3.0 ALTERNATIVES

3.1 Introduction

This chapter provides a description of the No Build Alternative and the 2005 Selected Alternative evaluated in this FSEIS, as well as a summary of other Build Alternatives considered and dismissed previously in the development of the project because they would not meet the purpose and need and/or were impracticable. In response to comments on the DSEIS, this chapter provides a reevaluation of alternatives that were previously dismissed and new alternatives that were not considered as part of the 2004 FEIS process. The reevaluation concludes that there are no changes or new information that would warrant a detailed analysis of previously dismissed or new alternatives in this FSEIS.

3.2 Description of the Alternatives Evaluated in this FSEIS

3.2.1 No Build Alternative

The future condition without the proposed project is called the No Build Alternative. The No Build Alternative does not meet the purpose and need for the project. Analysis of the No Build Alternative is required by the National Environmental Policy Act (NEPA) and is used as a baseline for the evaluation of the environmental effects of the 2005 Selected Alternative.

Reasonably foreseeable transportation projects that would be completed by 2020 or 2030 were identified for inclusion in the No Build Alternative roadway network based on discussions and communications between the New Hampshire Department of Transportation (NHDOT), the Central New Hampshire Regional Planning Commission, the Southern New Hampshire Planning Commission, the Nashua Regional Planning Commission, the Rockingham Planning Commission and the Commonwealth of Massachusetts. The following major roadway projects were included as part of the 2020 No-Build for Scenario 1 and Scenario 2:

- Bedford-Manchester, F.E. Everett Turnpike Airport Access Road
- Manchester, I-293 Exit 5 (Granite Street) interchange
- Windham- Salem, NH 111 Bypass
- Nashua, Broad Street Parkway
- Derry-Londonderry, I-93 Exit 4A

The following major roadway project was included as part of the 2030 No-Build for Scenario 2:

- Bow-Concord, Widen I-93 to six lanes between I-89 and Exit 15

For the 2020 roadway network it was assumed that the portion of I-93 in northern Massachusetts would have its current configuration of 3 lanes in each direction plus use of the breakdown lane as a travel lane in the peak periods. For the 2030 roadway network, it was assumed that the

fourth travel lane would be fully operational and that the shoulder would be restored. These assumptions were based on input from the Massachusetts Executive Office of Transportation (MA EOT).[1]

The No Build Alternative does not include the bus-on-shoulder service recommended by the I-93 Bi-State Transit Investment Study Preliminary Definition and Evaluation of Alternatives report. At this time the bus-on-shoulder service is not foreseeable because it is based on preliminary strategic planning and requires major infrastructure improvements in Massachusetts. Key steps to the implementation of the bus-on-shoulder concept have not yet been taken, such as the creation of an implementation agreement between NHDOT, MassDOT, transit agencies and operators, Federal Transit Administration (FTA), FHWA, and area regional planning commissions (RPCs). The bus-on-shoulder concept and infrastructure improvements are not currently included in statewide or metropolitan planning organization (MPO) fiscally constrained long-range transportation plans. For more information on the I-93 Bi-State Transit Investment Study and the decision to not include the conceptual bus-on-shoulder service in the No Build Alternative, see DSEIS Appendix A: Traffic Written Reevaluation/Technical Report.

3.2.2 2005 Selected Alternative

Description of the 2005 Selected Alternative

The main element of the 2005 Selected Alternative involves widening I-93 from the existing two-lane highway in each direction to a four-lane highway in each direction. The 2005 Selected Alternative begins in the Town of Salem, NH at the Massachusetts/New Hampshire State line and extends northerly through Salem, Windham, Derry and Londonderry, and into Manchester, ending at the I-93/I-293 interchange. In addition, the proposed project includes the following design modifications and infrastructure improvements for the five interchanges and local roads within the project corridor:

- Replace the red-listed Cross Street Bridge in the Exit 1 Interchange area.
- Reconstruct the Exit 1 interchange to improve substandard ramp geometry and replace seven red-list bridges.
- Reconstruct the Exit 2 interchange to a diamond-type interchange configuration and replace four red-listed bridges.
- Widen and reconstruct Pelham Road from Policy Road to Stiles Road.
- Replace the Brookdale Road Bridge.
- Replace four bridges, including two red-listed bridges, and relocate both the northbound and southbound barrels of I-93 into the median area in the vicinity of Exit 3.
- Reconfigure the Exit 3 interchange ramps with a diamond interchange design.
- Reconstruct and widen NH 111 beginning just west of the NH 111/NH 111A intersection.

[1] MA EOT was combined with other Massachusetts transportation agencies in 2009 to form the Massachusetts Department of Transportation (MassDOT).

- Relocate NH 111 north of its existing location before tying into existing NH 111 near the NH 111/Wall Street intersection.
- Relocate NH 111A on a new alignment near the NH 111/Wall Street intersection.
- In the Exit 4 Interchange area, widen I-93 to the east, retaining the existing layout for the southbound ramps.
- Reconstruct the existing Exit 4 northbound ramps diamond configuration with longer ramps.
- Reconstruct and widen NH 102 from Londonderry Road to the southbound ramps.
- Replace the NH 102 bridge over I-93 with a new bridge built directly south of the existing bridge.
- Reconstruct the Ash Street/ Pillsbury Road Bridge off-line.
- Reconstruct and widen NH 28 on-line from Symmes Drive to Liberty Drive including the reconstruction of the Perkins Road, Vista Ridge and Symmes Drive approaches, as well as the reconstruction of a portion of both Liberty and Independence Drives.
- Reconstruct the existing substandard diamond interchange at Exit 5 and replace four red-listed bridges.

In addition to the overall corridor highway improvements, the proposed project includes three new park-and-ride lots at Exits 2, 3 and 5, improvements to the existing park-and-ride facility at Exit 4, and new bus terminals at Exits 2, 4 and 5.

- Construct a 470-space park-and-ride facility and bus terminal at Exit 2 adjacent to the interchange in the SE quadrant with access via Pelham Road (eastbound traffic only) and from South Policy Street via Raymond Avenue (all directions).
- Construct a park-and-ride lot at Exit 3 adjacent to the relocated northbound barrel in the SE quadrant of the reconstructed interchange. Access would be from NH 111 east of the Exit 3 Interchange and from relocated NH 111A. Other locations are being considered within the immediate area of the interchange.
- Retain the existing parking lots at Exit 4 and construct a new bus terminal building.
- Construct a park-and-ride lot and bus maintenance facility at Exit 5 in the NW quadrant of the interchange just west of the southbound off-ramp. The park-and-ride lot access is from NH 28 (westbound traffic only) and from Symmes Drive (all directions) connecting to NH 28. This maintenance facility supports the implementation of the Expanded Bus Services provided by Boston Express.

Design Refinements Since the 2004 FEIS

Since the 2004 FEIS, the design of the 2005 Selected Alternative has been advanced. The reevaluation of the environmental impacts in this FSEIS takes into account these design refinements on a resource by resource basis.

Expanded Bus Service

NHDOT has developed a program to provide expanded intercity and commuter bus service in the I-93 corridor. In November 2008, the Boston Express bus service began operating between the Exit 5, Exit 4, and Exit 2 bus terminals and South Station and Logan Airport. The service operates seven days a week from Exits 5 and 2 and weekdays only from Exit 4, providing approximately 22 roundtrips on weekdays and 18 roundtrips on weekends. The bus service is a public/private partnership funded through the Congestion Mitigation and Air Quality Program (CMAQ). Total ridership for the expanded service in 2009 was 287,000 (Exit 2, Exit 4, Exit 5 and Manchester).

Intelligent Transportation Systems

Intelligent Transportation System (ITS) technologies and Incident Management strategies are an integral part of the overall transportation improvement strategy for the I-93 corridor. NHDOT proposes to implement some of these measures such as variable message boards, highway advisory radio broadcasts, web site information, emergency reference markers, and coordination strategies among safety agencies before the highway widening. Additional measures will be added when the highway widening is completed.

NHDOT, FHWA, the New Hampshire Department of Safety (NHDOS) and local emergency responders have initiated a program to address the mobility and safety implications of traffic incidents on the I-93 corridor before, during and after the construction of the 2005 Selected Alternative. Traffic incident management training workshops and meetings were held with state and local stakeholders to solicit their input on the needs and opportunities seen in the corridor. A multi-disciplined Incident Management Work Group of NHDOT employees was tasked with developing an action plan from the feedback gathered from these sessions. A Technical Steering Committee, established in 2007, and formalized with local chairmanship in 2008, adopted the I-93 Traffic Incident Management Plan (TIMP) on March 26, 2008. The plan established the following goals:

- Goal #1: Minimize the impacts of incidents on travel
- Goal #2: Improve safety at the incident scene
- Goal #3: Reduce the probability of secondary incidents
- Goal #4: Foster inter-agency cooperation
- Goal #5: Establish a sustainable traffic incident management program

The plan outlined the following strategies to achieve these goals:

- Strategy 1.1: Service Patrols. Service patrols involve assisting motorists stranded with minor vehicle problems to reduce congestion and safety issues caused by drivers shying away from vehicles stopped on the shoulder.

- Strategy 1.2: Intelligent Transportation System (ITS) Devices. ITS devices include cameras, traffic sensors, dynamic message signs, Highway Advisory Radio and phone-based "511" traveler information systems.
- Strategy 1.3: Communications Protocols. Communications protocols deal with the way in which ITS strategies are implemented to provide coordinated response to incidents and communicate information to travelers.
- Strategy 1.4: Emergency Detour Routes. Emergency detour routes help alleviate the traffic congestion on local roads as well as on the interstate during traffic incidents by allowing traffic to bypass the section of the interstate that is affected by an incident.
- Strategy 1.5: Individual Work Zone Traffic Incident Management Plans. This strategy involves the development of detailed traffic incident management measures specific to individual construction projects along the corridor.
- Strategy 1.6: Emergency Responder Support Infrastructure. Emergency responder support infrastructure includes issues such as access to the highway, turnaround points, and access to water sources.
- Strategy 1.7: Memorandums of Agreement (MOA). Examples of the types of MOAs between state agencies, local communities, and private entities envisioned by this strategy include standardization/interoperability of radio communications, traffic signal operations and maintenance, video and data sharing, utility (fire access and standpipe) maintenance and towing services.
- Strategy 1.8: Public Education and Awareness. A public outreach campaign will disseminate information about upcoming construction activities, TIMP strategies and traffic conditions.
- Strategy 1.9: Technical Steering Committee (TSC). The TSC is intended to improve interagency coordination and implementation of the TIMP strategies.
- Strategy 1.10: Post Incident Review Process. A formal post incident review process will improve coordination between responders and identify areas for improvement.
- Strategy 1.11: Enhanced Reference Location Signs. Improved mile marker signs will be installed to increase the accuracy of incident location identification and response times.

Potential Future Mass Transit Accommodations

The 2005 Selected Alternative does not include rail service within the I-93 corridor, or along the former Manchester and Lawrence Rail Line Corridor. However, the 2005 Selected Alternative will accommodate space for potential future mass transit opportunities between the MA/NH state line northerly to the Exit 5 Interchange. The potential rail line within the highway corridor could be a link in a future service between Lawrence, MA or Woburn, MA (and ultimately Boston, MA) to the south and the Manchester Airport and/or the City of Manchester, NH to the north. In addition, the proposed layout provides provisions, such as bridge replacements and continued grade separated crossings, to facilitate, and not preclude, the reestablishment of future rail service on the Manchester- Lawrence line.

NHDOT and the Commonwealth of Massachusetts are evaluating potential public transportation alternatives for the I-93 corridor as part of the separate I-93 Bi-State Transit Investment Study. While the transit service alternatives being evaluated by the Bi-State study would enhance mobility in the corridor, they would not divert sufficient vehicle trips from I-93 to eliminate the need to widen I-93 to four-lanes in each direction. For detailed information on the projected transit ridership levels supporting this conclusion, refer to the I-93 Transit Investment Study Ridership Memo provided in DSEIS Appendix A: Traffic Written Reevaluation/Technical Report.

Incremental Implementation

As discussed in Chapter 10, four waterbodies impaired for chloride are crossed by I-93 (Beaver Brook, Dinsmore Brook, the north tributary to Canobie Lake, and Policy Brook). Water quality impairment occurs when a waterbody fails to meet the applicable water quality standards (33 U.S.C. § 1313). Section 303 (d) of the Clean Water Act requires development of a pollutant loading and reduction plan, called a Total Maximum Daily Load (TMDL) for each impaired waterway (33 U.S.C. § 1313). The purpose of the TMDL is to identify existing loads in order to identify and eliminate the impaired status. On January 22, 2009, EPA issued a letter to NHDES approving the TMDL studies conducted for the chloride-impaired waterbodies in the I-93 corridor. While EPA approves the TMDL reports establishing the total reduction in chloride loadings needed to achieve water quality standards, NHDES is responsible for the implementation of the TMDLs. For the chloride impaired waterbodies in the I-93 corridor, NHDES will prepare an Implementation Plan containing chloride load allocations. The load allocations will be distributed among the various entities responsible for chloride loadings (e.g. NHDOT for roads maintained by the State, individual municipalities for municipal roads, etc.).

In the 2005 Record of Decision (ROD), FHWA and NHDOT committed to no additional chloride loading from the project to the impaired waterbodies within the corridor. The 2005 ROD concluded that three-lanes could be operated in each direction without increasing chloride loadings based on current salt application best management practices. To meet the commitment to no additional chloride loading, the 2005 ROD required incremental implementation of the project in the event that agreement is not reached with NHDES prior to commencement of construction that new technology, best management practices, and/or other considerations are sufficient for the project to be completed in compliance with conditions placed on the Section 401 Water Quality Certification. The 2005 ROD defined incremental implementation as building the full four-lane footprint for the 2005 Selected Alternative, but only paving and operating the highway as a six lane facility (three lanes in each direction). Bridges and their approaches would be built initially in the final four-lane configuration. The fourth lane would be completed and opened to traffic when agreement with NHDES is reached on chloride issues.

The Section 401 Water Quality Certificate (approved May 2, 2006) references the 2005 ROD and contains a provision requiring incremental implementation of the project if TMDL salt reduction loads cannot be met to ensure compliance with the Clean Water Act. Water Quality Certificate condition E-11 states:

> "if TMDLs are not approved by EPA and implementation plans are not completed and established with implementation of chloride load reductions in accordance with the plan, for the Activity and other roads operated by the Applicant in the TMDL watersheds, the Applicant shall incrementally implement the Activity, as proposed in the last paragraph of Section 1.3 of the ROD, by paving and operating only three lanes in each direction until implementation of the TMDLs is established for roads operated by the Applicant in the TMDL watersheds."

NHDOT and FHWA are cooperating with NHDES's effort to engage towns and the private sector in order to assist in the development of implementation plans that seek to meet the TMDL load reduction requirements in an equitable manner. To assist with the implementation of TMDL load reductions, NHDOT is also assisting the towns in applying for salt reduction grants. A total of $2.5 million is available from FHWA for the municipal salt reduction program. The first phase of the municipal salt reduction program involves each municipality creating a salt management plan. The salt management plans are expected to be completed by July, 2010. Following approval of the salt management plans by a Salt Reduction Workgroup Steering Committee consisting of representatives of NHDOT, EPA, NHDES and FHWA, the towns will be eligible to receive funds for the implementation of their salt management plans.

Incremental implementation of the project (three-lanes in each direction) is possible in the interim, depending on the timing of the implementation of the TMDLs. However, the long-term plan remains to implement the four-lane 2005 Selected Alternative, not the three-lane alternative. As discussed in Section 3.3.4, the changes and new information since the 2004 FEIS do not change the previous conclusions regarding the three-lane alternative.

Project Costs

An initial total project cost of $425 million was estimated in 2002 for the DEIS and Public Hearing. A total revised project cost of $480 million was estimated prior to the June 2005 ROD to coincide with the start of final design. This estimate updated the conceptual DEIS estimate by a simple across the board increase of 10 percent. As part of the 2008 Financial Plan update for the project, NHDOT has prepared a detailed total cost estimate of $795 million (inflated to the future year of construction dollars), see Table 3-1. The major causes of the increase in the project cost estimate include:

- Construction costs escalation (2003- 2006).
- Escalation in right-of-way acquisition costs due to higher than anticipated costs for acquired parcels, post-acquisition settlements, and planned acquisition of larger parcels.
- Ancillary projects such as the start-up costs of the expanded bus service and more detailed cost estimates for Intelligent Transportation Systems (ITS) and Incident Management (IM) elements. These costs were not anticipated in the previous cost estimates.
- Increases in engineering costs as a result of existing consultant contracts, the need to complete the SEIS and general state engineering increases.

Table 3-1
Current Cost Estimates

		Estimated Cost (millions)
Construction	Early Action	$73.8
	Mainline Priorities	$302.1
	Mainline Capacity Improvements	$235.5
	Subtotal	*$611.3*
Right-Of-Way	Acquisitions	$65.4
	Mitigation	$46.6
	Subtotal	*$111.9*
Engineering		$71.2
Total		$794.4

Source: I-93 Improvements 2008 Financial Plan

NHDOT is using a prioritized implementation strategy, utilizing the existing financial resources and available and expected bonding capacity to advance the construction of the project with an emphasis on the areas of greatest concern for safety, capacity and infrastructure condition. It is important to note that all work completed on the corridor will be functional and will be used to manage traffic volumes as construction along the corridor advances. Every segment will be usable once it is complete.

The 2005 Selected Alternative is fully funded in the Rockingham Planning Commission (RPC) and Southern New Hampshire Planning Commission (SNHPC) Metropolitan Planning Organization (MPO) long range plans and Transportation Improvement Programs (TIPs) with a 2020 open-to-traffic date. The revenue forecasts in the RPC and SNHPC MPO long range plans assume future revenue sources that are reasonably expected to be available for project implementation. These assumptions are reasonable because the State of New Hampshire has demonstrated their ability to secure legislative approval for GARVEE bond financing for the project, and assumptions of future growth in apportionment of Federal funds, toll rate increases and total resources allocated for I-93 are consistent with historical trends.

3.3 Summary of Alternatives Considered and Rejected

Section 3.3.1 summarizes the alternatives considered and rejected through the scoping process for the 2002 DEIS. Section 3.3.2 identifies the reasonable range of alternatives analyzed in the 2002 DEIS and 2004 FEIS. Section 3.3.3 explains the rationale for the 2005 Selected Alternative. During the reevaluation of the 2005 Selected Alternative, no information was found that would require the reexamination of other alternatives previously rejected.

3.3.1 Alternatives Screening

Conceptual alternatives were identified and discussed in the Scoping Report (VHB, May 2000) and the subsequent Rationale Report (VHB, January 2001). Both of these documents were provided to the appropriate federal and state resource agencies and comments solicited. In addition, a series of agency coordination and public information meetings were conducted as part

of the alternatives screening process, see Sections 2.4.1 and 2.4.2 of the 2004 FEIS. The conceptual alternatives identified provided a range of potential solutions or actions to address the purpose and need of the I-93 Salem-Manchester project. The six basic types of alternatives were:

- No-Build,
- Implementation of Transportation System Management (TSM) actions,
- Providing additional lanes to the existing highway (highway widening),
- Implementation of Transportation Demand Management (TDM) strategies
- Providing alternative modes of transportation (a form of TDM),
- A combination of these.

Alternative highway corridors involving the relocation of I-93 (or sections thereof) to bypass existing I-93 were not considered viable options because of the magnitude of investment required, presumed environmental impacts, and current traffic patterns associated with the existing facility.

Transportation System Management

A variety of transportation system management (TSM) measures were considered, including interchange geometry improvements, ramp metering, shoulder lane use, and Intelligent Transportation Systems (e.g. incident management, cameras, dynamic message signs). It was concluded that TSM measures alone would not address all the long-term safety and capacity needs of the I-93 corridor, but some TSM actions can provide short-term relief in advance of a more comprehensive solution. Specifically many of the interchange TSM actions would, in the short-term, enhance the safe and efficient flow of traffic in the vicinity of the interchanges. In addition, Intelligent Transportation Systems (ITS) technology will be incorporated into the overall improvements to I-93. Such systems will supplement and complement regional and statewide efforts currently underway in New Hampshire, and will serve in the long-term to enhance the safety and capacity of the I-93 corridor. Ramp metering was not proposed to be carried forward for further study as its effectiveness relative to improving I-93 would be limited to the southbound barrel in the morning peak period, and the resulting backups on secondary roads within the interchange area would be excessive. The evaluation of shoulder lane use did not support its continued consideration because of safety, cost and construction scheduling issues.

Highway Widening and Interchange Improvements

Highway widening alternatives considered included a three-lane alternative, four-lane alternative and a combination alternative. In addition, numerous interchange reconstruction alternatives were evaluated. Environmental, socioeconomic and engineering constraints were taken into account during the development of these alternatives with impacts to resources minimized as practicable. It was concluded that all three of the highway widening alternatives should be

advanced for detailed analysis in the EIS. In addition, several of the interchange options were advanced.

Transportation Demand Management

Transportation demand management (TDM) encompasses strategies that are designed to change personal travel behavior to reduce the demand for automobile use and the need for highway capacity expansion. TDM measures considered included employer-based incentives, congestion pricing, High Occupancy Vehicle (HOV) lanes, park-and-ride lots, bus service improvements, and rail service improvements.

Congestion pricing was not proposed for further study as it would do little to address current congestion levels, there is a lack of alternative routes or modes and heavy public opposition was anticipated.

Based on the study of potential ridership and its affect on highway level of service, bus service, rail service and the use of HOV lanes, either alone or in combination with each other, do not eliminate the need to widen the highway, if acceptable levels of service are to be achieved over the next 20 years. The mode options will help alleviate the number of hours over which congestion occurs, but the peak hour of congestion will remain, and under many of the mode combinations tested, the 3+ hour period of congestion will remain. These measures do not result in enough diversion to influence the need to widen the highway and would result in major additional expenditures for construction and long term operation. They also require substantial investment by the State of Massachusetts. With this in mind, it was concluded that further consideration of HOV lanes and rail service would be discontinued as part of this project.

Expanded bus service, new park-and-ride lots and enhanced ridesharing opportunities were proposed for further evaluation. In addition, given the possibility that rail service will be required to meet the long-range needs of transportation in the area served by I-93, it was proposed that space be reserved within the I-93 highway corridor for a possible future passenger rail line. By reserving such space, future opportunities for rail service, and possibly as an interim measure for bus service, will remain available.

In the 2004 FEIS NHDOT committed to conducting a study with the Commonwealth of Massachusetts to evaluate long-term transit alternatives between Boston, MA and Manchester, NH. The objective of the I-93 Bi-State Transit Investment Study is to determine future transit investments necessary to meet mobility needs within a study area which encompasses the study area for the I-93 project as well as part of Massachusetts, and to develop a strategic plan for funding and phased implementation of the recommended options. As part of the study, a Preliminary Draft Definition and Evaluation of Alternatives report was issued evaluating conceptual alternatives and recommending implementation of bus-on-shoulder service on I-93 and preservation of the Manchester & Lawrence right-of-way for potential future use (NHDOT and MAEOT, 2008). The bus-on-shoulder service was found to have roughly the same ridership at half the cost of rail. Therefore, a new rail transit service was found to not meet cost effectiveness criteria in comparison to the bus-on-shoulder alternative, but may be feasible in the future, possibly beyond the study's 2030 horizon year.

3.3.2 Identification of a Reasonable Range of Alternatives

Based on the collective consideration and analysis summarized in Section 3.3.2, the following seven alternatives or combination thereof were selected as a "reasonable range of alternatives" for more detailed evaluation in the 2002 DEIS and 2004 FEIS:

1. The No-Build Alternative, which essentially serves as the baseline condition for comparison with the Build Alternatives.

2. Transportation Systems Management (TSM) measures; specifically minor improvements such as ramp lengthening and lane widenings that can be accomplished within the existing ROW at minimal expense. Such measures generally do not address the long-term project purpose and need, but can help to alleviate problems in the near term. Two other TSM measures, ramp metering and shoulder lane use, were determined to be impractical and were not proposed for further consideration.

3. Widening I-93 to 4-lanes in each direction the entire length of the corridor including interchange improvements, in addition to constructing or expanding park-and-ride lots at Exits 2, 3, 4, and 5, and providing room and, as practical, constructing sub-grade for future rail transit service within the highway corridor.

4. Widening I-93 to 3-lanes in each direction for the entire length of the corridor including interchange improvements, in addition to the same park-and-ride lot construction and provision for future rail transit service as noted with the 4-lane widening alternative.

5. Widening I-93 to 4-lanes in each direction south of Exit 3 and 3-lanes in each direction north of Exit 3 including interchange improvements, along with the provisions proposed with either the 3 or 4-lane widening schemes. This is the so called "Combination Alternative".

6. Transportation Demand Management (TDM) measures; specifically Intelligent Transportation Systems (ITS) techniques as well as employer based measures utilizing incentives and disincentives to encourage people to not drive alone. It was concluded that congestion pricing, another TDM measure, would be impracticable.

7. Improvements in bus service to include expanding existing service and providing enhanced ride-sharing opportunities to employment centers in northern Massachusetts. After ridership studies, it was concluded that neither rail service nor HOV lanes would be effective alone or in combination with other mode options in satisfying the need for the project.

In a Memorandum of Agreement signed in the Fall of 2002, the U.S. Army Corps of Engineers (ACOE), U.S. Environmental Protection Agency (EPA), U.S. Fish & Wildlife Service (USFWS),

Federal Transit Administration (FTA), NHDES, New Hampshire Fish and Game Department (NHF&GD), and the New Hampshire Division of Historical Resources (State Historic Preservation Office - SHPO) agreed that these alternatives represented a reasonable range of alternatives.

3.3.3 Rationale for the 2005 Selected Alternative

The No Build Alternative would not meet the purpose and need for the project. The four-lane alternative rather than the three-lane alternative or combination alternative was selected as the final configuration, since four lanes provide an adequate level of service for future traffic projections, with limited additional direct impacts to the environment and at a similar cost (5 percent increase) (See Section 2.8 of the 2004 FEIS). On December 30, 2003 ACOE issued a letter to NHDOT identifying the four-lane alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA) under the Section 404(b)(1) Guidelines.

3.3.4 Reevaluation of Alternatives

As a result of the Court Order, the scope of the SEIS is limited and does not include analysis of alternatives other than the 2005 Selected Alternative. The Court Order directed NHDOT and FHWA to prepare a focused SEIS specifically considering: "how the Delphi Panel's population forecasts affect Defendant's analysis of both the effectiveness of the Four Lane Alternative as a traffic congestion reduction measure and the indirect effects of the population predicted by those forecasts on secondary road traffic and air quality issues." The Court Order did not require additional analysis of other alternatives. The limited scope of this SEIS was disclosed in the Notice of Intent published in the Federal Register on March 12, 2008. The use of a limited scope SEIS is explicitly allowed under FHWA's NEPA regulations (23 CFR 771.130 (f)).

Nevertheless, in response to comments on DSEIS, this section provides a reevaluation of alternatives that were previously dismissed and new alternatives that were not considered as part of the 2004 FEIS process. The reevaluation concludes that there are no changes or new information that would warrant a detailed analysis of previously dismissed or new alternatives in this FSEIS.

Three-Lane Alternative

Comments on the DSEIS included the desire for the three-lane alternative to be analyzed in the FSEIS based on the following new information: 1) the updated New Hampshire Statewide Model, 2) the use of the gravity model approach instead of the Delphi Panel for Scenario 2, and 3) population projections that have been revised downward since the 2004 FEIS. The changes and new information since the 2004 FEIS do not change the previous conclusions regarding the three-lane alternative. The basis for the decision not to analyze the three-lane alternative in the FSEIS is discussed in detail below.

Updated New Hampshire Statewide Model

The primary change to the New Hampshire Statewide Model since the 2004 FEIS has been the updates to population and employment information. This issue is addressed below in the Updated

Population and Employment Projections section. In addition to the population and employment updates, the updates to the New Hampshire Statewide Model between 2005 and 2007 included:

- Conversion of the model software platform from EMME/2 to TransCAD. The current TransCAD model retains the same basic structure and inputs as the original EMME/2 model developed in 1997. Therefore, this change would not substantially affect the results of the 2004 FEIS analysis of the three-lane alternative.
- Tourist trip purpose modeling. This additional feature would not substantially affect the results of the 2004 FEIS analysis of the three-lane alternative because tourist trips remain a limited proportion of overall travel activity.
- Transit model update. The transit network was updated to account for service changes since 1995-1998. These minor updates to the modeling of intercity rail and bus service would not substantially affect the results of the 2004 FEIS analysis of the three-lane alternative because transit ridership remains very small in comparison to the number of trips on I-93 made by automobiles and trucks.

The New Hampshire Statewide Model is an updated and improved tool, not new information unto itself. For more information on the updates to the New Hampshire Statewide Model, refer to DSEIS Appendix A-2.

Use of Gravity Model Approach for Scenario 2

The gravity model approach was used to model potential indirect land use effects under Scenario 2, instead of the Delphi approach used in the analysis of Scenario 1. The gravity model changes the distribution of population and employment in the region based solely on changes in accessibility.[2] In this case, the New Hampshire Office of Energy and Planning's (OEP's) population forecast is used as the basis for the Build Condition and the gravity model is used to define the No Build condition (distribution of population and employment without the project). However, the gravity model analysis for Scenario 2 shows a relatively small change in the distribution of population and employment as a result of the project (See for example, Table 12-7). Therefore, the gravity model approach itself does not substantially affect the results of the 2004 FEIS analysis of the three-lane alternative. The issue of changes in population and employment projections is addressed below.

Updated Population and Employment Projections

The Scenario 2 2020 population and employment projections used in the traffic modeling for the SEIS are only slightly higher than the population and employment projections used in the traffic modeling for the 2004 FEIS. As a result, the three-lane alternative would perform similar to or worse than it did in the 2004 FEIS analysis under Scenario 2 in 2020. Therefore, additional detailed analysis of the three-lane alternative in the SEIS is not warranted or necessary.

[2] Accessibility can be understood as the attractiveness of a place of origin (how easy it is to get from there to all other destinations) and as a destination (how easy it is to get to there from all other origins and destinations). Consequently, the structure and capacity of the transportation network affect the level of accessibility in a given area. The accessibility of places can have an impact on land value, and hence the use to which land is put. Holding all other factors constant, the gravity model formulation assumes that areas where accessibility increases as a result of a transportation project will be relatively more attractive for development than if the project had not been built.

The 2020 population and employment levels used in the 2004 FEIS traffic modeling were based on OEP projections from the mid-1990's. These projections were developed using the results of the 1990 Census. Subsequent to the release of the 2000 Census results, growth projections were revised upward. The 2005 Traffic Sensitivity Analysis (TSA) reported that the population projections used in the 2004 FEIS traffic model for the 23 communities in the New Hampshire portion of the Delphi study area was 11 percent lower than the latest available OEP projection at that time (See DSEIS Appendix A-1: 2005 Traffic Sensitivity Analysis). Since the release of the TSA, OEP has lowered their growth projections, but they still remain slightly higher than the projections used in the traffic modeling for the 2004 FEIS. For example, the 2020 population for the 23 communities under the Scenario 2 No Build condition is 3.9 percent higher than the population used in the 2004 FEIS modeling. The 2020 employment for the 23 communities under the Scenario 2 No Build condition is 7 percent higher than the population used in the 2004 FEIS modeling. A detailed comparison of the population levels used in the 2004 FEIS traffic modeling with the Scenario 2 2020 and 2030 No Build is provided in Table 3-2. The relative difference between the 2004 FEIS population levels and the Scenario 2 population levels would be slightly larger if the comparison was made to the Scenario 2 Build condition instead of the No Build condition.

Conclusion

The changes since the 2004 FEIS, including changes in population and employment growth projections, show that the three-lane alternative would perform similar or worse than it did in the 2004 FEIS. The three-lane alternative underperformed as a congestion mitigation measure for 2020 and would continue to provide inadequate LOS for 2030 (refer to FSEIS Appendix B: Three-Lane Alternative Memorandum for detailed information on the expected LOS for the three-lane alternative for Scenario 2 2020 and 2030). No new information has been identified that would change the conclusions of the 2004 FEIS regarding the three-lane alternative. Therefore, the information used in the decision to select the four-lane alternative remains valid.

Table 3-2
Comparison of Population Projections Used in Transportation Modeling
2004 FEIS vs. Scenario 2 2020 and 2030 No Build

	2004 FEIS 2020 Population	Scenario 2 2020 No Build Population	Difference	Percent Difference	2030 No Build Population	Difference	Percent Difference
Allenstown	5,731	5,634	-97	-1.7%	5,976	245	4.1%
Atkinson	6,639	7,307	668	9.1%	7,707	1,068	13.9%
Auburn	6,308	5,680	-628	-11.1%	5,999	-309	-5.2%
Bedford	28,250	23,730	-4,520	-19.0%	24,978	-3,272	-13.1%
Bow	7,974	9,731	1,757	18.1%	10,838	2,864	26.4%
Candia	4,594	4,516	-78	-1.7%	4,755	161	3.4%
Chester	3,753	5,116	1,363	26.6%	5,449	1,696	31.1%
Concord	41,813	47,626	5,813	12.2%	50,527	8,714	17.2%
Danville	5,484	5,057	-427	-8.4%	5,383	-101	-1.9%
Deerfield	5,537	4,744	-793	-16.7%	5,035	-502	-10.0%
Derry	49,547	37,960	-11,587	-30.5%	39,086	-10,461	-26.8%
Dunbarton	2,980	2,881	-99	-3.4%	3,102	122	3.9%
Goffstown	18,480	20,104	1,624	8.1%	21,474	2,994	13.9%
Hampstead	13,565	9,770	-3,795	-38.8%	10,440	-3,125	-29.9%
Hooksett	10,694	16,159	5,465	33.8%	17,725	7,031	39.7%
Londonderry	31,699	27,683	-4,016	-14.5%	29,456	-2,243	-7.6%
Manchester	94,633	116,515	21,882	18.8%	119,764	25,131	21.0%
Pelham	13,053	16,822	3,769	22.4%	19,612	6,559	33.4%
Pembroke	7,924	8,332	408	4.9%	8,926	1,002	11.2%
Raymond	15,236	11,843	-3,393	-28.6%	12,509	-2,727	-21.8%
Salem	27,879	32,484	4,605	14.2%	33,926	6,047	17.8%
Sandown	8,931	6,573	-2,358	-35.9%	7,007	-1,924	-27.5%
Windham	12,214	13,892	1,678	12.1%	14,728	2,514	17.1%
Total	**422,918**	**440,159**	**17,241**	**3.9%**	**464,402**	**41,484**	**8.9%**

Transportation Demand Management and Public Transportation

Comments on the DSEIS also included the desire for TDM measures to be evaluated in the FSEIS, such as congestion pricing, 55 mph speed limit and HOV lanes. Comments on the DSEIS also suggested improved public transportation as an alternative to roadway widening. Each of these alternatives, and the rationale for why they were not analyzed in detail in the FSEIS, are addressed below

Congestion Pricing

Congestion pricing was considered during the alternatives screening process for the 2004 FEIS (See Section 2.3.4.2 of the 2004 FEIS). It was concluded that congestion pricing would be impracticable. A congestion pricing alternative would still be impracticable for the following reasons:

- Impacts on other roadways- shifting traffic to other facilities from I-93 would not be consistent with the purpose and need for the project (improving transportation system efficiency);
- Public acceptance issues with the relatively high charges that would be needed to manage traffic demand in the peak periods without widening the roadway; and
- Social justice issues raised by disparate impacts by congestion pricing.

As discussed in Section 1.3.1, the $2 non-variable toll on I-93 southbound between the Stateline and Exit 1 under consideration at the time of the preparation of the DSEIS has since been found to be impracticable.

No new information has been identified that would change the conclusions of the 2004 FEIS regarding congestion pricing. Therefore, the information used in the decision to reject this alternative remains valid.

55 MPH Speed Limit

A 55 mph speed limit was suggested in comments on DSEIS as both a means to reduce travel demand and to improve safety. The speed limit on I-93 south of Exit 2 is 55 mph. Reducing the speed limit on I-93 north of Exit 2 to 55 mph would be inconsistent with the purpose of the project related to improving transportation system efficiency. A lower speed limit would increase travel times and costs for individuals and businesses.

As for the safety goals of the project, the effect of speed limit policies on safety on interstate highways is unclear. While some studies have shown a reduction in accident rates with a lower speed limit, others have shown no change.[3] In addition, experience with the National maximum speed limit law (repealed in 1995) has shown that the majority of drivers ignore a 55 mph speed limit on interstate highways. Therefore, reducing the speed limit on I-93 to 55 mph would not be an effective strategy for improving safety.

Although a 55 mph speed limit was not an alternative considered during the alternatives screening process for the 2004 FEIS, the discussion above supports the conclusion that it is not a reasonable alternative that would warrant detailed analysis in the FSEIS.

HOV Lanes, Rail Service, Bus Service

Alternatives incorporating HOV lanes, rail service and bus service were considered and found not to meet the purpose and need during the alternatives screening process for the 2004 FEIS (See Section 2.3 of the 2004 FEIS). These alternatives would result in little or no reduction in travel on I-93 during the design hour and would not reduce the number of additional travel lanes required to provide acceptable levels of service on I-93. Since they would not increase the efficiency of the transportation system, these alternatives were eliminated from further consideration and do not require detailed study in the FSEIS.

[3] See for example: Malyshkina and Mannering, 2008. "Effect of Increases in Speed Limits on Severities of Injuries in Accidents" Transportation Research Record, Volume 2083. (An increase in the speed limit from 65 mph to 70 mph did not have a statistically significant effect on the severity of accidents on Interstate highways in Indiana).

No new information has been identified that would change the conclusions of the 2004 FEIS regarding HOV lanes, rail service and bus service. Therefore, the information used in the decision to reject these alternatives remains valid.