m$ follows the same general alignment as $E_{(4)}$. Alternative $E_{(4)}$ consisted of a four-lane, limited access expressway with a 20 m. (66 ft.) median. Alternative $E_{(4)}m$ was developed as a four-lane arterial roadway with PCBC in the median. The roadway width was reduced from a minimum of 41 m. (134 ft.) to 24 m. (79 ft.), with the intent of minimizing environmental and socioeconomic impacts.

To further minimize impacts, the $E_{(4)}m$ alternative incorporated 11 additional and/or modified bridge structures across wetlands and slightly modified horizontal and vertical geometry, reducing cuts and fills and the overall footprint of the impacted area. The $E_{(4)}m$ alternative included six more bridges than $E_{(4)}$ and increased the total length and area of the bridge spans. The total length of the spans for $E_{(4)}$ and $E_{(4)}m$ were approximately 900 m. (3,000 ft.) and 2,000 m. (6,700 ft.), respectively, excluding the bridges associated with reconstruction in the I-95/I-395 area. Other design modifications applied to specific locations along the $E_{(4)}m$ alignment are detailed in the Impact Minimization Study.



NORMAL SECTION

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State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTIONS
IMPACT MINIMIZATION ALTERNATIVE E(4)m
Figure 3–7

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Under the $E_{(4)}$m alignment, the configuration of the Route 11 interchange was conceived to merge at the existing I-95/I-395 interchange with a minimum of construction required along the existing roadways. Route 11 southbound would merge with I-95 southbound approximately 244 m. (800 ft.) south of the existing merge of I-95 and I-395. For safety reasons it would be necessary to close Exit 75. Exit 75 traffic would, instead, have to use Exit 74 (Route 161) or Exit 81 (Cross Road). The existing Boston Post Road/U.S. Route 1 on-ramp would remain open. No connection between Route 11 and I-395 was proposed.

At Route 161, Alternative $E_{(4)}$m proposed an at-grade intersection rather than the grade separated interchange that was proposed for the DEIS alternatives in an attempt to reduce impacts associated with construction of an interchange. While this modification would have resulted in a reduction in wetland impact area in the vicinity of Latimer Brook, it also would have compromised roadway safety, capacity and driver expectation.

3.4.1.1 *Comparison of Impacts:* The $E_{(4)}$m alignment developed for the Impact Minimization Study provided for a reduction in impact in several of the more critical impact categories, as compared with the $E_{(4)}$ impacts presented in Section 5. For several impact categories there was either no change or minimal change in impact between the expressway alternative and the arterial; however, in other impact categories, such as wetlands and property impacts, the analysis showed that the potential for impact reduction was substantial.

Wetland Impacts: For the $E_{(4)}$ alternative, direct wetland impacts were estimated at 14.3 ha (35.3 ac). By comparison, $E_{(4)}$m would directly impact only 2.8 ha (6.8 ac) of wetland area, based on the Impact Minimization Study. The $E_{(4)}$m alternative would result in an 81% reduction in overall direct wetland impact. The marked reduction in wetland impacts was, in large part, a result of adding more bridge spans over wetlands and increasing the length of the spans proposed for the $E_{(4)}$ alternative. The reduction of the roadway footprint and cuts and fills also contributed to the reduction in impact.

Habitat Blocks / Wildlife Habitat Impacts: Impacts to forest areas would be reduced under the $E_{(4)}$m alternative as a result of the need for less clear-cutting of forested areas. The number of habitat blocks impacted, however, would not change. Impacts to each of the habitat block areas are summarized and compared in Table 3-3. In addition to the reduction in acreage of affected forest area for $E_{(4)}$m, the roadway would impact less wetland area, thereby decreasing impacts to species that utilize wetland areas during their life cycle.

TABLE 3-3
IMPACTS TO HABITAT BLOCKS – IMPACT MINIMIZATION STUDY

	LARGER BLOCKS (> 200 ha. Habitat Blocks)		SMALLER BLOCKS (50 - 200 ha. Habitat Blocks)			
ALTERNATIVE	BLOCK #1 ha (ac)	BLOCK #2 ha (ac)	BLOCK #3 ha (ac)	BLOCK #4 ha (ac)	BLOCK #5 ha (ac)	BLOCK #6 ha (ac)
$E_{(4)}$	12.5 (30.9)	34.2 (84.5)	8.0 (19.8)	3.4 (8.4)	5.7 (14.1)	N/I
	TOTAL: 46.7 (115.3)		TOTAL: 17.1 (42.2)			
$E_{(4)}m$	8.7 (21.5)	22.9 (56.5)	4.7 (11.7)	4.9 (12.2)	3.2 (8.0)	N/I
	TOTAL: 31.6 (78.0)		TOTAL: 12.8 (31.9)			

N/I = no impact

The $E_{(4)}m$ alternative would impact substantially less area than the $E_{(4)}$ alignment within both the large and small habitat blocks. However, the cross section proposed for the arterial alignment could result in greater impacts to wildlife movement as a result of the addition of the concrete barrier. Upon reaching the barrier and not being able to cross, wildlife would spend more time within the roadway, thereby increasing the probability of road kill. Restricting the movement of animals between habitat blocks could create small populations with limited or no emigration and immigration.

Property Impacts: Alternative $E_{(4)}m$ would also result in fewer impacts to private property than the $E_{(4)}$ alignment. The arterial would require acquisition of an estimated 203 ha (503 ac) of land, which is approximately 74 ha (181 ac) less than the area needed for the $E_{(4)}$ alignment. Alternative $E_{(4)}m$ would result in partial property takes from 34 parcels, and 14 properties would be taken in their entirety, including 8 dwellings. By comparison, the $E_{(4)}$ alignment would take 22 dwellings.

Other Impacts: Other reductions in impact were noted for floodplain, high-yield aquifer and prime farmland areas. The area of floodplain impacted by the $E_{(4)}$ alignment was estimated to be 2.3 ha (5.6 ac). The $E_{(4)}m$ alignment would result in a floodplain impact area of 0.9 ha (2.1 ac). This substantial reduction is realized because much of the floodplain area that would be impacted under the $E_{(4)}$ alignment is in the vicinity of Route 161 where a full interchange is proposed, as opposed to the at-grade intersection that was proposed under $E_{(4)}m$.

The reduction in the amount of roadway surface associated with the arterial alignment would reduce the pavement over high-yield aquifer areas. Under the $E_{(4)}$ alignment, 1.4 ha (3.5 ac) of pavement would be placed over high-yield aquifers; this was reduced to 0.7 ha (1.7 ac) with the $E_{(4)}$m alignment. Impacts to areas designated as prime farmland would be similarly reduced, with impact areas calculated at 6.3 ha (15.6 ac) and 4.3 ha (10.6 ac), respectively, under $E_{(4)}$ and $E_{(4)}$m.

Cost: Total construction costs estimated in 1999 for $E_{(4)}$ and $E_{(4)}$m, were $255,200,000 and $224,200,000, respectively. The overall footprint of $E_{(4)}$m covers substantially less area than the $E_{(4)}$ expressway alignment, therefore, costs associated with excavation, fill and typical roadway construction materials would be less. However, because several specific design features would add substantially to the cost, a reasonable comparison between $E_{(4)}$ and $E_{(4)}$m must consider the additional features.

The following additional features are included in the cost of the $E_{(4)}$m alignment. The addition of six bridges and extended length of the other bridges was estimated at $41,300,000. The addition of approximately 11,000 ft. of retaining walls was estimated at $1,320,000. The cost of the $E_{(4)}$ expressway alignment includes reconstruction of over a 5 km. (3 mi.) segment of I-95 estimated at $63,300,000. It also includes a full interchange at Route 161, as opposed to the at-grade intersection proposed for $E_{(4)}$m, estimated at $6,800,000.

3.4.1.2 *Summary of Impacts:* A comparison of impacts associated with the $E_{(4)}$ alignment and the $E_{(4)}$m arterial alignment, as presented in the Impact Minimization Study, is summarized in Table 3-4.

TABLE 3-4
COMPARISON OF IMPACTS – $E_{(4)}$ AND $E_{(4)}$M

ALTERNATIVE	IMPACT CATEGORY				
	WETLANDS (ha (ac))	PROPERTIES (ha (ac))	FLOODPLAIN (ha (ac))	AQUIFERS (ha (ac))	COST[(1)]
$E_{(4)}$	14.3 ha (35.3 ac)	277 ha (684 ac)	2.3 ha (5.6 ac)	1.4 ha (3.5 ac)	$255,200,000
$E_{(4)}$m	2.8 ha (6.8 ac)	203 ha (503 ac)	0.9 ha (2.1 ac)	0.7 ha (1.7 ac)	$224,200,000

(1) 1999 estimate

The $E_{(4)}$m arterial alignment was generally viewed by the public, community officials and regulatory representatives as being superior to

the expressway alternatives presented in the DEIS. As described, this alignment would provide essentially the same roadway capacity as an expressway, but with substantially less environmental impact.

Regardless of overall support for the alignment, however, many indicated a preference for including a full interchange at Route 161. Although an at-grade intersection would allow for a substantial reduction in impact to wetlands and the Latimer Brook floodplain in the vicinity of Route 161, it was viewed as less safe than a full interchange. ConnDOT acknowledged that safety factors could ultimately dictate the need for a full interchange at this location and that this design option could be evaluated at a later date. Similarly, due to the complexity of the I-95/I-395/U.S. Route 1 interchange, concerns regarding a simple connection of the new Route 11 were raised. As a result, it was determined that this interchange would be revisited.

3.4.2 COMMUNITY-SENSITIVE UPGRADE STUDY

At the request of EPA, ConnDOT conducted further analysis of potential roadway upgrade options that would eliminate the need to construct an expressway. A *Community-sensitive Upgrade Study* was published in February of 2000, which analyzed EPA's suggestion that roadway capacity and safety needs could be satisfied by upgrading existing Routes 82 and 85.

EPA's request stood in opposition to the desires of the local communities. Town officials, legislators and individual citizens in the corridor area communities have, from the inception of the study, been very vocal in their support of a new expressway and their opposition to an upgrade of the existing roadway system. A vast majority of the public comments received cite not only traffic and safety concerns, but also the dramatic changes in the character of the community that would likely result if Route 85 were widened.

Acknowledging that public opinion was overwhelmingly in favor of not upgrading the existing roadway, EPA asked that the study consider measures that could be incorporated to minimize adverse community effects that would occur under widening scenario. EPA's specific request for exploration of a "community-sensitive upgrade" alternative was used as a guide in carrying out the tasks associated with developing the new alternative. The EPA requested, in part, the following:

> *"... detailed and creative exploration of transportation system management and demand management (TSM/TDM) opportunities on the existing roadways; a 2-lane widening option combined with TSM/TDM; ways to preserve the character of the roadway, including reducing speed limits,*

limits on new development and land acquisition; pedestrian and bike path; turning lanes, improved shoulders, better-coordinated signalization and intersection design, and other upgrade designs that are more sensitive to local concerns about property impacts and the character of the community."

EPA introduced the term "community-sensitive upgrade" to characterize an alternative that would fulfill capacity and safety needs, but do so in a manner that preserves community character and integrity. The Community-sensitive Upgrade Study investigated the practicability of upgrading the existing roadway system within the context of the seemingly contradictory objectives of improving transportation efficiency while maintaining the aesthetic quality and character of the corridor.

The Community-sensitive Upgrade Study presented a detailed exploration of the factors that contribute to a community-sensitive approach to transportation improvements utilizing the existing roadway system. The study revisited traffic and roadway design issues, as requested by EPA, and discussed the ability of this alternative to satisfy the project purposes and needs. The study presented an alternative referred to as $W_{(2)}$m; this alternative was a modification of Alternative $W_{(2)}$, the two-lane widening alternative. The $W_{(2)}$m concept was designed to bring the existing two-lane principal rural arterial into conformance with the current highway design standard, adding community-oriented enhancements to address concerns regarding safety, scenic and rural quality, and historic character.

This document, like the Impact Minimization Study, was a critical step in the EIS process in that it helped to define which alternatives should be advanced for further evaluation, and eventual selection of the preferred alternative.

3.4.2.1 *Transportation and Safety Enhancements:* The basis for the $W_{(2)}$m concept incorporates the safety improvements for Routes 82 and 85 that were already programmed by ConnDOT. Instead of utilizing a typical cross section throughout, individual roadway segments were evaluated based on specific deficiencies or safety concerns and a variable cross section was applied. Turning lanes were added where necessary, and shoulder widths were increased or decreased according to specific site and traffic conditions.

In addition, several other site-specific measures were incorporated into the $W_{(2)}$m concept, including: roadway realignment to improve sight lines; intersection realignment to improve turning movements; additional traffic signals; and a closed drainage system, spill containment structures, protective barriers and other measures to protect water supply areas.

As part of the upgrade concept and in response to EPA's request, TSM strategies considered for Alternative $W_{(2)}$ were reviewed and any additional potential strategies were considered. Among the TSM measures that were included in Alternative $W_{(2)}$m were: increased shoulder width, traffic calming/community enhancement features, and additional coordinated traffic signals. These elements were selected not only based on safety factors, but also for their potential to contribute to the community sensitivity objective. However, in some cases, a TSM improvement produced unintended negative impacts on other community concerns. For example, widened shoulders provide a much safer roadway for vehicles, pedestrians and bicyclists but adversely impact the rural character of the roadway. Additionally, while installation of new signals and signal coordination is effective for creating gaps in traffic, it also has a negative effect on congestion reduction efforts.

TDM strategies were also reviewed, and additional strategies to reduce overall traffic volumes were considered. TDM was found to have limited potential for reducing traffic volumes, particularly during summer peak hours. TDM measures found to be most feasible for the corridor area were ridesharing, flexible work hours and telecommuting; these were recommended in the study.

3.4.2.2 *Community Enhancements*

The Community-sensitive Upgrade Study identified some of the inherent conflicts in attempting to identify and fulfill all of the needs and desires of the community at large, given that perceptions of what constitutes community sensitivity differs considerably among the various community sectors. An option that is perceived as community-sensitive by some, may be completely unacceptable to others. For example, some may place the greatest value on the convenience of quick travel times through the corridor while others might regard increased business/economic development activity, preservation of open space, prevention of sprawl, housing opportunities, safe bicycle routes, rural character, individual property values, environmental protection or any number of other concerns as higher priority issues.

Issues of "community" and the relative importance of the various elements that contribute to community character and livability are clearly subjective. Nevertheless, the comments received on the DEIS pointed to common areas of concern among the various community sectors. Certain issues were cited numerous times during the DEIS process as high priorities with respect to corridor transportation improvements. Safety issues were

identified most often as the highest priority, therefore, in developing the concept, particular attention was focused on elements that would make the roadway safer.

An attempt was made to address specific problems and issues that were frequently mentioned as being important to the community. Certain elements such as sidewalks, medians, crosswalks and gateway signage were widely accepted as both safety and aesthetic improvements. However, other potential "remedies" often resulted in effects that conflicted with other perceptions of community sensitivity, making it difficult to fulfill the multi-faceted project purposes under the community-sensitive upgrade scenario.

3.4.2.3 *Access Management/Growth Management*: One of the primary factors contributing to accidents along the existing roadway system is the number of curb cuts and the associated traffic entering from numerous secondary roads and driveways. Therefore, the study concluded that an essential element in improving the safety of the roadway is limiting new access points directly onto Route 85.

Management of growth, and specifically development along Routes 82 and 85 that would require access to the highway, was explored. The only way to accomplish this would be through strict local regulations that would severely limit new access points, or access control through state acquisition of access rights. The latter was included in the Alternative $W_{(2)}$m concept as a critical element in maintaining desired capacity and safety levels. The Community-sensitive Upgrade Study identified approximately 5.8 mi. of frontage along Routes 82 and 85 for purchase of access rights as a curb cut control measure. This is a radical approach that would be difficult to execute, add approximately $24,000,000 to the upgrade costs and would likely conflict with municipal goals and future growth plans.

3.4.2.4 *Summary*: In conclusion, ConnDOT and FHWA acknowledged that an upgrade of Routes 82 and 85, as presented in the Community-sensitive Upgrade Study, could meet certain capacity and safety needs in the corridor, but determined that other important transportation-related purposes would remain unmet. For example, this alternative would not complete the link in the highway system; would not separate through and local traffic; would result in only marginal improvement in congestion (LOS would remain at unacceptable levels at some locations); would increase average speeds, compromising safety at driveways and intersections; and, where traffic calming measures are introduced to reduce speeds and accident rates, operational gains would be sacrificed by increasing vehicle delay. In addition, upgrading Route 85 has very limited

community support and could not be undertaken in a way that was generally acceptable to the majority of the community. The study showed that the "community sensitive" alternative would not meet the project purposes and needs, and a decision was made by ConnDOT and FHWA to not pursue this alternative further.

In March 2000, the ACOE requested that FHWA provide expert opinion on the community-sensitive upgrade alternative and the other DEIS Route 85 upgrade alternatives. FHWA findings were provided to the ACOE in the report, *Federal Highway Administration's Engineering Evaluation of Route 82/85 Upgrade Alternatives, August 2000.* The conclusions of this evaluation were that the community-sensitive upgrade would not meet the long term safety and capacity needs of the corridor, and "would only serve as a short term improvement which only temporarily addresses the safety and capacity needs of the corridor." None of the upgrade alternatives would meet the project purpose and need, or be acceptable to community residents or local officials. FHWA concluded that the upgrade alternatives would not be feasible to implement and would not be practicable.

3.4.3 SELECTION OF THE PREFERRED ALTERNATIVE

Following evaluation of the alternatives, review of agency and public comments received on the DEIS and the above-mentioned studies, ConnDOT and FHWA were able to eliminate corridor improvement alternatives that were not considered practicable. Based on the recommendations of the corridor AC, strong public sentiment and the EPA comment letter, ConnDOT, with FHWA's concurrence, ultimately eliminated from further consideration *all* of the fifteen DEIS alternatives, as they were presented. While all were found to be not practicable to pursue in their initial conceptual form, the modified versions of two of the DEIS alternatives - $E_{(4)}m$ and $W_{(2)}m$ - remained under consideration.

Following release of the Impact Minimization Study and the Community-sensitive Upgrade Study that examined the $E_{(4)}m$ and $W_{(2)}m$ alternatives, ConnDOT and FHWA engaged in an extensive interagency environmental streamlining effort in coordination with the EPA, ACOE and others to determine how to proceed with developing a preferred alternative for the corridor. These coordination efforts are also discussed in Section 7. As a result of the coordination that occurred, it was determined by ConnDOT and FHWA in early 2001 that the $E_{(4)}m$ alignment best met the project purposes and needs; however, the resource agencies found that habitat impacts associated with this alternative remained unacceptable from a permitting perspective.

The EPA and ACOE position was that the $E_{(4)}$m alignment did not appear to represent the LEDPA, a finding that must be determined in order to permit the project. The agencies indicated that there appeared to be opportunities to modify the alignment in such a way that would preserve additional resources. Their comments primarily focused on the preservation of the forest block, identified as Habitat Block No. 2, which straddles the Waterford and East Lyme town boundaries.

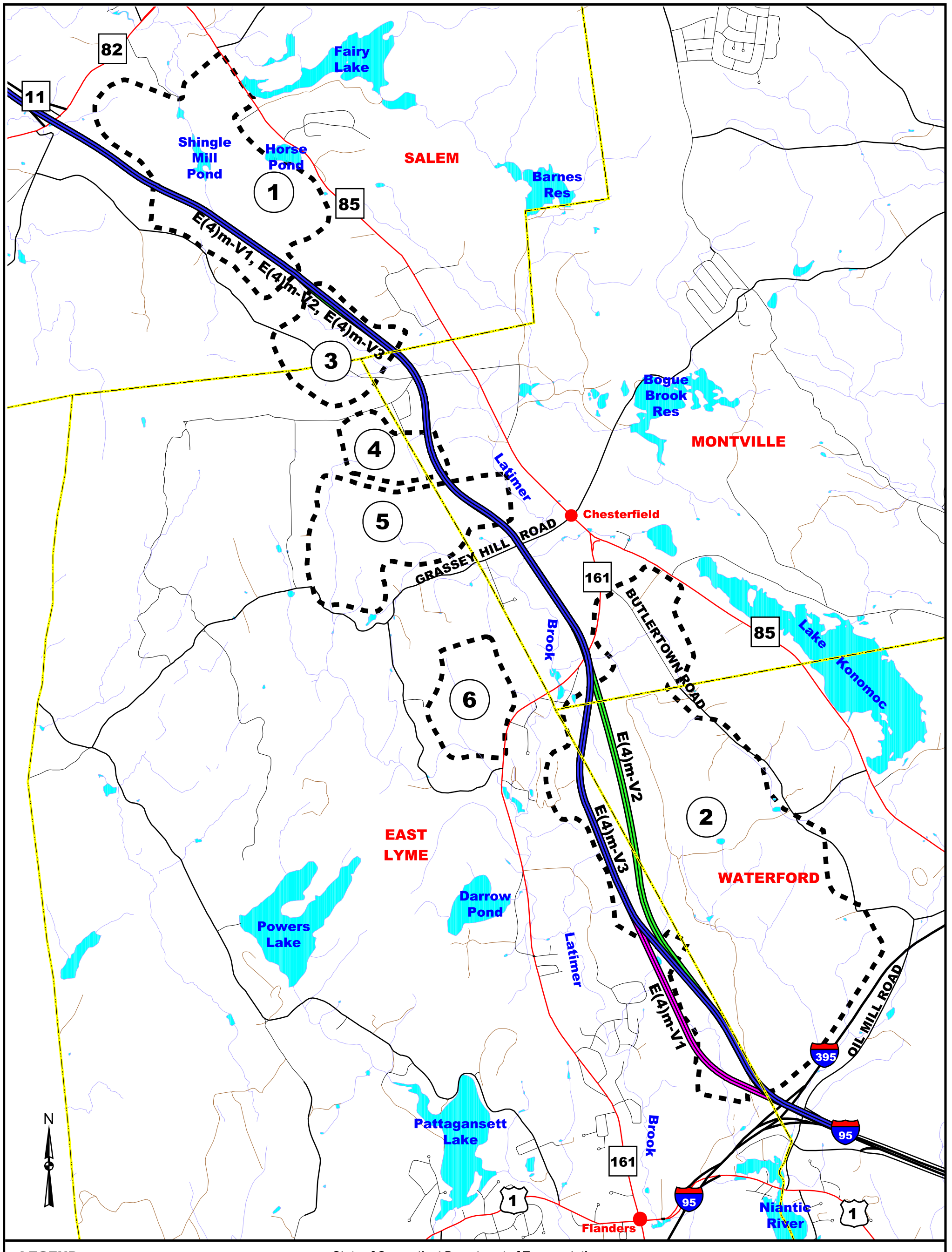
ConnDOT began an additional concept study during the summer of 2001, *$E_{(4)}$m Variation Study, July 2001*, to determine if there were options for modifying the $E_{(4)}$m alignment in a way that would leave valuable Habitat Block No. 2 intact, and still provide a safe and efficient roadway. Resource agency officials requested a roadway concept that would move a portion of the $E_{(4)}$m alignment as far as possible to the west, into East Lyme, to avoid fragmenting Habitat Block No. 2.

To this end, three conceptual variations on $E_{(4)}$m were developed; they were termed $E_{(4)}$m-V1, $E_{(4)}$m-V2 and $E_{(4)}$m-V3. Each of the variations is described below and the alignments are shown in Figure 3-8.

The first variation, $E_{(4)}$m-V1, created a substantial shift in the alignment, reducing the fragmented forest area from 230.3 ha (569 ac) to 48.6 ha (120 ac). While this option would have dramatically reduced the impact to important habitat areas, it increased direct impacts to wetlands by nearly an acre. In addition, the alignment would have come within a few hundred feet of established neighborhoods. For this reason, it was met with strong opposition from East Lyme residents and town officials.

In response, a second variation, $E_{(4)}$m-V2, was developed to moderate potential impacts to nearby neighborhoods. This option represented a more satisfactory option for neighbors of the proposed roadway, and resulted in fewer direct wetland impacts than $E_{(4)}$m–V1; however, it did not substantially reduce the fragmented portion of Habitat Block No. 2. The fragmented area under $E_{(4)}$m-V2 would have been 173.6 ha (429 ac) as compared with 230.3 ha (569 ac) under $E_{(4)}$m. Resource agency officials rejected the $E_{(4)}$m-V2 option for this reason.

The third variation, $E_{(4)}$m-V3, represented a compromise option that reduced the fragmented portion of Habitat Block No. 2 to 108.1 ha (267 ac), or less than half of what would have been fragmented under $E_{(4)}$m. $E_{(4)}$m-V3 also left a substantial buffer area between the limits of the roadway and neighborhoods in East Lyme. This option was considered a satisfactory compromise route by local officials as well as by the regulatory officials. On September 17, 2001, the ACOE notified ConnDOT and FHWA that either the $E_{(4)}$m-V1 or $E_{(4)}$m-V3 alignment variations could qualify as the project LEDPA. After consultations with SCCOG and the AC in October 2001, ConnDOT and FHWA adopted the $E_{(4)}$m-V3 alignment as the preferred alternative to be studied in the FEIS.



LEGEND

- E(4)m-V1
- E(4)m-V2
- E(4)m-V3
- INTERSTATE HIGHWAY
- SECONDARY HIGHWAY
- LOCAL ROAD
- DIRT ROAD
- WATER BODY
- STREAM/RIVER
- HABITAT BLOCK WITH NUMBER
- TOWN BOUNDARY

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 11 CORRIDOR
FINAL ENVIRONMENTAL IMPACT STATEMENT
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM, AND WATERFORD

ALIGNMENT VARIATIONS
E(4)m-V1, E(4)m-V2, E(4)m-V3

Figure 3-8

0 1 2 Kilometers

MARCH 2003 FOR PLANNING PURPOSES ONLY

Planning for the greenway was already underway as a separate effort by the Route 11 Greenway Authority Commission (Route 11 GAC), which was established by Public Act 00-148 (May 26, 2000). The greenway is being planned as a corridor of open space located generally parallel to the proposed roadway alignment. The properties to be considered for acquisition are evaluated for their potential use in natural and cultural resources preservation and passive recreation (Route 11 GAC Greenway Development Plan 2005).

Options for interchanges of the $E_{(4)}$m-V3 alignment at Route 161 in Montville and at the I-95/I-395/U.S. Route 1 in East Lyme and Waterford were evaluated by a subcommittee of the AC. The concept for an at-grade interchange at Route 161 had been considered as part of the Impact Minimization Study, but was eliminated from further consideration because it would not meet safety or operational standards. The subcommittee reviewed three options for the Route 161 interchange. Option 1 was a diamond interchange configuration featuring straight on/off ramps in each of the four quadrants. Option 2 was a cloverleaf type interchange with loop ramps in the southwest and northeast quadrants, and Option 3 was a combination of Options 1 and 2 with ramps in three out of four quadrants. Option 1 had the highest wetland impact (0.95 ac.), but the lowest impact to residences, Option 2 impacted the most residences and the least amount of wetlands (0.5 ac.) and Option 3 was in between. The subcommittee selected Option 1 because it was the safest and most functional configuration, had fewer residential impacts, and an insignificant increase in wetland impacts.

After preliminary consideration of 15 potential scenarios for the Route 11/I-95/I-395/U.S. Route 1 interchange, including the interchanges described in Section 3.3.5 for the two- and four-lane new location alternatives, two new options were evaluated by the subcommittee. Option 1 was a less intensive and less expensive construction option that would provide connections to and from Route 11 without completely reconstructing I-95 and the adjacent roadways. Under Option 1 only two traffic movements (Route 11 southbound to I-95 northbound, and I-95 southbound to Route 11 northbound) could be safely provided with acceptable levels of service because of the existing interchange configurations and deficiencies. Under this option, minor reconstruction of the interchange, only sufficient to accommodate a connection from Route 11, would be completed and reconstruction of the 4.8 km. (3 mi.) segment of I-95 would not be done.

Option 2 included reconstruction and reconfiguration of the interchange area and 4.8 km. (3 mi.) of I-95. The AC subcommittee concluded during a meeting on January 24, 2002 that only Option 2 with full reconstruction of the interchange and I-95 segment would satisfy safety and operational requirements. The I-95/I-395 interchange including reconfiguration and reconstruction of I-95 are included as part of the preferred alternative and are described in detail in Section 3.4.4.

3.4.4 DESCRIPTION OF THE PREFERRED ALTERNATIVE

The $E_{(4)}$m-V3 alignment is a four-lane limited access roadway that follows an alignment from the I-95 / I-395 interchange in East Lyme to the existing terminus of Route 11 in Salem at Route 82. The length of this alignment would be approximately 13.7 km. (8.5 mi.). In addition, approximately 4.8 km. (3 mi.) of I-95 would be reconstructed in order to allow safe traffic movement at the interchange of Route 11, I-95 and I-395.

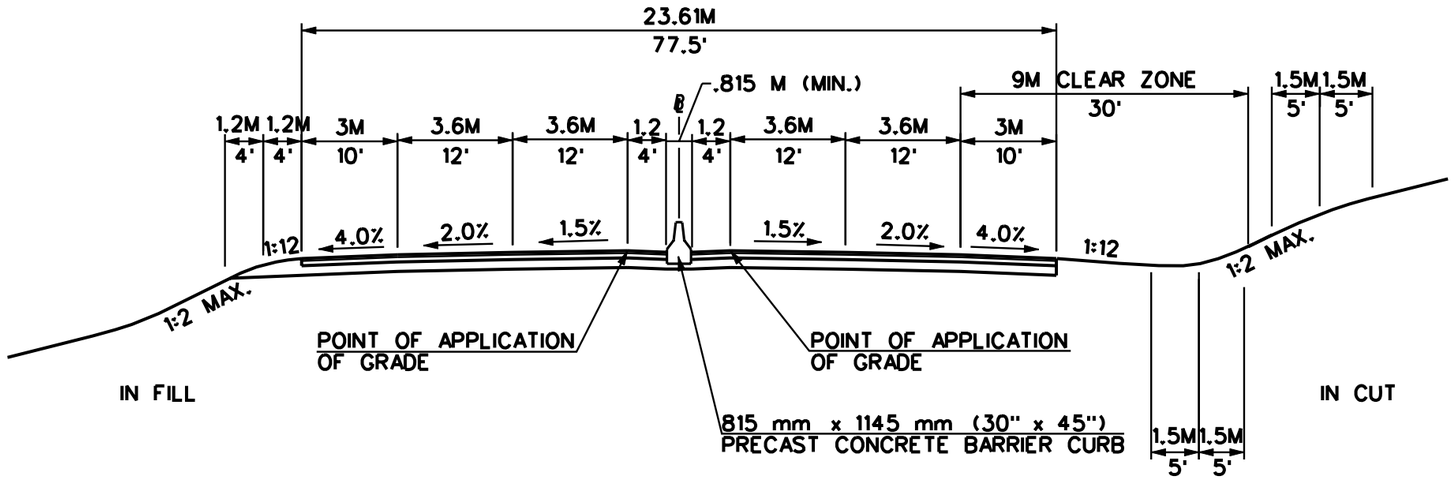
The typical roadway cross section for the proposed Route 11 would consist of four 3.6 m. (12 ft.) lanes, 3.0 m. (10 ft.) outside shoulders and 1.2 m. (4 ft.) inside shoulders (Figure 3-9). The opposing lanes would be separated by an 815 mm. x 1,145 mm. (32 in x 45 in.) PCBC. In general, the maximum side slopes for cut and fill areas would be 1:2 (vertical: horizontal). Metal beam rail would be utilized, as necessary, based on slopes and clear zone requirements. A maximum fill slope of 1:1½ would be used in certain areas to minimize wetland impacts, and steeper cut slopes may be used in areas of rock excavation. Side slopes would be contained within the right-of-way.

A 61 m. (200 ft.) right-of-way is proposed along the majority of the alignment. However, a 152 m. (500 ft.) right-of-way will be maintained within the town of Salem, where the state currently owns the land adjacent to the proposed alignment. In addition, right-of-way in excess of 61 m. (200 ft.) will be acquired at the interchanges.

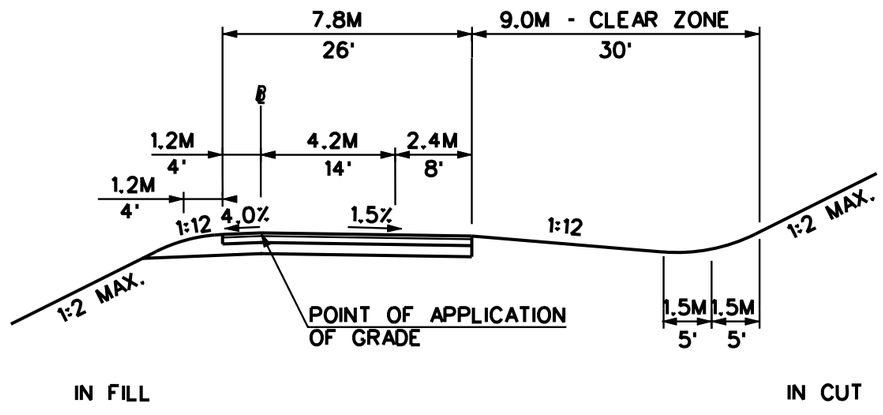
The typical roadway cross section for the ramps at Route 82 and Route 161 would consist of one 4.2 m. (14 ft.) lane, 1.2 m. (4 ft.) inside shoulder and 2.4 m. (8 ft.) outside shoulders.

The $E_{(4)}$m-V3 alignment would begin at the I-95 / I-395 Interchange in East Lyme and head in a northwesterly direction approximately 430 m. (1,410 ft.) northeast of Grouse Circle. From this point, the alignment would continue in a northerly direction toward Route 161, crossing into Waterford approximately 1,000 m. (3,300 ft.) south of Route 161, and then into Montville approximately 550 m. (1,800 ft.) south of Route 161. In this area, the alignment would be approximately 350 m. (1,150 ft.) east of Chapman Drive.

Approaching Route 161, the alignment would be located east of Silver Falls Road. A grade-separated full service diamond interchange would be constructed at Route 161



ROUTE 11 TYPICAL SECTION



RAMP TYPICAL SECTIONS

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	State of Connecticut Department of Transportation Federal Highway Administration	ROUTE 82 /85 /11 CORRIDOR ENVIRONMENTAL IMPACT STATEMENT (EIS) IN THE TOWNS OF EAST LYME, MONTVILLE, SALEM AND WATERFORD TYPICAL SECTIONS PREFERRED ALTERNATIVE E(4)m–V3 Figure 3–9

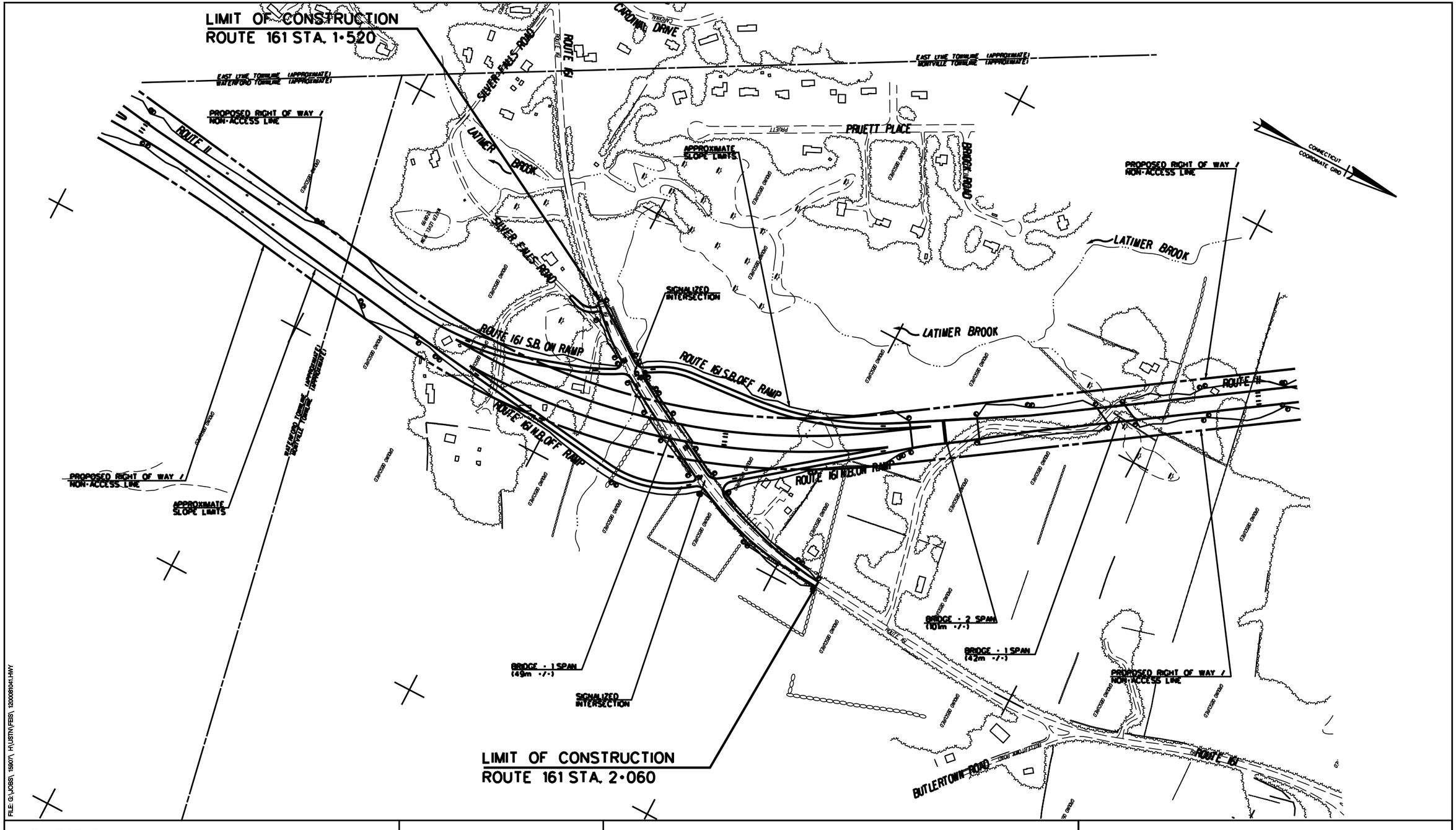
(Figure 3-10). The alignment would cross over Route 161 approximately 1,160 m. (3,800 ft.) south of the intersection of Route 85 and Route 161, and approximately 140 m. (460 ft.) northeast of the intersection of Silver Falls Road and Route 161. Route 161 would require reconstruction for a distance of 540 m. (1,780 ft.) to provide adequate lane arrangements approaching and through the intersections for each of the on- and off-ramps associated with the interchange. Approximately 60 m. (200 ft.) along Silver Falls Road would have to be realigned to provide a suitable intersection with Route 161 and to provide adequate separation distance from the on- and off-ramps at the interchange.

From Route 161, the alignment would continue in a northwesterly direction crossing Latimer Brook approximately 130 m. (430 ft.) south of Grassy Hill Road. The alignment would pass over Grassy Hill Road approximately 510 m. (1,680 ft.) west of the intersection of Grassy Hill Road and Route 85. Grassy Hill Road would require reconstruction beneath and adjacent to the Route 11 overpass for a distance of 120 m. (395 ft).

Continuing in a northwesterly direction from Grassy Hill Road, the alignment would head north just south of Daisy Hill Drive dividing the distance between Birch Terrace and Daisy Hill Drive. The alignment would cross under the existing Northeast Utilities (Connecticut Light and Power) high voltage transmission lines immediately south of Daisy Hill Drive.

The alignment would pass over Salem Turnpike Road immediately east of the intersection of Salem Turnpike and Holmes Road, approximately 550 m. (1,800 ft.) west of the intersection of Salem Turnpike Road and Route 85. Holmes Road would have to be realigned and reconstructed for a distance of approximately 45 m. (150 ft.) to provide adequate sight distance and distance for the Route 11 overpass in this vicinity. Salem Turnpike Road, beneath and adjacent to the overpass, would require reconstruction for a distance of 140 m. (460 ft).

Approximately 250 m. (820 ft.) northwest of Salem Turnpike Road, the alignment would head in a northwesterly direction crossing the Salem / Montville town line. The alignment would then follow the existing right-of-way owned by the State of Connecticut in a northwesterly direction passing between Fawn Run and Beckwith Hill Drive, approximately 180 m. (600 ft.) from either subdivision. Northwest of this location, the alignment would pass over Shingle Mill Brook just prior to splitting into two barrels to match the existing Route 11 roadway configuration in the vicinity of Route 82. This section immediately south of Route 82 had been previously excavated during the original construction of Route 11.



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MAP LEGEND

- PROPOSED R.O.W. / NON-ACCESS LINE
- EXISTING EDGE OF ROAD
- WATER COURSE / WATER BODY
- PROPOSED EDGE OF ROAD

SCALE IN METERS

0 25 50 75 100 125

SCALE 1:2500

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD

ROUTE 161 INTERCHANGE SKETCH PLAN

Figure 3–10

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The roadway would pass over Route 82 where there would be a grade separated full service diamond interchange. The northern half of this interchange was constructed in 1972 along with Route 11. The terminus of the alignment would be approximately 460 m. (1,500 ft.) northwest of Route 82, matching the existing Route 11 northbound and southbound roadway alignments. Route 82 would require reconstruction for a distance of 580 m. (1,900 ft.) to provide adequate lane arrangements approaching and through the intersections for each of the on- and off-ramps associated with the interchange.

Bridges and structures along the alignment would be utilized over the following wetland, stream and roadway locations:

- Wetland system northeast of Grouse Circle in East Lyme
- Wetland system north of Grouse Circle in East Lyme (approximately 1,000 m. 3,300 ft. north of preceding bridge)
- Route 161
- Wetland system adjacent to Latimer Brook, located approximately 400 m. (1,310 ft.) north of Route 161
- Wetland system adjacent to Latimer Brook, located approximately 260 m. (855 ft.) north of preceding structure
- Latimer Brook and adjacent wetland system approximately 145 m. (475 ft.) south of Grassy Hill Road
- Grassy Hill Road
- Wetland system located approximately 265 m. (870 ft.) south of the Northeast Utilities high voltage transmission lines
- Salem Turnpike Road
- Wetland system located approximately 135 m. (440 ft.) north of Salem Turnpike Road
- Wetland system located immediately north of Fawn Run and by Beckwith Hill Drive
- Shingle Mill Brook approximately 1,900 m. (6,230 ft.) south of Route 82
- Wetland system approximately 1,230 m. (4,035 ft.) south of Route 82
- Route 82 (northbound and southbound barrels).

Approximately 4.8 km. (3 mi.) of I-95 would be reconstructed in association with the construction of the interchange of Route 11, I-95 and I-395. This additional construction would be necessary because of the existing layout of the I-95 / I-395 interchange. Close spacing of the adjacent interchanges (Exit 74-Route 161, Exit 75-U.S. Route 1 and Exit 80-Oil Mill Road), weaving movements and the left exit to I-395 northbound from I-95 compromise driver safety on this segment of roadway.

To improve existing deficiencies in this area and accommodate access to and from the proposed Route 11, I-95 would be reconstructed to include three lanes in each

direction from immediately west of the Exit 74 (Route 161) overpass to approximately the Exit 81 (Cross Road) interchange. I-95 would be reconstructed approximately 110 m. (360 ft.) north of its current location in the vicinity of Gurley Road where I-395 begins. This is necessary to remove the current broken back curve beginning at the existing U.S. Route 1 overpass and improve the horizontal radius of I-95 both northbound and southbound.

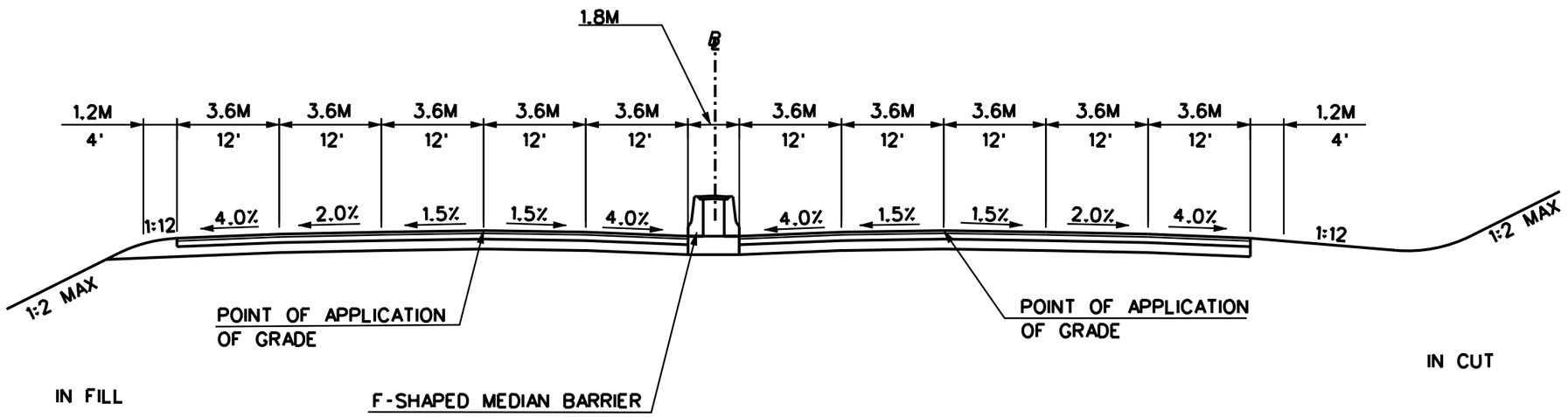
The roadway typical cross section for I-95 would consist of three 3.6 m. (12 ft.) lanes and 3.6 m. (12 ft.) inside and outside shoulders due to heavy vehicular and truck volumes and high incidents in this area (Figure 3-11). The opposing lanes would be separated by an 815 mm. x 1,145 mm. (32 in. x 45 in.) PCBC. In general, the maximum side slopes for cut and fill areas would be 1:2 (vertical : horizontal). Metal beam rail would be utilized at all locations, where required based on slope and clear zone requirements. A maximum fill slope of 1:1½ would be used in certain areas to minimize wetland impacts and steeper cut slopes would be used in areas of rock excavation. The roadway typical cross section for ramps at interchanges would consist of one 4.2 m. (14 ft.) lane, 1.2 m. (4 ft.) inside shoulder and 2.4 m. (8 ft.) outside shoulders.

The following movements would be provided to and from Route 11 (Figs. 3-12a-c):

- One lane ramp from Route 11 southbound to I-95 northbound
- One lane ramp from Route 11 southbound to I-95 southbound
- One lane ramp from I-95 southbound to Route 11 northbound
- One lane ramp from I-95 northbound to Route 11 northbound (via I-395 northbound ramp)

Route 161 at the Exit 74 interchange would remain in its existing configuration, except that heading in the southbound direction on I-95, the third lane would drop and become the off-ramp for Route 161, providing more deceleration length than is currently provided. The left hand I-395 northbound ramp from I-95 northbound would be relocated to the right hand side, south of the U.S. Route 1 overpass. Vehicles would also be able to proceed to Route 11 northbound via this ramp further along on the ramp. The Route 11 northbound ramp would split off of the I-395 northbound ramp after passing under the relocated I-95. The following movements would be provided to and from Exit 75 – U.S. Route 1.

- One lane ramp from U.S. Route 1 to I-95 northbound
- One lane ramp from U.S. Route 1 to I-395 northbound
- One lane ramp from I-95 southbound to U.S. Route 1
- One lane ramp from I-395 southbound to U.S. Route 1



I–95 TYPICAL SECTION WITH CONCRETE BARRIER CURB MEDIAN

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State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
TYPICAL SECTIONS
I–95
Figure 3–11

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LIMIT OF CONSTRUCTION
ROUTE 1

LIMIT OF CONSTRUCTION
I-95 STA. 20+000

LIMIT OF CONSTRUCTION
ROUTE 161

CONNECTICUT COORDINATE GRID

ROUTE 161/ROUTE 1
INTERSECTION IMPROVEMENTS
SEE SHEET NO. 15

APPROXIMATE SLOPE LIMITS

BRIDGE WIDENING

ROUTE 161

ROUTE 1

LATIMER BROOK

GROUND DISCARD

CEMETERY (APP. LOCATION)

I-95 SB.

I-95 NB.

RTE. 161 NB OFF RAMP

ROUTE 161 NB ON RAMP

APPROXIMATE SLOPE LIMITS

EXISTING RIGHT OF WAY / NON-ACCESS LINE

SIGNALIZED INTERSECTION

BRIDGE - 2 SPAN (100m +/-)

PROPOSED RIGHT OF WAY / NON-ACCESS LINE

PRECAST CONCRETE BARRIER CURB

MATCH MARK
SEE FIG. 3-12b

BRIDGE - 1 SPAN (92m +/-)

PRECAST CONCRETE BARRIER CURB

APPROXIMATE SLOPE LIMITS

EXISTING RIGHT OF WAY / NON-ACCESS LINE

NOISE WALL

KING ARTHUR DRIVE

ROUTE 161/I-95
INTERCHANGE IMPROVEMENTS
SEE SHEET NO. 16

MANTIC RIVER

WATER LEVEL 494 (2089)

ROUTE 1

LIMIT OF CONSTRUCTION
ROUTE 1 STA. 61+245

LIMIT OF CONSTRUCTION
ROUTE 161

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MAP LEGEND

PROPOSED R.O.W. / NON-ACCESS LINE
EXISTING EDGE OF ROAD
WATER COURSE / WATER BODY
PROPOSED EDGE OF ROAD

SCALE IN METERS
0 25 50 75 100 125
SCALE 1:2500

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD

I-95 INTERCHANGE SKETCH PLAN

Figure 3-12a

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LIMIT OF CONSTRUCTION
I-395 STA. 51+400

EXISTING RIGHT OF WAY / NON-ACCESS LINE
PROPOSED RIGHT OF WAY / NON-ACCESS LINE
RETAINING WALL
APPROXIMATE SLOPE LIMITS
BRIDGE - 1 SPAN (36m +/-)
BRIDGE - 1 SPAN (34m +/-)
BRIDGE - 1 SPAN (30m +/-)
BRIDGE - 1 SPAN (30m +/-)
BRIDGE - 2 SPAN (66m +/-)
PRECAST CONCRETE BARRIER CURB
BRIDGE - 1 SPAN (22m +/-)
BRIDGE - 1 SPAN (30m +/-)
BRIDGE - 2 SPAN (53m +/-)
BEGIN RETAINING WALL
END RETAINING WALL
NOISE WALL
BRIDGE - 2 SPAN (44m +/-)
BRIDGE - 2 SPAN (54m +/-)
BRIDGE - 1 SPAN (30m +/-)
BRIDGE - 2 SPAN (15m +/-)
BRIDGE - 2 SPAN (58m +/-)
BRIDGE - 2 SPAN (70m +/-)
ROUTE 11 N.B.
ROUTE 11 S.B.
I-95 N.B.
I-95 S.B.
PKWY N
PARKWAY NORTH
PARKWAY SOUTH
GURLEY ROAD
OIL MILL BROOK
GROUND OBSCURED
MATCH MARK SEE FIG. 3-12c
MATCH MARK SEE FIG. 3-12a

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MAP LEGEND

- PROPOSED R.O.W. / NON-ACCESS LINE
- EXISTING EDGE OF ROAD
- WATER COURSE / WATER BODY
- PROPOSED EDGE OF ROAD

SCALE IN METERS
0 25 50 75 100 125
SCALE 1:2500

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD
I-95 INTERCHANGE SKETCH PLAN
Figure 3–12b

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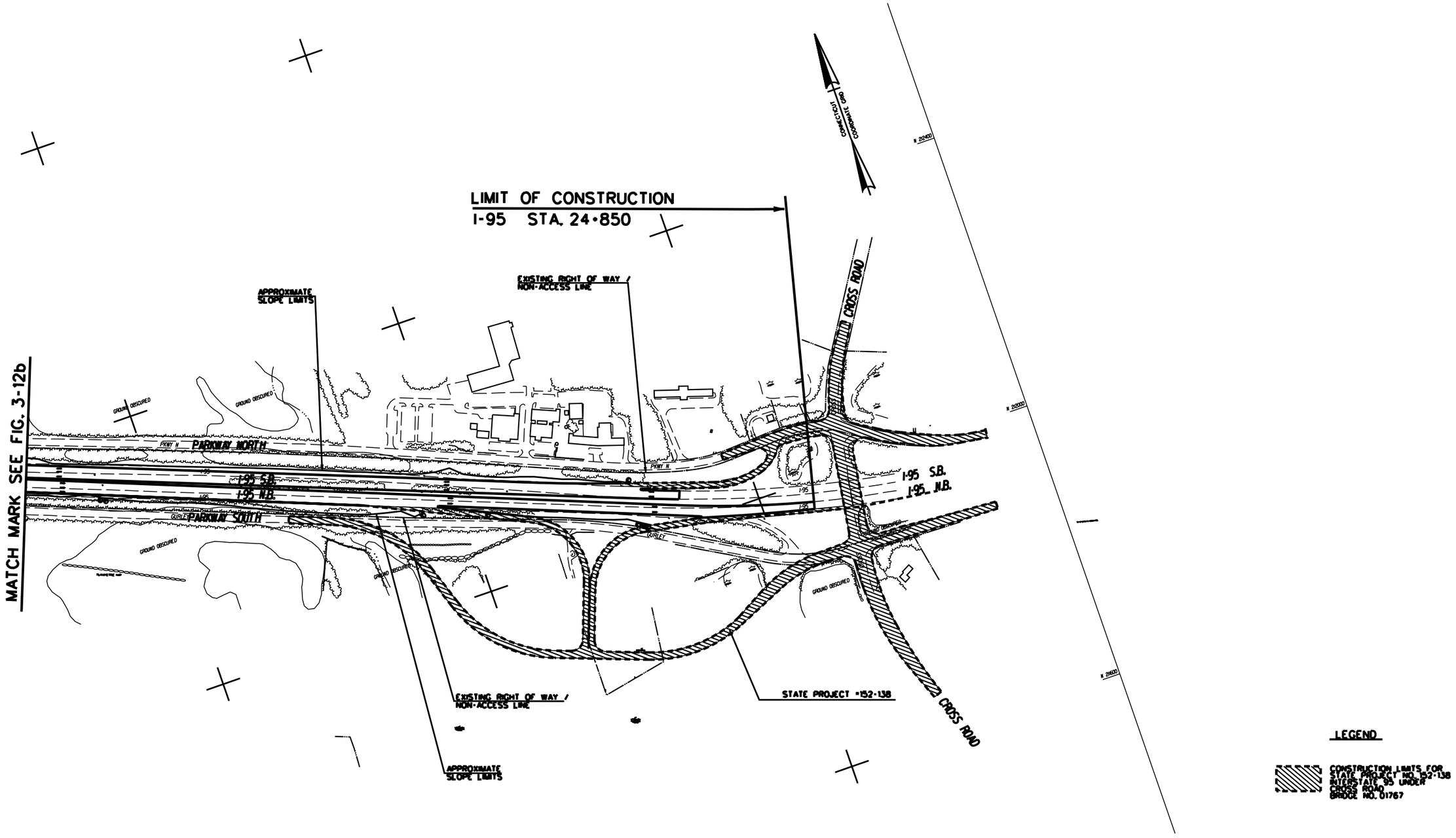

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MAP LEGEND

- PROPOSED R.O.W. / NON-ACCESS LINE
- EXISTING EDGE OF ROAD
- WATER COURSE / WATER BODY
- PROPOSED EDGE OF ROAD

SCALE IN METERS

0 25 50 75 100 125

SCALE 1:2500

State of Connecticut Department of Transportation
Federal Highway Administration

ROUTE 82 /85 /11 CORRIDOR
ENVIRONMENTAL IMPACT STATEMENT (EIS)
IN THE TOWNS OF
EAST LYME, MONTVILLE, SALEM AND WATERFORD

I-95 INTERCHANGE SKETCH PLAN

Figure 3-12c

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The interchange at Exit 75 - U.S. Route 1 would be reconfigured due to the existing deficiencies in this area, the additional movement from Route 11 and relocating the left hand I-95 exit to I-395 northbound to the right side. The existing northbound I-95 off-ramp to U.S. Route 1 and southbound on-ramp to I-95 southbound would be removed. These movements would still be provided at Exit 74 (Route 161) and Exit 81 (Cross Road) located approximately 0.9 km. (0.6 mi) away. The terminus of the U.S. Route 1 reconstruction would be from approximately 280 m. (900 ft.) south of the I-95 centerline to immediately south of the existing Latimer Brook Bridge on U.S. Route 1, approaching the intersection of U.S. Route 1 and Route 161.

U.S. Route 1 and the U.S. Route 1 bridge would be realigned and reconstructed as a result of the modifications to the interchange. The U.S. Route 1 bridge would consist of four 3.6 m. (12 ft.) lanes and 2.4 m. (8 ft.) outside shoulders to provide proper lane arrangement for the intersections associated with the ramps. PCBC would be utilized where the U.S. Route 1 to I-395 northbound ramp and I-95 northbound off-ramp to I-395 northbound ramp are in close proximity to each other. The barrier would prevent any movement from U.S. Route 1 to Route 11 northbound, thus avoiding a weaving condition.

As a result of the modifications to this interchange, intersection improvements would be required at U.S. Route 1 and Route 161, and the I-95 northbound off-ramp and Route 161 intersection. Improvements would include signal modifications, pavement marking modifications and minor widening to accommodate proper lane arrangement for acceptable levels of service, based on the projected traffic volumes at this location. The existing on-ramp from Gurley Road to I-95 northbound would be removed as well as the Exit 80 - Oil Mill Road off-ramp from I-95 southbound. New ramps to and from Route 11 would be constructed to replace both ramps. Access would be maintained by using the Exit 81 - Cross Road interchange, located approximately 0.9 km. (0.6 mi.) away.

The third lane on I-95 northbound would terminate at the Exit 81 - Cross Road interchange off-ramp. The third lane on I-95 southbound would begin as the on-ramp from Cross Road.

The following movements would be provided to and from I-395:

- I-95 northbound to I-395 northbound
- I-395 southbound to I-95 southbound
- U.S. Route 1 to I-395 northbound (also listed above as a U.S. Route 1 ramp)
- I-395 southbound to U.S. Route 1 (also listed above as a U.S. Route 1 ramp)

Bridges along I-95 and associated ramps include the following:

- I-95 over Route 161 (structure widening)
- I-95 over Latimer Brook immediately west of U.S. Route 1
- I-95 over Oil Mill Brook
- I-95 over Oil Mill Road
- I-95 northbound ramp to Route 11 northbound over I-395 southbound ramp to I-95 southbound
- I-95 northbound ramp to Route 11 northbound over I-395 southbound ramp to U.S. Route 1
- Route 11 southbound ramp over I-95 / I-395 southbound ramps to U.S. Route 1
- Route 11 southbound ramp over I-395 southbound ramps to I-95 southbound
- Route 11 southbound ramp over I-95 northbound & southbound & I-395 northbound ramps
- Route 11 southbound ramp over Oil Mill Road
- Route 11 northbound ramp over Oil Mill Road & Oil Mill Brook
- Route 11 northbound ramp over I-395 northbound
- Route 11 northbound ramp over I-395 southbound ramp to I-95 southbound
- Route 11 northbound ramp over I-395 southbound ramp to U.S. Route 1
- U.S. Route 1 over I-95
- U.S. Route 1 ramp to I-95 northbound over Oil Mill Road

In addition, retaining walls would be provided along the U.S. Route 1 ramp and Route 11 ramp to I-95 northbound south of Oil Mill Road. This construction is to accommodate a shift in the roadway that is necessary in order to avoid impacting an historic house located on Gurley Road. Retaining walls would also be provided along Parkway North south of Oil Mill Road.

The estimated construction, preliminary engineering and right-of-way acquisition costs, including contingencies, is estimated to range between $843,000,000 and $924,000,000, in projected year of expenditure (2013) dollars. Of this amount, between $364,000,000 and $400,000,000 is associated with the I-95/I-395/U.S. Route 1 interchange. Much of the higher cost of the preferred alternative is attributed to the additional bridges and other structures added to minimize environmental impacts, and as a result of the annual rate of inflation projected for the year of expenditure. Construction of noise walls, as necessary, is included in the estimated roadway construction cost. Right-of-way acquisition costs are estimated to range between $18,360,000 and $20,100,000. Estimated costs for additional parcel acquisition for wetland and habitat mitigation, as well as costs associated with implementation of the mitigation program, range between $8,350,000 and $9,100,000.

A financial plan for the Preferred Alternative is required that utilizes the most current project cost estimates acceptable to FHWA. The financial plan must be submitted for

approval by FHWA to demonstrate that adequate funding resources are available for this project. Both a project management plan and a financial plan will be required, pursuant to Section 106(h) of title 23, United States Code, as amended, prior to the authorization of federal funding for any of the subsequent project phases (preliminary engineering, rights-of-way, or construction).