SUMMARY/CLASSIFICATION REPORT

Bow-Concord Interstate 93

Transportation Planning Study

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List of Acronyms

AADT	Average Annual Daily Traffic
CATF	Citizen Advisory Task Force
CNHRPC	Central New Hampshire Regional Planning Commission
CSS	Context Sensitive Solutions
DHTV	Design Hour Traffic Volume
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
ITS	Intelligent Transportation Systems
GRANIT	Geographically Referenced Analysis and Information Transfer System
MJ	McFarland-Johnson, Inc.
NEPA	National Environmental Policy Act
NHDES	New Hampshire Department of Environmental Services
NHDOT	New Hampshire Department of Transportation
RSG	Resource Systems Group,
SPNHF	Society for the Protection of New Hampshire Forests
SPUI	Single Point Urban Interchange
TAZ	Traffic Analysis Zone
TDM	Travel Demand Management
TRC	Technical Review Committee
TSM	Transportation System Management
USACOE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency

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1.0 Project Description

1.1 Introduction

The New Hampshire Department of Transportation (NHDOT) is conducting a planning study of the Interstate 93 (I-93) corridor in Bow and Concord, New Hampshire. The purpose of the planning study is to define the problems that exist along the corridor and develop a range of alternatives to deal with these problems while understanding the unique character of the Capital Region.

I-93 is the principal north-south arterial highway within New Hampshire and is part of the National System of Interstate and Defense Highways. I-93 extends a distance of approximately 132 miles through New Hampshire from the Massachusetts border to the Vermont border. This study covers a distance of approximately 4.5 miles from just south of the I-93/I-89 Interchange in Bow to just north of the I-93/I-393 Interchange (Exit 15) in Concord. The segment of I-93 from the south to Exit 14 is also part of the Central Turnpike, commonly known as the F.E. Everett Turnpike. The study limits include six interchanges;

Description	Access
I-93/I-89	Interchange Trumpet interchanges connecting two Interstates
Exit 1 on I-89	Partial cloverleaf at South Street and Looking Hill Road
Exit 12 on I-93	Partial cloverleaf at NH Route 3A (So. Main Street)
Exit 13 on I-93	Single point urban interchange at US Route 3 (Manchester Street)
Exit 14 on I-93	Diamond interchange at NH Route 9 (Loudon Road)
Exit 15 on I-93	Full cloverleaf connection two Interstates and So. Main Street
Exit 1 on I-393	Partial cloverleaf at Fort Eddy Road and Technical Institute Dr

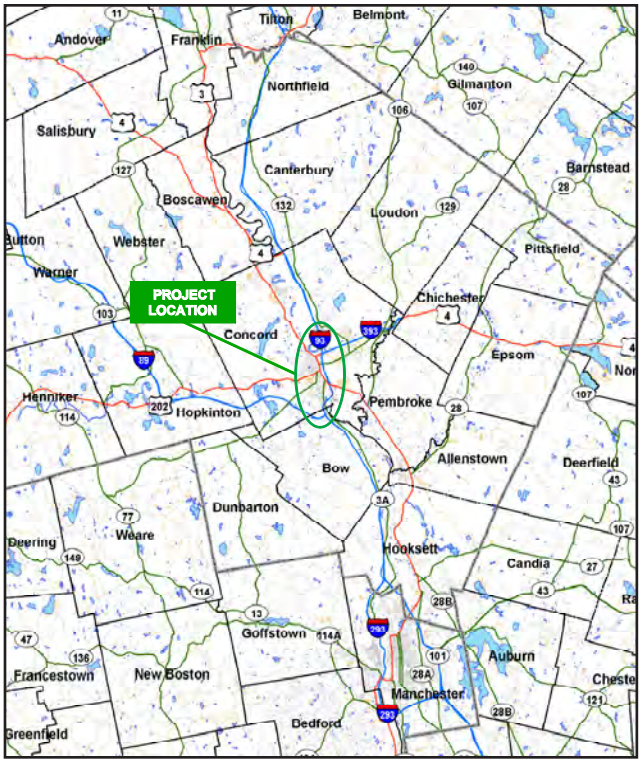

Figure 1.1 Project Location

Exit 1 on I-89 is included in the study due to its proximity to the I-93/I-89 Interchange and Exit 1 on I-393 is included due to its proximity to Exit 15 (I-93/I-393 Interchange). Figure 1.1 shows the project location and Figure 1.2 shows the study limits.

This transportation planning study is Part A of a three part project development process. Part A has three main objectives: (1) to define a project purpose and need; (2) develop a range of reasonable alternatives; and (3) to identify the level of environmental documentation required for the project as prescribed by the National Environmental Policy Act of 1969.

Part B involves the scoping portion, where preliminary design of the reasonable alternatives is conducted, a preferred alternative is identified, an environmental document is prepared, and a selected alternative is determined.

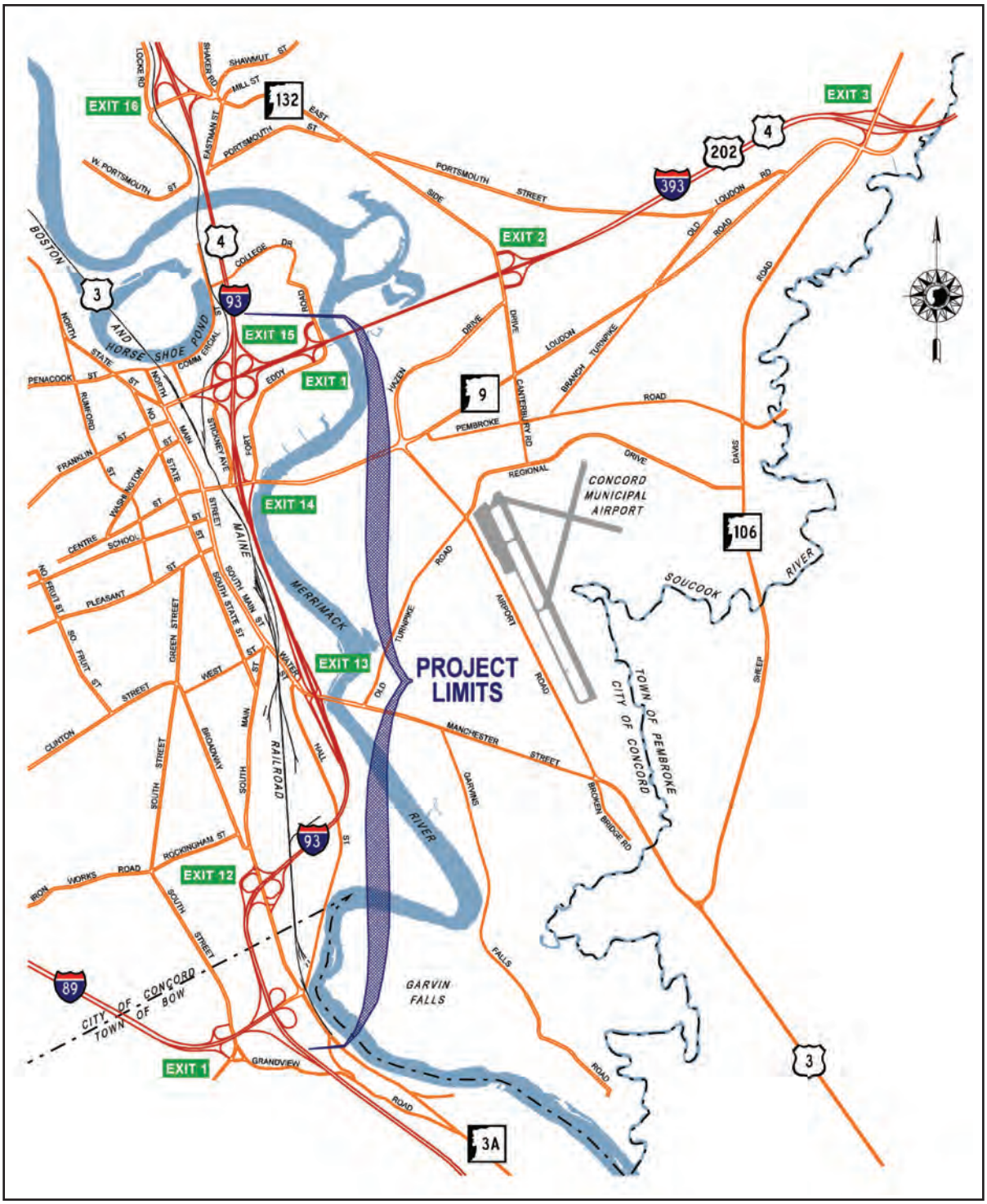

Figure 1.2 Project Limits

Part C involves final design, right-of-way acquisition, and construction advertisement. This Summary/Classification Report documents the findings of Part A and recommends the type of environmental document to be prepared in Part B.

1.2 Project History and Overview

Interstate 93 in central New Hampshire was constructed in the late 1950's and early 1960's as part of the F.E. Everett Turnpike and as part of the Interstate Highway System. No substantial improvements were made to the segment through Bow and Concord until around 2003 when reconstruction of Exit 13 in Concord was completed. This reconstruction included a new single-point urban interchange (SPUI) and widening of I-93 to accommodate six (6) lanes at that location, although only four (4) lanes are presently provided.

The need to address issues along I-93 in Bow and Concord was identified in 1990 when the Bow-Concord Widening Project was first placed on the State's Ten-Year Plan. The first study of the corridor was conducted in 1991/1992 and was documented in the I-93 Bow-Concord Feasibility Study. The purpose of that study was to determine the feasibility of widening I-93 while maintaining all of the existing access points. The proposed improvements included the following:

- Widen I-93 to eight lanes south of I-89
- Widen I-93 to six lanes through the I-93/I-89 Interchange
- Widen I-93 to eight lanes from I-89 to I-393 (Exit 15)
- Widen I-93 to six lanes north of I-393 (Exit 15)
- Provide auxiliary lanes on northbound and southbound I-93 between Exits 13 and 14
- Reconfigure interchanges at the I-93/I-89 junction, Exits 12 through 15, and Exit 1 on I-89

The scale of the recommended improvements was not well received by the surrounding communities and the recommendations were never implemented.

The City of Concord embarked on a visioning effort for the City beginning in 1998. This effort became the 20/20 Vision for Concord, NH completed in September 2001. This visioning effort included a comprehensive evaluation of the transportation system in Concord. The vision identified the importance of I-93 as a local road in addition to its role as a key commuter route and a route for recreational users. The 2020 Vision also developed options and recommendations for I-93. It determined that a six-lane I-93 would be sufficient to handle traffic until 2020. It developed options to shift and lower I-93 between Exits 13 and 14 to facilitate at-grade access to and view of the Merrimack River from downtown. A pedestrian bridge would need to be built over I-93. This option required a re-configuration of Exit 14 where Loudon Road would cross over I-93. These and other options developed by the 20/20 Vision were included in the evaluations for this project.

The City of Concord independently completed a *Concord Opportunity Corridor Master Plan* in April 2005. This master plan focused on the north-south area of Concord between downtown and the Merrimack River. It developed a concept based on the *20/20 Vision* options that included specific recommendations for improvements to I-93. The Opportunity Corridor Concept recommendations included a six-lane I-93 corridor through downtown Concord, reconfigured Exits 14 and 15, an expanded Storrs Street, and a new local connection over I-93.

The current Ten Year Transportation Improvement Plan signed into law on June 1, 2006, covering 2007 to 2016, included significant funding for the improvement of I-93 in Bow and Concord. This planning study was initiated to determine the improvements to I-93. Under the current plan, construction would have occurred in 2014 and 2015.

However, the *Draft* Ten Year Transportation Improvement Plan, covering 2009 to 2018, only includes funding to fix four red listed bridges along I-93 in Bow and Concord. The long-term improvements to the I-93 corridor would not be started until after 2018. This information came to light after the Draft of this report was distributed. The plan is still in draft form, but it appears unlikely that funding would be restored to this project.

Because of these developments, Part B of this project must be delayed until a future Ten Year Transportation Improvement Plan restores the funding. The progress made by this planning study was valuable and will be used as a starting point when the project is re-started..

1.3 Existing Roadway System

I-93 through Bow and Concord is a four-lane divided urban principal arterial highway with full control of access. South of the project limits, I-93 is a six-lane divided urban arterial highway. An auxiliary lane exists southbound between I-89 and Exit 12. The posted speed within the project limits is 55 miles per hour (mph). The design speed within the project limits exceeds 60 mph. The 60 mph design speed is acceptable for urban freeways according to the American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Design Standards – Interstate System* and *A Policy on Geometric Design of Highways and Streets*.

There are six existing interchanges on I-93 within the project limits, below is a description of each.

The I-93/I-89 Interchange is a modified trumpet interchange where I-89 ends at I-93. There are direct and loop ramps connecting the two Interstate routes. In addition, the extension of I-89 connects directly to NH Route 3A via a signalized at-grade intersection. This is an important regional interchange providing the connection between I-89 and I-93, in addition to providing access to Bow and Concord via NH Route 3A.

There is only approximately 1,200 feet between the I-93/I-89 Interchange and Exit 1 on I-89. Exit 1 provides access to South Street in northern Bow and the South End district of Concord. Exit 1 on I-89 is a partial cloverleaf interchange with all ramps on the west side of South Street in order to provide the maximum available separation with the ramps from the I-93/I-89 Interchange.

Exit 12 is also a partial cloverleaf interchange, but it has two sets of exit ramps from I-93. Exit 12 on I-93 connects to South Main Street (NH Route 3A). South Main Street provides access to northern Bow and the South End district of Concord.

Exit 13 is a (SPUI) with access to Water and Manchester Streets (US Route 3) in Concord. A SPUI terminates the ramps at a single point where a single traffic signal controls most of the movements within the intersection. To the west, Exit 13 provides access to downtown Concord via South Main Street. To the east, it provides the first access across the Merrimack River in Concord. This is the main point of access to southeastern Concord and the Town of Pembroke. Southeastern Concord includes the Garvin Falls area, which is currently lightly populated with several hundred acres of open land.

Exit 14 is a diamond interchange providing access to Loudon Road (NH Route 9). Loudon Road provides access to downtown Concord and the State Capital to the west and to the east across the Merrimack River to the Heights district of Concord, the commercial areas along Loudon Road as well as the State office complex. There is only approximately 2,800 feet between Exits 14 and 15.

Exit 15 is a full cloverleaf interchange providing the connection between I-93 and I-393. The extension of I-393 to the west beyond I-93 connects to North Main Street providing access to downtown Concord and the State Capital. Exit 15 is an important regional interchange, similar to the I-93/I-89 Interchange, connecting two Interstate routes.

Exit 1 on I-393 is a partial cloverleaf interchange providing access to Fort Eddy Road and College Drive. Fort Eddy Road is a commercial area with several shopping malls and restaurants. College Drive is the main entrance to the New Hampshire Technical Institute.

1.3.1 Traffic Conditions

I-93 between I-89 and I-393 provides a regionally important link in New Hampshire's Interstate system. Not only is I-93 a primary north-south corridor, through its short segment through Bow and Concord it also serves as a vital segment of an important east-west corridor. East-west travel between Maine and Vermont uses this segment of I-93 intermixing with the more prominent north-south travel between Massachusetts and northern New Hampshire.

I-93 is reduced from six lanes to four lanes just south of I-89. This lane reduction, coupled with the traffic from I-89, results in congestion on northbound I-93 during peak periods. The queue on northbound I-93 during peak periods can stretch as far south as the Hooksett Toll Booth, a distance of about six miles.

The central New Hampshire region has experienced a great deal of growth over the past two decades. This growth is reflected in the increased traffic on I-93. Since 1981, traffic on I-93 in Concord has nearly tripled. Table 1.1 shows the average annual daily traffic volume (AADT) on I-93 between Exits 12 and 13 for the period from 1981 to 2005.

The AADT on I-93 between Exits 12 and 13 is 72,000 vehicles per day (vpd) as of 2005 and is projected to exceed 101,000 vpd by 2030. I-93 experiences high volumes of traffic during peak recreational seasons including summer, fall foliage, and winter skiing. The absolute peak traffic volumes occur during the two NASCAR races each year that take place in Loudon, NH at the

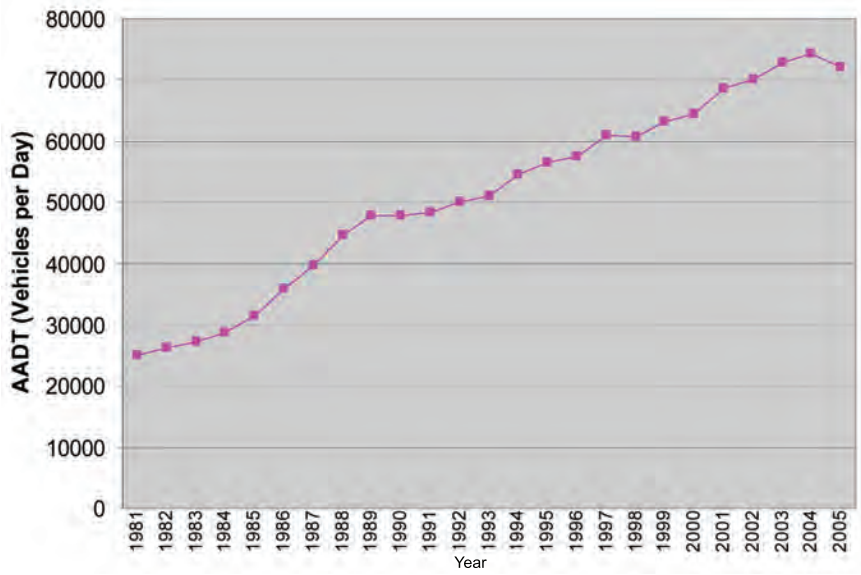

Table 1.1 – I-93 AADT between Exits 12 and 13

New Hampshire International Speedway. On race day, I-93 through Bow and Concord uses reversible lanes so that three lanes carry race fans to the race in the morning and three lanes carry race fans home in the evening. A single lane is used for the opposing direction of traffic.

1.3.2 Safety Issues/Crash History

There are several safety issues that exist along I-93 within the project limits. Many of these issues are expected with a facility that is approaching 50 years of age. There are two main safety concerns; inadequate weaving lengths and inadequate deceleration distances.

Inadequate weaving lengths occur in several places and are a result of interchanges being too close to one another. The term weaving refers to the segment of highway between critical points where traffic is entering and exiting and the vehicle paths must cross each other. Inadequate weaving lengths exist at the following locations:

- I-89 southbound between Exit 1 entrance ramp and the I-93 southbound exit ramp
- I-89 northbound between the I-93 southbound entrance ramp and the Exit 1 northbound exit ramp
- I-93 southbound between Exits 14 and 15
- I-93 northbound between Exits 14 and 15
- I-93 southbound between Exit 15 loop ramps
- I-93 northbound between Exit 15 loop ramps
- I-393 eastbound between Exit 15 loop ramps
- I-393 westbound between Exit 15 loop ramps
- I-393 eastbound between Exit 15 and Exit 1 on I-393
- I-393 westbound between Exit 1 on I-393 and Exit 15

Inadequate deceleration distances exist at the four exit ramps at Exit 12. The four exit ramps have curved geometry with posted speeds of 25 mph. The exit ramps leading to these curves are not of sufficient length for vehicles to comfortably decelerate outside the main flow of traffic on I-93 from 55 mph to 25 mph.

For the five (5) year period from January 2001 to December 2005, a total of 586 crashes were reported to the NHDOT within the study limits. These crashes occurred on I-93, the on and off ramps to I-93, the intersections where the ramps terminate with other roadways, and these other roadways within the project limits. Of the 586 crashes, 154 resulted in 199 injuries, and there were 2 fatalities.

The mainline of I-93 had 144 of the crashes, 36 of the injury crashes, and one of the fatalities. The fatality was attributed to a distracted driver. The accident rate for the mainline of I-93 was 0.184 crashes per million vehicle miles traveled. This is below the statewide crash rate for Interstate highways in NH of 0.459 crashes per million vehicle miles traveled.

Exit 14 had the highest number of crashes with 149, 54 of which were injury crashes, but no fatalities. The majority of the accidents occurred on Loudon Road as vehicles were queuing to access I-93. The accident rate for Exit 14 is at least 3.25 crashes per million vehicle miles traveled.

The other fatality within the project limits occurred on I-89 where a vehicle left the road at the end of I-89 and entered the Merrimack River. This fatality was attributed to unsafe speed. Table 1.2, on the following page, depicts the crash data listed by Interstate and exit.

Location	Total Number of Crashes	Injury Crashes	Fatalities
Interstate 93	144	36	1
Interstate 89	29	4	1
Exit 1 on I-89	7	1	0
I-93/I-89 Interchange	57	7	0
Exit 12	47	16	0
Exit 13	38	8	0
Exit 14	149	54	0
Exit 15 (I-93/I-393)	61	13	0
Interstate 393	38	9	0
Exit 1 on I-393	16	6	0
Total	586	154	2

Table 1.2 - Crashes within Study Limits (2001 – 2005)

1.4 Context Sensitive Solutions Approach

NHDOT has formally adopted and is incorporating the Context Sensitive Solutions (CSS) approach into its project development process. The CSS approach is a community driven process that looks for solutions that match the context of the location. CSS is defined by the Federal Highway Administration (FHWA) as

> *"a collaborative interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting and preserves scenic, aesthetic and environmental resources, while maintaining safety and mobility".*

Part A of the I-93 Bow-Concord Study was initiated before CSS was a formal process for NHDOT. However, a conscious decision was made to follow the concepts of CSS from the beginning of Part A. Many of the early project activities were specifically designed to include the surrounding communities of Bow, Concord and Pembroke. In addition, the Central NH Regional Planning Commission (CNHRPC) has been a constant and active participant from the beginning.

Part of the NHDOT implementation plan is to use CSS on specific active projects as a pilot program. The I-93 Bow-Concord Study was chosen to be one of these pilot projects in late 2005. Since then, the project has followed specific CSS guidelines. One of the guidelines is to involve all stakeholders in the process. A stakeholders group, known as the Planning Group, was formed in early 2006. This group is discussed in detail in Section 1.4.1. In addition, the CSS process outlines specific steps in the planning process that are used to gain a better understanding of the project. The steps are shown below in Figure 1.3 and described in more detail in the following sections.

Figure 1.3 - CSS Planning Steps

1.4.1 Planning Group

An essential aspect of the CSS approach is to involve all stakeholders at every step of the process. For the I-93 Bow-Concord Project, the Planning Group was assembled with stakeholders representing the community, environment, and transportation interests. Each agency or group appointed its own representative to the Planning Group.
Figure 1.4 is a list of the agencies and groups represented on the Planning Group.

The Planning Group evolved from two committees that were formed in the early stages of the project. The Technical Review Committee (TRC) was comprised of staff from transportation, planning and resource agencies. The Citizen Advisory Task Force (CATF) was a citizens committee with members from Bow, Concord, Pembroke, and the Central NH Regional Planning Commission. Appendix C contains the list of the Planning Group, TRC and CATF members.

One of the important distinctions regarding the Planning Group involved the way decisions were handled. The Planning Group is an advisory group, but its opinions and direction are thoughtfully considered by the project's lead agencies: the NHDOT and FHWA. The distinction is that the Planning Group functioned on the basis of consensus. For each step of the process, consensus was sought from the Planning Group.

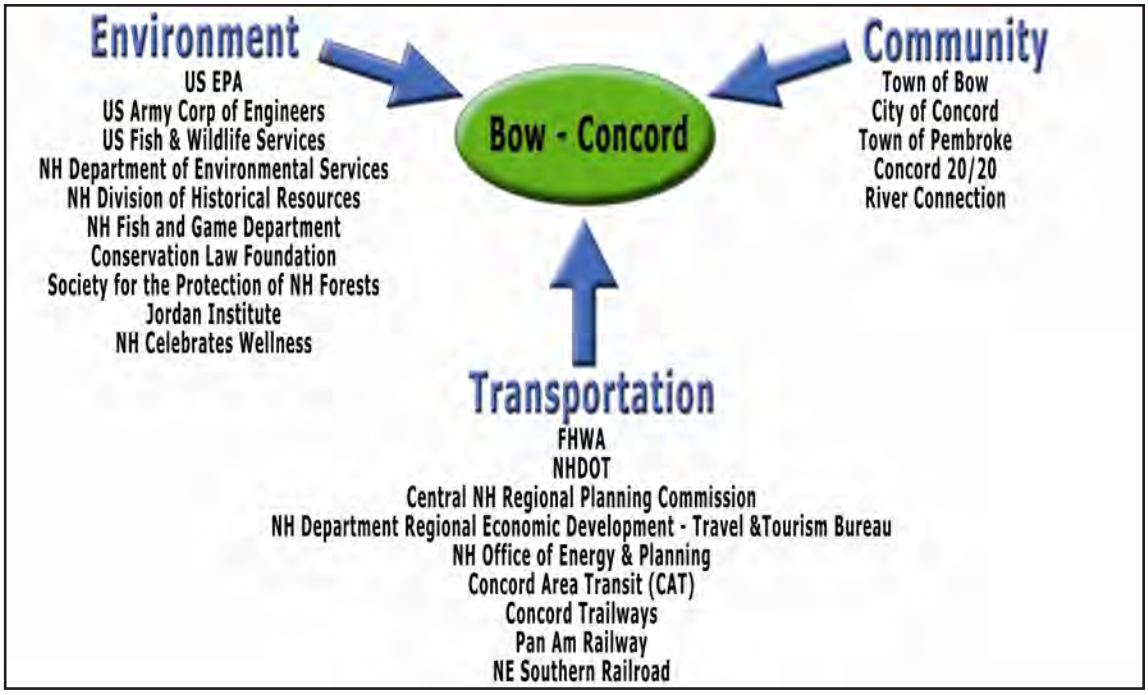

Figure 1.4 - Planning Group Members

The definition of consensus used by the group stated:

> *"Consensus does not mean that everyone agrees, but that principal groups and individuals can live with a proposal"*

The objectives of consensus are for the Planning Group to work together to make progress in the project development process and to take ownership of the decisions.

An important CSS consideration for a stakeholders group, such as the Planning Group, is to have an impartial third party moderate the meetings. For the Bow-Concord Planning Group, the NHDOT contracted Steve Whitman with the firm Jeffrey H. Taylor & Associates, Inc. to be the moderator. Mr. Whitman is a planner and educator with extensive experience in transportation and corridor studies.

1.4.2 Problems and Goals

The first two CSS steps involve gaining a better understanding of the project and what the stakeholders want to see come out of the process. First, it is crucial to have a clear picture of the problem the project is attempting to address. The problems need to include the obvious transportation issues such as capacity, safety and maintenance issues. They should also include those functions the project is not currently providing, but which the stakeholders believe it should.

In order to gain a full understanding of the problems that exist along I-93 for those who are using it, the public was asked to comment on the problems they experience. A large project area map was created that stated, "We Need Your Help!" The public was asked to place an orange sticker on the map at a location where they see a problem and to describe it. Their

problems were documented on project comment sheets. The project map was brought to several community events and public spaces. The map was displayed at the Steeplegate Mall for one weekend. It was displayed all day at the Town of Bow and Pembroke Town Meetings as well as at a City of Concord Master Plan Public Meeting.

The problems and comments received from the public and members of the Planning Group were separated into several categories. These categories included community vision, safety, mobility, economic vitality, aesthetics, natural environment, access, transportation choice, and cultural resources. From this list, a broad Problem Statement was developed. The Planning Group reached consensus on the Project Problem Statement after several versions were developed over the course of about two months.

Project Problem Statement

Marked by aging infrastructure and limited transportation options, the Bow-Concord I-93 Corridor neither meets the varied transportation and safety demands of Interstate highway users, nor appropriately balances those demands against the interests of the Capitol Region communities in their unique identities and visions, their economic vitality, preservation of and access to their natural and historic resources, and their quality of life. Future population and economic growth, in the region and beyond, will increase transportation demand and further exacerbate this problem.

Understanding the existing problems with I-93 is important, but equally important is the long-term vision or goal the communities' desire for the I-93 corridor. The solution for the corridor should address the problems identified, but with an understanding of and direction towards achieving the overall goal for the corridor. The Planning Group reached consensus over the course of several weeks on a Project Goal Statement that addresses the items identified in the Project Problem Statement.

Project Goal Statement

The Bow-Concord I-93 Corridor should balance the needs of all users and the surrounding communities by providing a safe, affordable, reliable, environmentally acceptable and community compatible transportation system. The system will offer mobility choices and complement the unique character of the Capitol Region communities. It will support their economic initiatives, preserve and/or enhance their natural and historic resources, facilitate non-vehicular access, and sustain the communities' quality of life, now and into the future.

1.4.3 Screening Criteria

Screening criteria are a set of measures to determine whether an alternative addresses the stated project problems and goals. The screening criteria for Part A of the Bow-Concord I-93 Study were designed as qualitative criteria to identify whether an alternative was reasonable,

and should be carried forward, or was unreasonable, and should be rejected. These criteria were developed before the alternatives were identified.

Development of the screening criteria began in 2004. A list of screening categories was developed from the problem categories. Initially, the criteria were separated into three categories; transportation issues, resource issues and community issues. Transportation criteria included safety, mobility, access, transportation choice, and implementation. Resource criteria included natural environment, cultural environment, and agency support. Community criteria included community vision, economic vitality, aesthetics, and public support.

This first version of the screening criteria was presented at a Planning and Transportation Summit held on June 24, 2004. Invitees to the summit not only included the CATF and TRC, but also included many organizations that later became members of the Planning Group. At the Summit, the screening criteria were presented and then tested with a mock alternative. At the conclusion of the summit the attendees critiqued the criteria and provided invaluable comments. The resultant version of the criteria was presented to the Planning Group in March 2006. The group was generally supportive of the criteria, but did make some minor revisions. They felt there was no reason to separate the criteria into three broad categories. The project team also refined the scoring system to utilize color coding rather than symbols. The Planning Group reached consensus on the Project Screening Criteria in April 2006.

The criteria are an eight page document that is included in Appendix D. Figure 1.5 shows page 1, which is the Screening Summary.

1.4.4 Alternatives Development and Screening

The intent of the alternatives development is to identify any and all alternatives, concepts or options that could be considered for the corridor. It is imperative that all alternatives get fair

ALTERNATIVE SCREENING CRITERIA

SCREENING SUMMARY

Alternative X proposes the following improvements or provisions; ...

Category	Score					
Access						
Aesthetics						
Community Resources						
Community Vision						
Economic Vitality						
Historic and Archeological Resources						
Implementation						
Mobility						
Natural Environment						
Public Health						
Quality of Life						
Residential Neighborhoods						
Safety						
Support						
Transportation Choice						

Alternative X is deemed ...	Reasonable or Unreasonable

Figure 1.5 - Screening Summary

consideration so that in the future, the range of reasonable alternatives can be defended. The alternatives were all screened using the project criteria.

The alternatives developed for this planning study were purposely conceptual in nature. The overall objective of the study was to determine a reasonable range of alternatives. The alternatives did not need to be developed in detail to determine whether they were reasonable. However, some of the alternatives were more detailed, but this was primarily because they were developed as part of other studies.

The range of potential alternatives considered for I-93 through Bow and Concord came from many sources. Alternatives developed by other studies were included. These studies included the *I-93 Bow-Concord Feasibility Study* recommendation completed in 1992, the Opportunity Corridor Concept, elements of the *20/20 Vision* study, and others. Some alternatives and components came from members of the Planning Group while others came from members of the public. The intent was to ensure that any potential idea was given fair consideration.

The term alternative refers to a stand-alone strategy that addresses the problems and goals of the Bow-Concord segment of I-93. Through the alternatives development process it became obvious that many of the concepts were not stand-alone alternatives. They were viewed favorably, but did not completely address the goals of the project. These became components that could be combined or considered along with another alternative. Full descriptions of the alternatives and components can be found in Section 3.0.

Once the list of Potential Alternatives was established, the screening was conducted. Because there were over a dozen alternatives and components, and because the screening criteria is an eight-page document, it was decided that the project team would conduct the initial screening. The project team consists of the consultant firms and NHDOT staff. Of the fifteen screening categories, twelve were initially screened by the project team. The remaining three categories were community vision, quality of life and support. The project team felt it was inappropriate for them to attempt the screening of these three criteria.

The initial screening was presented to the Planning Group at a series of meetings. The group reviewed the screening, asked questions, made comments and recommendations, and then completed the remaining screening categories. When all fifteen categories were screened, a final determination was made as to whether the alternative or component was reasonable or unreasonable. The full screening process required five Planning Group meetings to complete. The results of the screening are presented in Section 5.0.

It should also be noted that three additional alternatives are required to be evaluated for consistency with the National Environmental Policy Act (NEPA). These include the No Build Alternative that is used as a baseline for comparison (See Section 3.2), Travel Demand Management (See Section 3.3), and Transportation System Management (See Section 3.4). Screening was conducted for these alternatives.

1.4.5 Public Participation Activities

A fundamental aspect of a planning study is a comprehensive public participation program. The CSS process promotes the role of stakeholders, but it also emphasizes the need to bring a project to the people and users. There have been many meetings, summits, forums and displays during Part A of the Bow-Concord I-93 Project. These activities have corresponded to key milestones in the project where public comment beyond that provided by the Planning Group was needed. Table 1.3 lists chronologically the public participation activities and their purpose.

Activity	Date	Location	Purpose
Master Plan Concord Community Forum	Novemebr 17, 2003	Beaver MeadowSchool Concord, NH	Present Project to Concord
Pembroke Board of Selectmen Meeting	December 1, 2003	Pembroke Town Hall	Present Project to Selectmen
Master Plan Concord Community Forum	February 7, 2004	Concord High School	Gather Problems and concerns about I-93
Bow Board of Selectmen Meeting	February 20, 2004	Bow Town Hall	Present Project to Selectmen
Town Meetings	March 9, 2004	Bow & Pembroke	Gather Problems and concerns about I-93
Transportation Projects Open House	June 8, 2004	Rundlett Middle School Concord, NH	Gather Problems and concerns about I-93
Planning & Transportation Summit	June 24, 2004	Horseshoe Pond Community Resource Center, Concord	Evaluate and test the Screening Criteria
The Growth Forum	October 13-15, 2005	Capital Center for the Arts	Discuss growth projected for Central NH
Community Transportation Workshops	May 18 & 20, 2006	Pembroke, Bow & Concord, NH	Present the Problem & Goal Statements, Screening Criteria and Range of Alternatives
Mainstreet Concord Market Days	July 19 to 21, 2006	Main Street Concord	Present the Problem & Goal Statements, Screening Criteria and Range of Alternatives
Public Information Meeting	April 17, 2007	Rundlett Middle School Concord, NH	Present the Range of Alternatives and Screening Results
Bow Rotary Club	May 11, 2007	Bow Old Town Hall	Present the Range of Alternatives and Screening Result

Table 1.3 - Public Meetings

2.0 Transportation Modeling

2.1 Introduction

The following section briefly describes the transportation forecasting model used in the Bow-Concord study. The travel demand model used for the Bow-Concord study was developed by Resource Systems Group (RSG) for the CNHRPC in 2004. Below is a brief discussion of the Base Year 2000 Model and the Design Year 2030 Model. A more detailed description of the model and how it was developed are included as Appendix B.

2.2 Base Year 2000 Model

The CNHRPC 2000 calibrated model was slightly modified for use in the Bow-Concord Study. The modifications are described in Appendix B. Year 2000 was used because the census data provides the most thorough data for population. See Figure 2.1 for the Base Year 2000 design hour traffic volumes.

2.3 Design Year 2030 No Build

The year 2030 was used as the design year for analyzing all scenarios. One of the important exercises under the NEPA requirements is to establish the "no build" condition. The "no build" is the base case for comparison with the build options.

The basis for the no build scenario is to show how the existing transportation network would function with the growth in population and employment that are expected to occur in the region by the design year of 2030. The steps involved in developing the growth are discussed in Appendix B. However, Table 2.1 shows the expected increase in populations and jobs that are expected to occur in the region between 2000 and 2030.

Municipality	2000 Population	2030 Population	Population Difference	2000 Employment	2030 Employment	Employment Difference
Allenstown	4,854	6,100	1,516	1,040	1,872	832
Boscawen	3,684	5,100	1,416	1760	3092	1,332
Bow	7,168	11,300	4,132	4,741	10,070	5,329
Canterbury	1,991	3,400	1,409	336	606	270
Chichester	2,259	3,600	1,341	729	1,172	443
Concord	40,785	53,600	12,815	46,423	87,518	41,095
Dunbarton	2,252	3,700	1,448	244	688	444
Epsom	4,051	6,700	2,649	1,387	2,273	886
Hopkinton	5,412	7,000	1,588	2,206	3,537	1,331
Louden	4,510	7,400	2,890	1,826	2,716	890
Pembroke	6,917	9,000	2,083	2,600	3,931	1,331
Webster	1,591	3,100	1,509	113	138	25
Total	85,474	120,000	34,526	63,405	117,613	54,208

Table 2.1 - Population and Employment Growth

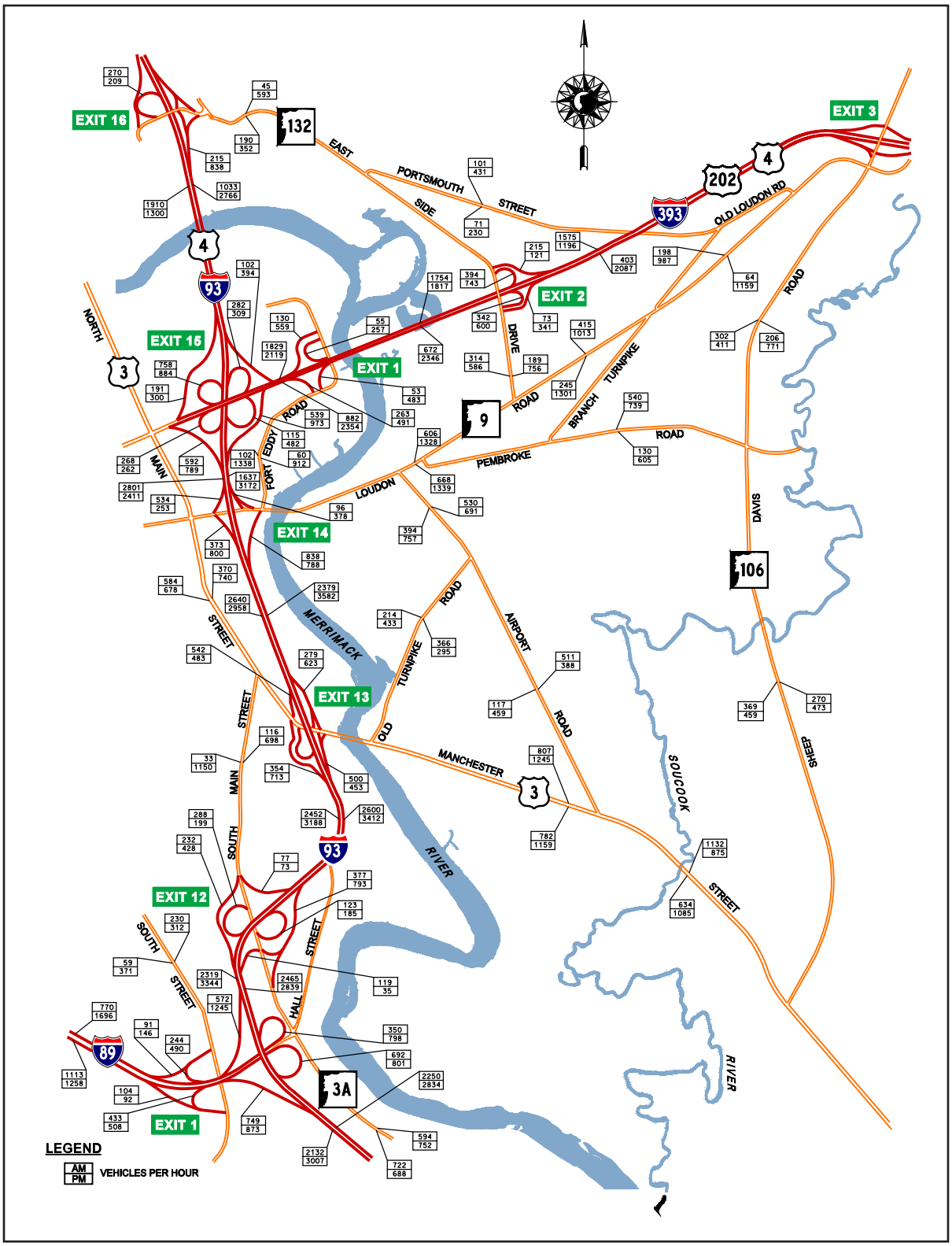

Figure 2.1 - Base Year 2000 - Design Hour Traffic Volumes

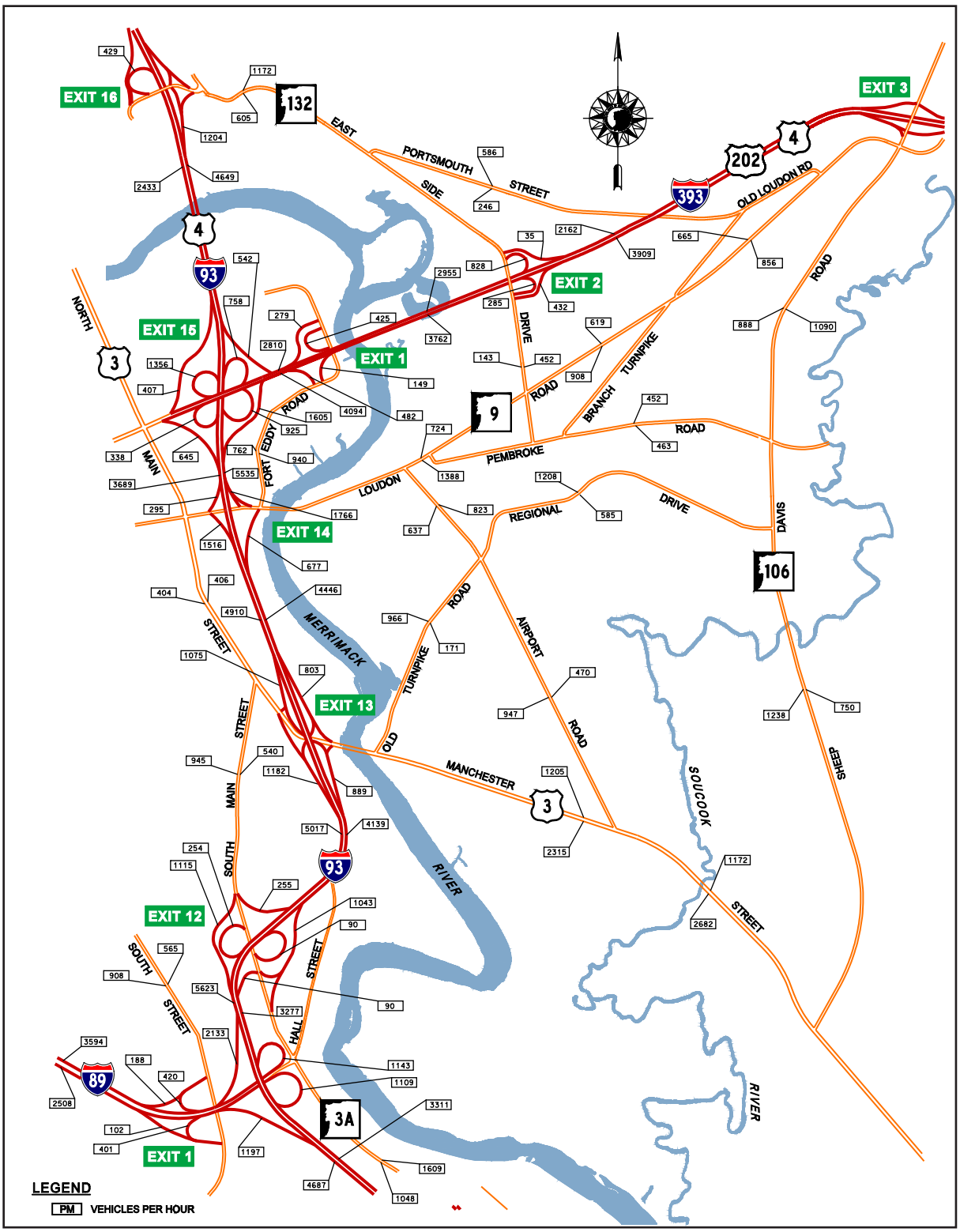

Figure 2.2 - No Build Year 2030 - Design Hour Traffic Volumes

2.4 Design Year 2030 Modeling Scenarios

Multiple scenarios were developed for the year 2030. In all but two cases (listed below), the assumed future land use was not altered. While this assumption may not be reasonable during the next phase when the short-list of alternatives is analyzed, it was deemed both expedient and necessary for the purposes of comparing scenarios. The process of modeling scenarios, then, was to perform an iterative distribution-mode choice-assignment step. This allows several important model dynamics to operate in response to changes in congestion. The important dynamics are:

- Changing the end location of the trip (You may not travel as far to shop if congestion increases).
- Changing the mode choice (You may choose to walk or bike a short trip rather than drive if congestion increases).
- Varying driving route choice (You may choose to take a slightly more circuitous route to avoid points of congestion).

Each of the scenarios was built from the "2030 No Build" road network. Thus, the results of the model runs when compared to each other reveal only the differences resulting from the assumptions about the scenarios. The modeling results of these scenarios were later used to develop the range of alternatives to further evaluate and screen. The following sections describe the modeling of the scenarios (in no particular order).

2.4.1 I-93 Widening:

- *I-93 Widened to 6-lane cross-section* – This scenario has I-93 widened to a 6-lane cross-section through the study limits.
- *I-93 Widened to 8-lane cross-section* – This scenario has I-93 widened to an 8-lane cross-section through the study limits.

2.4.2 NH Route 106 Options:

- *NH Route 106 Connector to I-89/I-93 Interchange* – this involved a simple direct extension from NH Route 106 (Sheep Davis Road) at its terminus with US Route 3 in Pembroke to the interchange of I-89/I-93 in Bow. The number of lanes on I-93 is kept constant (4 lanes) in this scenario.
- *NH Route 106 Connector to Exit 11 1/2* – this is an extension from NH Route 106 to I-93 connecting between Dow Road and Robinson Road in Bow. The number of lanes on I-93 is kept constant (4 lanes) in this scenario.
- *NH Route 106 Bypass* – a connector similar to the NH Route 106 Connector that does not connect with existing Route106 but rather extends from the interchange of I-89/I-93 parallel to NH Route 106 to the intersection of Loudon Road and NH Route 106 in Pembroke. The number of lanes on I-93 is kept constant (4 lanes) in this scenario.

2.4.3 Local Road Improvements:

- *Local Roads Improvement 1* – This scenario has extensions at Storrs Street and Commercial Street. Storrs Street is extended in the south to the intersection of US Route 3 and NH Route 3A and to the north to Constitution Ave. Commercial Street is extended north to Exit 16.

- *Local Roads Improvement 2 with Storrs Extension* – This scenario has all of the improvements from Local Roads Improvement 1 and also contains the completed Langley Parkway. The Langley Parkway starts at the I-93/I-393 Interchange and loops west and then south, intersecting Pleasant Street and ending at Clinton Street

- *Local Roads Improvement 2 without Storrs Extension* – This scenario does not have the northern or southern extensions of Storrs Street or the extension of Commercial Street, but does include the Langley Parkway.

2.4.4 Opportunity Corridor:

- *Opportunity Corridor Concept Option 1* – This scenario includes a major re-working of the I-93/I-393 Interchange which incorporates Storrs Street into the interchange and has Storrs Street connect to the exit at Loudon Road. There is also a connection that crosses I-93 from Fort Eddy Road on the east to US Route 3 of the west.

- *Opportunity Corridor Concept Option 4* – This scenario is the Opportunity Corridor Concept Option 1 with the NH Route 106 Connector from I-89 to Route 106.

2.4.5 Garvin Falls (changes to land use):

- *Employment in Garvin Falls removed from regional employment* – The Garvin Falls development assumes an additional 3,775 jobs. In this scenario, it was assumed that the additional employment occurring at Garvin Falls would not increase the regional growth but would rather represent redistribution of some of the 30 years of growth assumed to occur between the base year 2000 and the forecast year of 2030. RSG assumed a proportional decrease in the growth increment (the 30 years of assumed growth) in all other employment land use throughout the region. This assumption maintains the same jobs/housing balance in all the other scenarios and thus provides a comparable scenario.

- *New employment in Garvin Falls and associated regional housing* – In this scenario, the same growth in employment at Garvin Falls was assumed to be new land use added to the 30 years of growth. To maintain the jobs/housing balance (which is necessary as described above), 1,604 new housing units were added to those already assumed in the 30 years of growth. These units were applied proportional to the growth already assumed over the 30 year. 759 of these units were assumed to be built in Concord. Note that no effort was made to confirm that these units would in fact fit into the landscape. This model run was performed simply to illustrate the possible higher end of impacts that could occur from new employment growth at Garvin Falls.

2.4.6 Transit/TDM

- *Transit and Transportation Demand Management Strategies* – This model run was performed differently than all of the others. Rather than running in "descriptive" mode, where the alternative is coded and the model describes the impacts, this scenario was analyzed in "proscriptive" mode. A proscriptive model run is one where the outcome is assumed and then the results are analyzed. In this case, a highly successful transit system is being modeled along with other successful transportation demand measures such as employee vanpool and peak-shifting incentives. RSG assumed, therefore, that the outcome of these efforts would be a 10% system-wide reduction in auto trip-making. With this reduction, the model can then be run to see what results could occur. While the results cannot be associated back to a specific transit line or TDM program, it is possible to illustrate the efficacy of these policies.

3.0 Potential Alternatives and Components

3.1 Introduction

This section provides a summary and description of the potential alternatives and components that were screened during this planning study. The screening process itself is described in Section 5.0. The list of potential alternatives and components are a result of coordination with the project's Planning Group and workshops with the public. Table 3.1 includes a list of the potential alternatives and components considered.

Table 3.1 Potential Alternatives and Components

Potential Alternative	Potential Components
• No Build	• Alternate Land Use
• Travel Demand Management (TDM)	• I-93 Tunnel
• Transportation System Management (TSM)	• Shift I-93 to East side of Merrimack River
• Opportunity Corridor Concept Option 1	• Move Merrimack River to the east
• Opportunity Corridor Concept Option 2	• Rail Transit in I-93 Median
• Opportunity Corridor Concept Option 3	
• Opportunity Corridor Concept Option 4	
• Opportunity Corridor Concept Option 5	
• Route 106 Connector Option 1	
• Route 106 Connector Option 2	
• Local Road Improvements	
• Safety Improvements	
• 1992 Feasibility Study	
• Passenger Rail Service	
• Western Beltway	

Through the screening process, the Planning Group felt that *all* build alternatives should include the following:

- Preservation of the rail corridor
- Safety improvements
- Enhanced pedestrian and bicycle facilities
- Travel Demand Management (TDM) strategies

These four concepts would be considered components of all the proposed alternatives. They are described below.

Preservation of the rail corridor would require that any improvement to the I-93 corridor include provisions for maintaining the rail corridor. There are locations within the project limits where the rail corridor is directly adjacent to I-93. Any expansion of I-93 would therefore impact the existing rail corridor. This component requires that the expansion of I-93 include the relocation of the rail corridor wherever it is impacted by the expansion of I-93.
There are several safety issues within the project limits, as described in Section 1.3.2. The Safety Improvements component would require that all proposed alternatives address these deficiencies.

The Project Goal Statement mentions the desire to "offer mobility choices" and to "facilitate non-vehicular access" along the I-93 corridor. Enhancing the current pedestrian and bicycle facilities would be a component to all alternatives to ensure this goal is achieved.

TDM is described in Section 3.3 because it is also a standalone alternative.

3.2 No-Build

The No Build Alternative is the "do nothing" scenario where no improvements other than routine maintenance are made to the I-93 corridor through Bow and Concord. However, it does include improvements to the transportation system which have been planned independently as part of other projects. The existing problems identified for the corridor would continue and in some cases worsen as growth in the region continues. The "No Build" Alternative serves as the baseline for comparison for the other alternatives.

3.3 Travel Demand Management

The goal of Travel Demand Management (TDM) strategies is to reduce the demand for travel rather than increase capacity for accommodating increased demand. These strategies require changing travel behavior to reduce the number of vehicles on the road during peak periods. This is accomplished by eliminating trips, shortening trips, or shifting trips out of the peak congestion periods. Some of the strategies include:

- Expanded Transit Service
- Park and Ride Facilities
- Tele-commuting
- Flexible Work Hours
- Toll Pricing
- Increased Enforcement
- High Occupancy Vehicle Lanes
- Car-Pooling

Several TDM strategies are most effective when promoted or supported by employers. Employers can promote transit use by making transit passes available at work. Preferred parking spaces can be made available to vehicles used for pooling. Employers who allow flexible work hours can shift travel out of the peak periods.

Park and ride lots encourage car pooling by providing a convenient location for commuters to meet. Laptops and internet access give employees the option of working from home rather than commuting to an office. High occupancy vehicle lanes provide separate, usually less congested, lanes for those vehicles with more than one occupant.

Toll pricing at existing toll locations is a strategy that encourages off-peak travel by increasing tolls during the peak travel periods. For this study, toll pricing at the Hooksett Toll Booth could potentially impact the volume of traffic on I-93 through Bow and Concord. All of these strategies reduce the number of vehicles on the road, especially during peak periods.

3.4 Transportation System Management

Transportation System Management (TSM) refers to low cost, short term measures to address congestion and safety concerns. These measures typically can be easily implemented and can be accomplished within existing rights of way. These measures include:

- Intelligent Transportation Systems (ITS)
- Ramp Metering
- New Traffic Signals
- Re-timing Traffic Signals
- Turn Lanes
- New Lane Striping
- Signage

An example of a TSM measure is the new speed signage installed along I-89 in Bow. A safety issue was identified at the east terminus of I-89 as its approaches I-93. The speed limit is reduced, but speed studies showed that few vehicles were slowing down. Additional signs were installed to reinforce the speed reduction.

3.5 Opportunity Corridor Concept Options

The Opportunity Corridor refers to a segment of land in Concord that has been identified as one of the most valuable assets in Concord. The City of Concord sponsored the *Concord Opportunity Corridor Master Plan* completed in April 2005. The Opportunity Corridor is a north-south area in downtown Concord bounded by Exit 12 to the south, Exit 15 to the north, Fort Eddy Road and the Merrimack River to the east, and North Main and South Main Streets to the west. The master plan evaluated land use, development potential, implementation and transportation strategies related to the Opportunity Corridor.

The Concept Plan for the Opportunity Corridor included several proposed improvements for I-93, local streets along the I-93 Corridor, and other transportation components.

These improvements or strategies include:

- Widen I-93 to six lanes to Exit 15 (I-393)
- Shift I-93 to the west between Exits 13 & 14 to provide separation from river
- Lower I-93 between Exits 13 & 14
- New configurations for Exits 14 & 15
- Maintain existing rail corridor west of I-93
- Extend Storrs Street north & south
- New overpass on I-93 to connect No. Main Street to Fort Eddy Road
- New multi-modal center in downtown
- Pedestrian crossing over I-93 to connect downtown and the Merrimack River
- Enhanced pedestrian & bicycle connections

The Opportunity Corridor Concept Plan became the basis for several alternatives considered for the Bow-Concord Study. These options are described in more detail in the following sections. See Figure 3.1 on the following page for the presentation of the Concept Plan from the *Concord Opportunity Corridor Master Plan*.

Figure 3.1 - Opportunity Corridor Master Plan Concept

3.5.1 Opportunity Corridor Concept Option 1

The Opportunity Corridor Concept presented in the master plan only included the portion of I-93 from north of Exit 12 to Exit 15. Option 1 for the Bow-Concord Study also includes:

- Upgrades to the I-93/I-89 Interchange
- Upgrades to Exit 1 on I-89
- Upgrades to Exit 12

These upgrades were not developed in detail. No improvements are anticipated at Exit 13 since the recent reconstruction will accommodate a six-lane I-93. See Figure 3.2 on the following page for Option 1.

3.5.2 Opportunity Corridor Concept Option 2

Opportunity Corridor Concept Option 2 includes all of the elements of Option 1 with one exception. Option 2 proposes a five-lane I-93 rather than six lanes. The additional lane would be a reversible lane in the center of I-93 where it would be for northbound traffic for one part of the day and southbound traffic for the other part of the day. At either end of the reversible lane a transition zone would be required to change the direction of flow for the fifth lane. See Figure 3.3 on the following page.

Figure 3.2 - Opportunity Corridor Concept Option 1

3.5.3 Opportunity Corridor Concept Option 3

Opportunity Corridor Concept Option 3 includes all of the elements of Option 1, but would assume an alternate land use scenario. The alternate land use would concentrate development so that transit, walking and biking could be more accessible. The purpose would be to reduce the number of vehicle trips and reduce the level of congestion. For the purposes of this study, no specific alternate land use scenarios were developed.

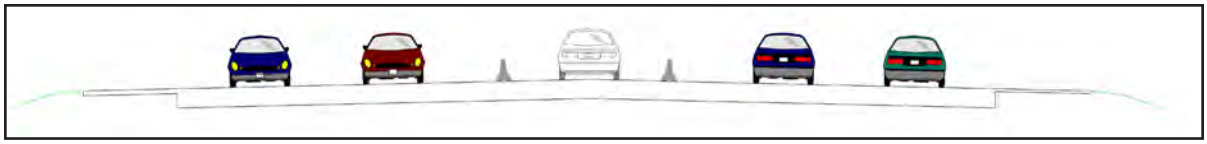

Figure 3.3 - Opportunity Corridor Option 2

3.5.4 Opportunity Corridor Concept Option 4

Opportunity Corridor Concept Option 4 includes all of the elements of Option 1 as well as several additional components. The additional components include:

- Exit 2 ½ on I-393
- Route 106 Connector from I-89 to US 3/NH Route 106
- Access from Route 106 Connector to the Garvin Falls area
- Additional employment growth at Garvin Falls

The Route 106 Connector for Option 4 would be a new roadway from the I-93/I-89 Interchange to the US 3/Route 106 intersection. The connector is more fully described in Sections 3.6 and 3.6.1. The I-93/I-89 Interchange for Option 4 would be different than the one for Option 1. It would become the I-93/I-89/Route 106 Interchange with all movements allowed from I-93 and I-89 to the new Route 106 Connector. Access to Garvin Falls provid by the connector would allow for more commercial and residential development. The additional growth would be mostly commercial with an estimated 3,775 additional jobs. The development at Garvin Falls is consistent with the *Garvin Falls Urban Reserve Area Development Feasibility Study* dated August, 1996 and later approved by the Concord City Council as part of the City's Master Plan. See Figure 3.4 for a plan of Option 4.

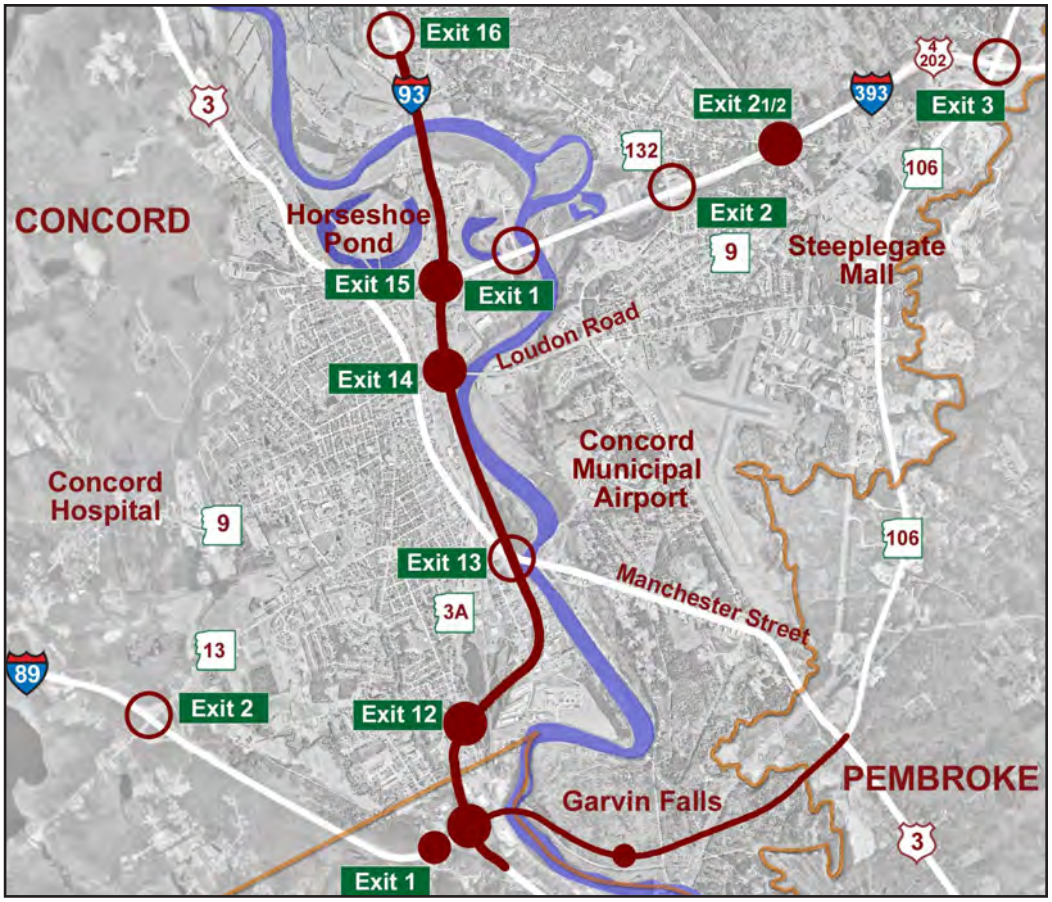

Figure 3.4 - Opportunity Corridor Concept Option 4

3.5.5 Opportunity Corridor Concept Option 5

Opportunity Corridor Concept Option 5 is considered the "Lite" version of Option 1. Option 5 includes all of the functional elements of Option 1, but it does not include some of the community elements. These include the shifting and lowering of I-93, the pedestrian crossing of I-93, and the multi-modal center. Option 5 would operate the same as Option 1 for vehicles, but would not provide the same level of service for non-motorized travel.

3.6 NH Route 106 Connector Options

Providing a connection from I-93 and/or I-89 to the southern end of Route 106 in Pembroke has been considered for many years. Most recently, the *20/20 Vision for Concord, NH* considered the Route 106 Connector as a means to avoid widening I-93. The two options for the Route 106 Connector considered for this project assume that I-93 remains four lanes. The objective of the connector is to attract sufficient traffic to avoid the need to widen I-93. Unlike Opportunity Corridor Concept Option 4, this connector is a limited access roadway that would not provide access to Garvin Falls. Consequently, no additional growth is assumed at Garvin Falls. Two locations for the connector were developed and are described in the following sections.

3.6.1 Route 106 Connector Option 1

Route 106 Connector Option 1 proposes a connection from the I-93/I-89 Interchange in Bow to the US 3/Route 106 intersection in Pembroke. The connector would cross the Merrimack River, pass through Garvin Falls, and cross the Suncook River before connecting to Route 106. The interchange at I-93/I-89 would provide for all movements from I-93 and I-89 to the Route 106 connector. There would be a four-way signal at the US 3/Route 106 Intersection. There would be no intermediate access points along the connector. See Figure 3.5 for a plan of Option 1.

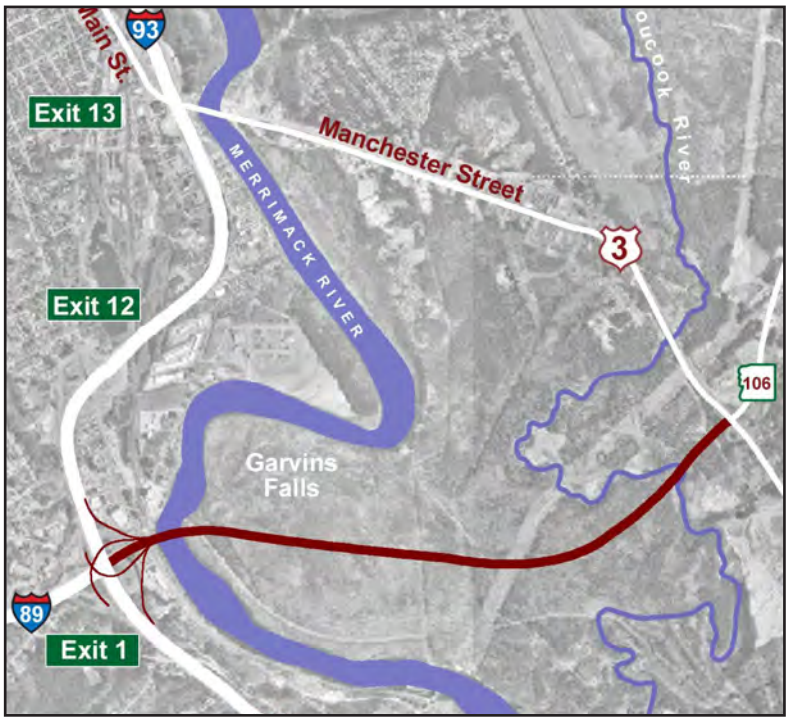

Figure 3.5 - Route 106 Connector Option 1

3.6.2 Route 106 Connector Option 2

Route 106 Connector Option 2 proposes a connection from I-93 in Bow to the US 3/Route 106 intersection in Pembroke. The connection to I-93 would be facilitated by a new interchange, Exit 11 ½, on I-93. The connector would cross the Merrimack River but would parallel the Soucook River and not cross over it. An at-grade intersection would be provided where the connector crosses Route 3A in Bow. There would be no intermediate access points along the connector. See Figure 3.6 for a plan of Option 2.

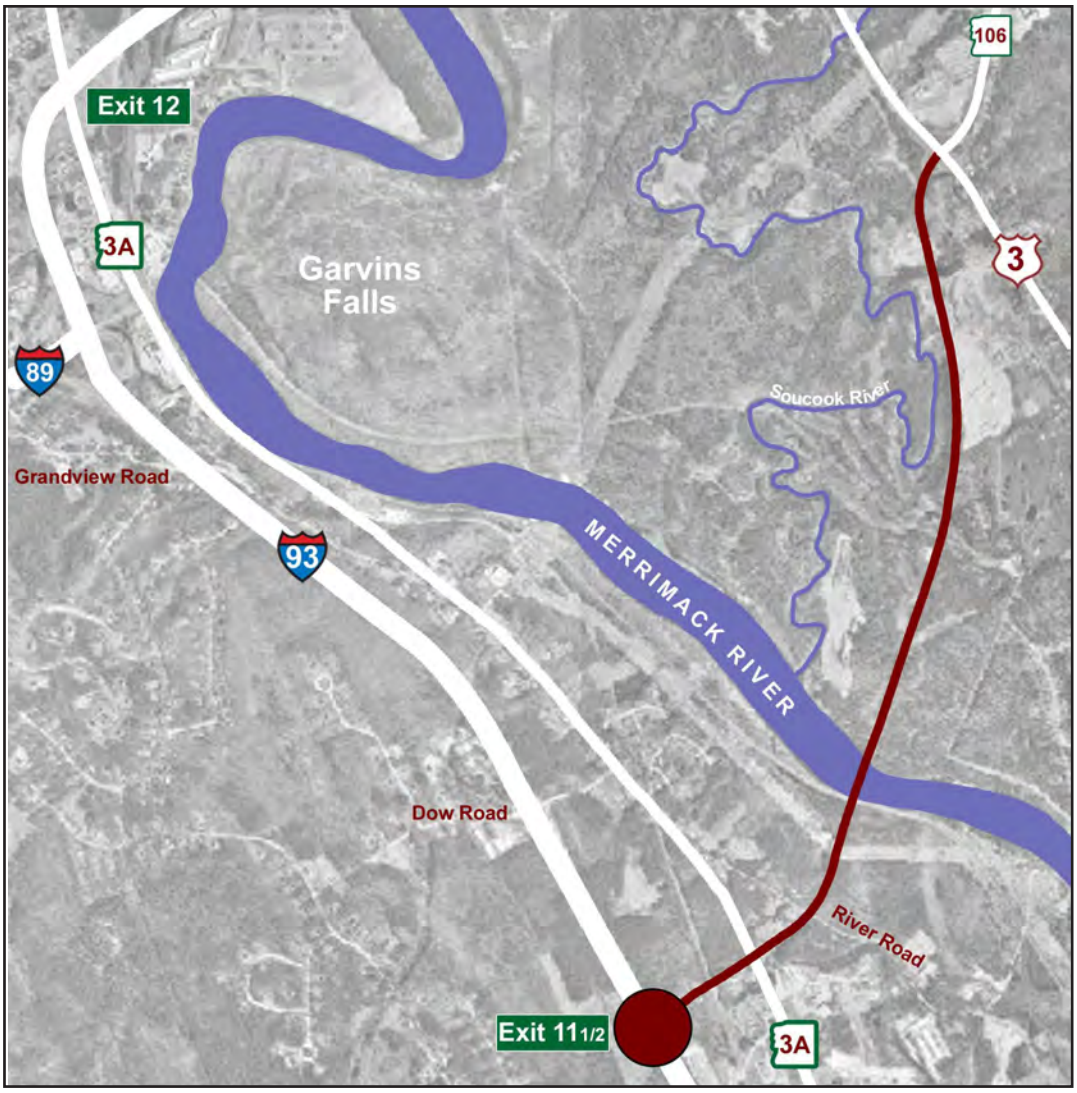

Figure 3.6 - Route 106 Connector Option 2

3.7 Other Alternatives

3.7.1 Local Road Improvements

The goal of the Local Road Improvements Alternative would be to provide sufficient improvement to the local roadway network to avoid the need to widen I-93. The improvements considered include components included in other alternatives, city projects and some recommended by members of the public.

The local road components included in the alternative are:

- Completion of the Langley Parkway (Northwest Bypass)
- Expand Storrs Street north and south
- A connector from Exit 16 to US Route 3 (Fisherville Road)
- New Exit 16 ½ on I-93 at Sewalls Falls Road

The Langley Parkway is a project considered for the west side of Concord for many years. It would be a new arterial roadway from Route 13 (Clinton Street), through the Concord Hospital campus, connecting to North State Street near North Main Street. The south leg of the project connecting Clinton Street to Concord Hospital is currently under construction and due to open in 2008. The Local Improvements Alternative assumes completion of the northern portion.

Storrs Street currently terminates at South Main Street and North Main Street. It provides an alternate north-south route to South and North Main Streets, but does not connect to any of the east-west roadways. Under this alternative, the Storrs Street expansion north connects it to the I-393 extension and the expansion south connects to the Route 3A/Water Street Intersection.

The connector from Exit 16 to US 3 would be a new east-west roadway connecting I-93 and US 3. It would use the existing Exit 16 and would require a new bridge over the Merrimack River. A new Exit 16 ½ at Sewalls Falls Road would be similar in that it would provide a new connection between I-93 and US 3. This would be a new interchange where currently there is only an undercrossing for Sewalls Falls Road to cross under I-93.

This alternative assumes I-93 remains a four-lane Interstate. See Figure 3.7 for a plan of the Local Road Improvements alternative.

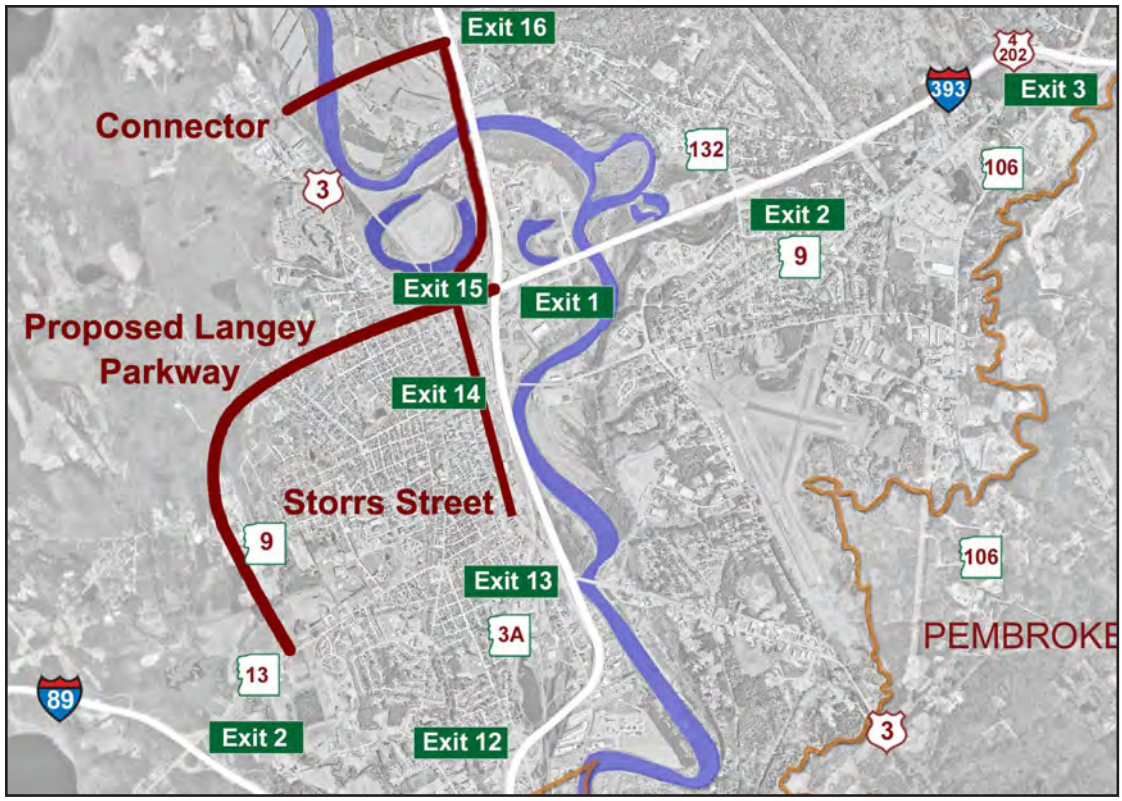

Figure 3.7 - Local Road Improvements

3.7.2 Safety Improvements

The Safety Improvements Alternative proposes addressing the safety issues along I-93, but not providing additional capacity through widening. The safety issues to address include those identified in Section 1.3.2, but also maintenance issues including bridge conditions that could pose a safety problem if not improved.

3.7.3 1992 Feasibility Study

The 1992 Feasibility Study Alternative was described in Section 1.2 – Project History and Overview. The alternative proposed widening I-93 to eight lanes and providing highway access at all of the current exits. See Figure 3.8 for the presentation of the *1992 Feasibility Study Recommended Improvement Plan*.

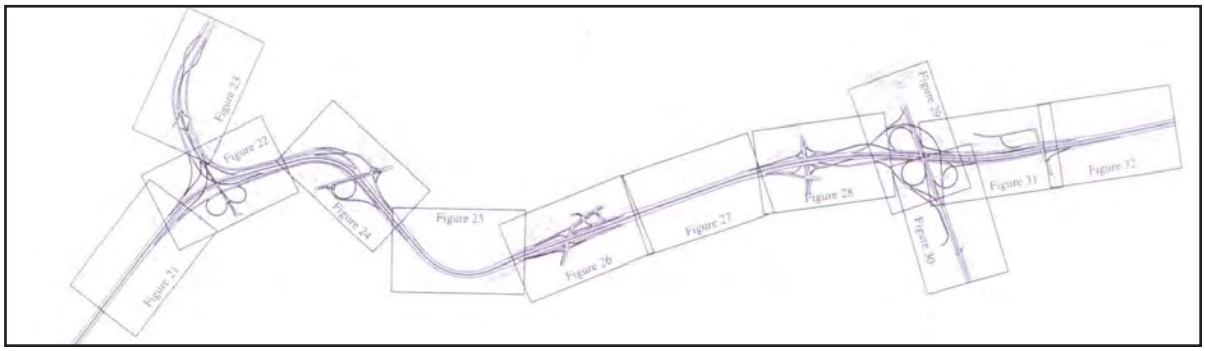

Figure 3.8 - 1992 Feasibility Study Recommended Plan

3.7.4 Passenger Rail Service

The Passenger Rail Service Alternative proposes providing passenger rail service to Concord instead of widening I-93. See Figure 3.9 on the following page for a plan showing the exiting rail corridors within the project limits. These are corridors that currently have some freight service but not passenger service. The only passenger rail service currently in New Hampshire is Amtrak's Down-easter that runs along the Seacoast. Currently, the potential of creating passenger rail from the Massachusetts border to Manchester is being studied.

3.7.5 Western Beltway

The Western Beltway Alternative proposes a new limited access roadway on the west side of downtown Concord. This alternative was proposed by two members of the public during a project workshop. It was intended to be a more robust version of the Langley Parkway. The beltway would begin at Exit 2 on I-89 at Clinton Street and proceed northerly passing west of Concord Hospital. It would run west of Horseshoe Pond, cross the Merrimack River, and end at Exit 16. It would be a limited access roadway with several access points at major crossings. See Figure 3.10 on the following pafe for a plan of the Western Beltway Alternative.

3.8 Components

The components considered for the Bow-Concord Study are concepts that by themselves would not completely address the project goal, but combined with other alternatives or components could potentially fully address the project goal.

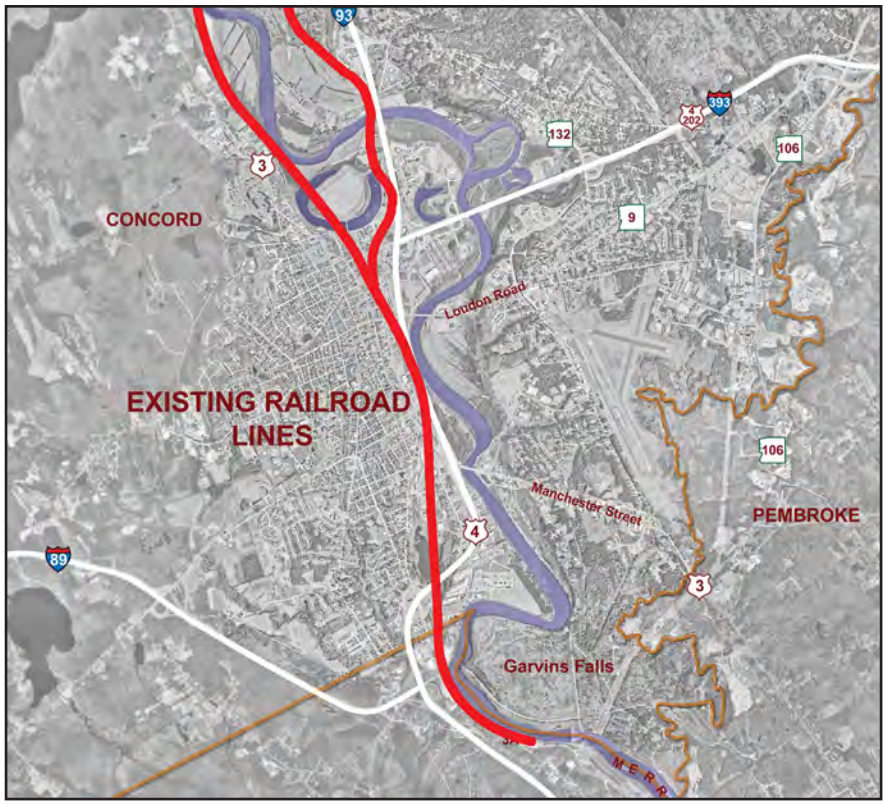

Figure 3.9 - Passenger Rail Service

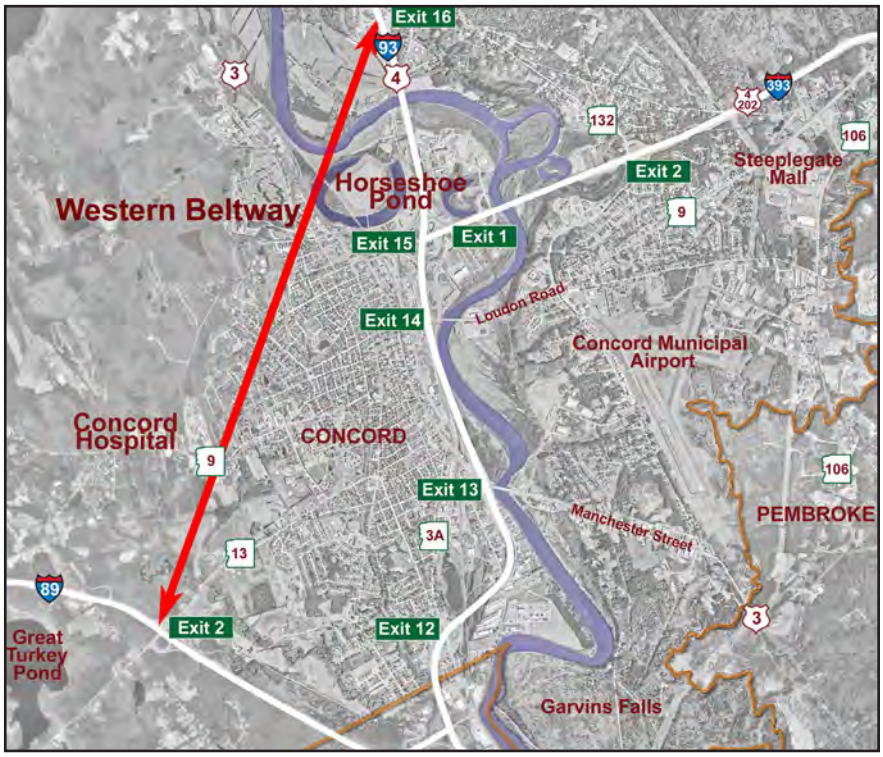

Figure 3.10 - Western Beltway

3.8.1 Alternate Land Use

As mentioned in Section 3.5.3, Alternate Land Use would concentrate development so that transit, walking and biking could be more accessible. The purpose would be to reduce the number of vehicle trips and reduce the level of congestion. For the purposes of this study, no specific alternate land use scenarios were developed.

3.8.2 I-93 Tunnel

Placing I-93 in a tunnel through a portion of downtown Concord serves two objectives. First, it provides a way of connecting downtown with the Merrimack River. It also conceals the Interstate as it passes downtown and the State Capitol. This alternative was proposed by a member of the public during a project workshop. This component could replace the pedestrian crossing proposed as part of the Opportunity Corridor Concept.

3.8.3 Shift I-93 to the East Side of the Merrimack River

Many believe I-93 was placed on the wrong side of the Merrimack River when it was originally constructed. The *20/20 Vision for Concord, NH* mentions the shift of I-93 as a way of re-connecting downtown Concord and the Merrimack River. This shift would begin north of Exit 12 where I-93 would proceed straight over the river rather than curving to avoid it. I-93 would cross the river just south of Manchester Street (US 3) and curve gently to head north. It would parallel the river through the existing corn fields, cross Loudon Road near the Everett Arena before crossing the river a second time. It would re-connect to existing I-93 near Exit 15. Exits 13 and 14 would have to be re-constructed on the east side of the river. See Figure 3.11 for a plan of the shifted I-93.

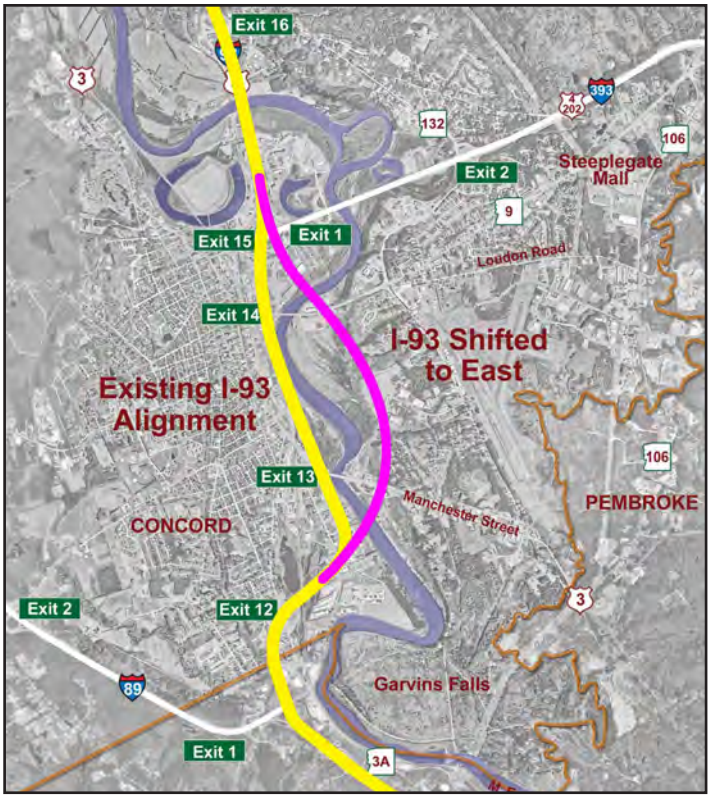

Figure 3.11 - Shift I-93 East of Merrimack

3.8.4 Move Merrimack River

The purpose of several of the components is to provide a connection between downtown Concord and the Merrimack River. Currently, I-93 is too close to the river south of Exit 14 to allow for any recreational trail or connection. This component proposed creating a separation between the river and I-93 by moving the river. See Figure 3.12 for a plan showing the extent of the proposed river relocation.

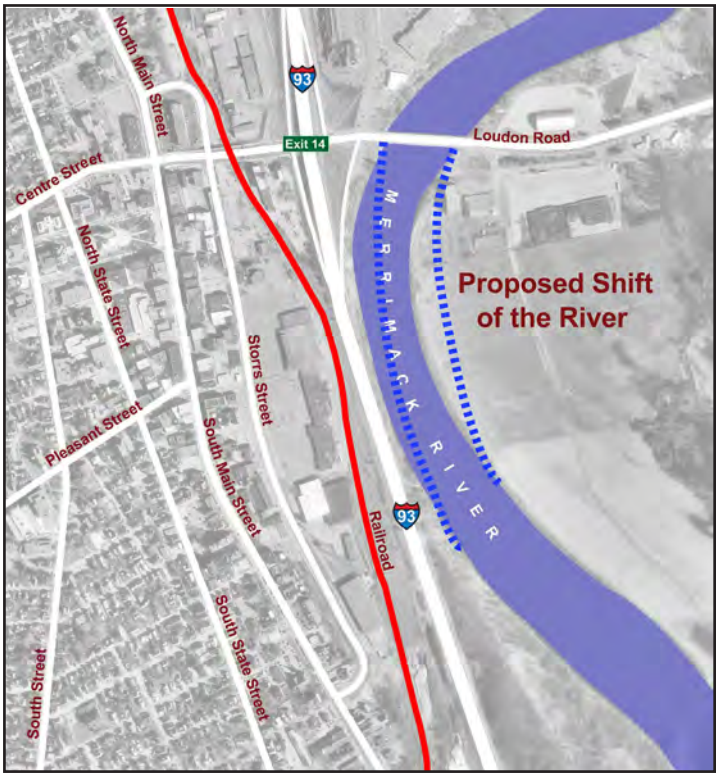

Figure 3.12 - Move Merrimack River

3.8.5 Rail Transit in I-93 Median

This component proposes placing a rail transit system in the median of I-93. This system could be only local serving the corridor from Bow to Concord, or part of a regional system connecting to the south. A regional system does not exist and would need to be created. Currently, the potential of creating passenger rail from the Massachusetts border to Manchester is being studied. See Figure 3.13 below for a cross section of rail transit in the median.

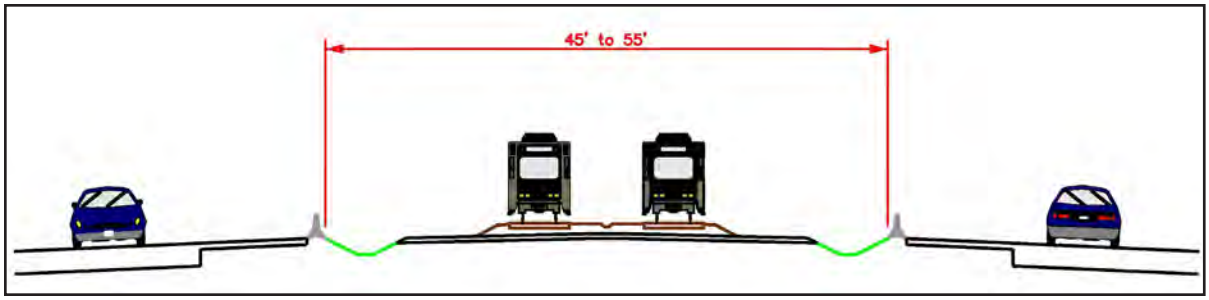

Figure 3.13 - Rail Transit in I-93 Median

4.0 Resources

Resources in the study area were mapped by using available mapping from the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT), other available published mapping, and by field review and study for some resources (historic and archaeological resources). Floodplain mapping within the City of Concord limits was provided by the City. A project study area was determined for resource identification and can be seen on Figure 4.1.

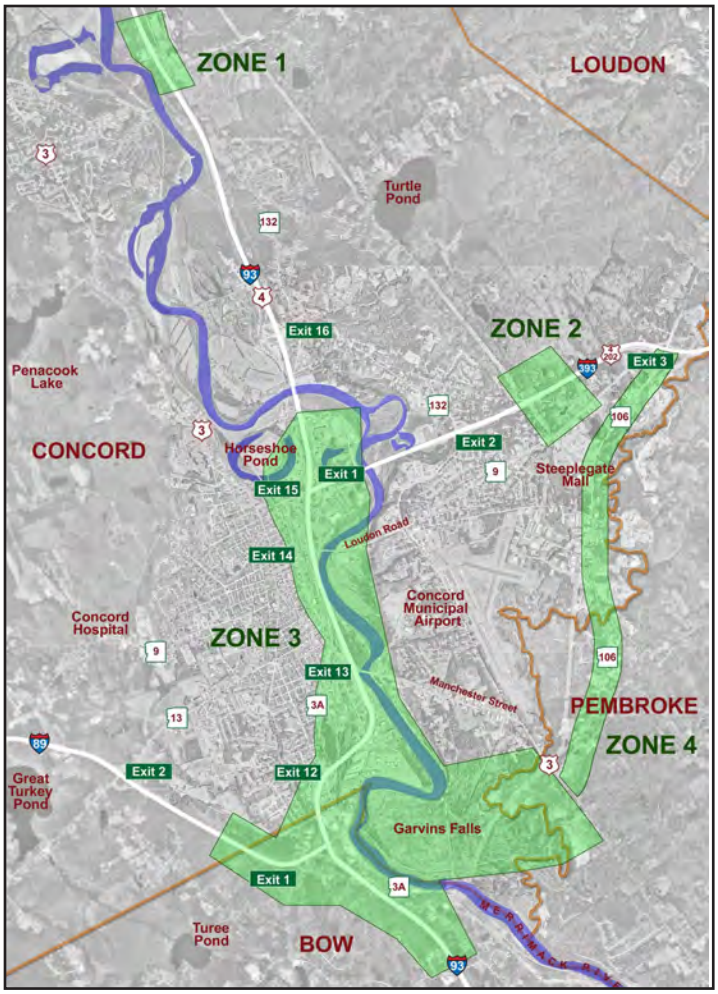

Figure 4.1 - Project Study Area

4.1 Surface and Ground Waters

The most significant surface water within the study area is the Merrimack River. The Merrimack is a fourth order stream with a watershed that originates in the White Mountains and measures, in total, approximately 5000 square miles. The river flows south throughout New Hampshire and then east to Newburyport, Massachusetts where it flows into the Atlantic Ocean. It is fed by several tributaries including the Soucook River which joins the Merrimack just south of the study area along the boundary between Concord and Pembroke, and the Turkey River which joins the Merrimack in the southern part of the study area (approximately at the junction of I-93 and I-89) in Bow. Three bridges span the Merrimack River in the study area, at Exit 13 (Manchester Street), at Exit 14 (Loudon Road) and at Exit 15 (I-393). I-93 parallels the river

on the west side of the river, and then spans the river just north of the study area. At the northern end of the study area, the river is classified on the National Wetland Inventory (NWI) map as Cowardin classification R2UBH, or lower perennial with an unconsolidated bottom, and permanently flooded. From the Loudon Road Bridge southward, the river is Cowardin classification L1UBHh, or lacustrine, limnetic (deepwater), with an unconsolidated bottom, permanently flooded, and impounded. The impoundment is created by the dam at Garvin Falls but is at the southern end of the study area. The river quality is classified as Class B water, which means that it is suitable for recreational activities, such as swimming and fishing, but non-potable without treatment.

Portions of the riparian areas associated with the Merrimack River are highly developed with little natural buffer retained. Other portions are in agricultural use for corn or other crops, including the corn fields south of Exit 14, on the east side of the river, and northwest of Exit 15. The banks are vegetated with silver maple, red maple, green ash, basswood, gray birch, and other species.

Other surface waters within the study area include Horseshoe Pond, a broad shallow pond with a slow moving stream, which was created by a meander scar of the river. Horseshoe Pond is fed by a stream channel to the west, flows northwest, and into the Merrimack through an unnamed stream channel. The pond is identified on the NWI map as Cowardin classification L1UBH, or lacustrine, limnetic (deepwater), with an unconsolidated bottom and permanently flooded. Both the north and south ends of the pond are shallower than in the middle, and support aquatic emergent vegetation.

Turkey River, at the southern end of the study area, is a perennial stream (Cowardin classification R3RB2, or upper perennial with a rubble substrate). A narrow fringe of riparian marshland lies along portions of the stream channel. The river has steep, fast moving sections, and crosses under several roadways including I-89 and highway access ramps before joining the Merrimack River just south of the I-93/I-89 junction. Surface and ground waters are shown on Figure 4.2 in Appendix A.

4.2 Floodplains

Digital floodplain mapping was developed by the City of Concord. The mapping was developed for general planning purposes and is not intended to supersede, supplement or replace the "FIRM – Flood Insurance Rate Map" and "Corps of Engineers Maps" for zoning, insurance, or other regulatory purposes. A large portion of the study area lays within the 100-year floodplain of the Merrimack River, including a section of I-93 between Exits 13 and 14, the retail development between Exits 14 and 15, all of the agricultural fields throughout the study area, and most of the property associated with the New Hampshire Technical College. Portions of the floodplain are inundated seasonally, whereas other portions are inundated with less regularity. Floodplains are shown on Figure 4.2 in Appendix A.

4.3 Wetlands

Wetlands were mapped using NWI data provided through GRANIT. Wetlands include floodplain forests, scrub shrub wetlands, and shallow marshland associated with the Merrimack River. Floodplain forests that fringe both sides of the Merrimack River, such as the wetlands at the north end of the study area, south of the NH Technical College fields, and southwest of the retail establishments along Fort Eddy Road, are dominated by silver maple. Areas of slightly higher elevation also support green ash, elm, and red maple.

Scrub shrub swamps include a large alder swamp east of Exit 14, at the foot of the slope that leads to the Concord Heights. The swamp abuts a large corn field, and includes scattered green ash, red maple, and American elm trees.

Emergent wetlands include an extensive open water / cattail marsh (a NHDOT wetland mitigation project) north of Exit 12 and a meander scar wetland on the grounds of the New Hampshire Technical College, northeast of Exit 15. Recent beaver activity has impounded the wetland near Exit 15 and created an open water marsh. Many trees along the fringe of the marsh, including basswood, red maple, American elm, and silver maple, are in standing water and are dead or dying. Wetlands are shown on Figure 4.2 Appendix A.

4.4 Farmlands

Farmlands within the study area include cornfields north of Horseshoe Pond and southwest of Exit 14. Farm fields are in active cultivation. Portions of the farm fields are identified as Prime Farmland by the Natural Resource Conservation Service. These include Pootatuck and Occum fine sandy loams, both of which are floodplain soils. Prime farmland soils receive special consideration in federally funded projects. Farmlands are shown on Figure 4.3 in Appendix A.

4.5 Vegetation and Wildlife

Vegetation communities in the study area include floodplain forests, some of which are remnant forests, the rest having been cleared for agriculture. Lower silver maple floodplain forests exist north of Exit 15, and between Exits 14 and 15.

Other vegetation communities along the corridor include agriculturally altered fields and hay fields, athletic fields and lawns dominated by grass, and open marshes dominated by cattails. Vegetation and Wildlife are shown on Figure 4.3 in Appendix A.

4.5.1 Habitat

Wildlife habitat in the study area includes the Merrimack River and associated riparian areas, marshland, farm fields, and upland forest. The river corridor provides habitat for many species of fish, amphibians, reptiles, mammals, and birds. Although portions of the corridor are highly urbanized with little intact riparian buffer, there are stretches of expansive undisturbed vegetation. Although some areas such as along I-93 south of Exit 14, have very little intact buffer, they still provide passage for aquatic mammals and fish.

Farm fields provide habitat for deer, coyote, fox, raccoon, skunks, woodchucks, and small mammals such as mice and voles; amphibians such as leopard frogs; and many species of birds including birds of prey such as red tailed hawks.

Horseshoe Pond provides habitat for aquatic wildlife such as painted and snapping turtles, mink, and muskrat, and is a haven for migratory waterfowl, such as mallards, green winged teals, eiders, wood ducks, common and hooded mergansers, and other species.

Forested riparian areas provide habitat for mammals such as otters, raccoons, mink, moose, deer, skunk, and small mammals; amphibians such as green frogs, tree frogs, American toads, peepers, and other species; reptiles such as snapping turtles and numerous songbirds and birds of prey. The rich floodplain soils and abundant food sources in the river contribute to the species richness along the river corridor.

Large expanses of forested upland exist in the Garvin Falls vicinity. This area provides habitat for many species, including deer, possibly bear, porcupine, raccoon, skunk, and other mammals. This is an extensive area of virtually intact habitat that is linked to the Soucook River corridor, and many species likely use this undisturbed area for travel. Urbanized portions of the study area support urban wildlife, such as coyote, fox, raccoon, skunk, mink, opossum, gray squirrel, and songbirds.

4.5.2 Rare species

Rare species information was provided by the New Hampshire Natural Heritage Bureau, the New Hampshire Department of Resources and Economic Development – Division of Forests and Lands, the New Hampshire Fish and Game Department, and the US Fish and Wildlife Service. The rare species data was randomized before being made available for the project, so that the occurrences are between 0- 500' from the actual occurrence location. Species are categorized in the mapping as amphibians, birds, insects, mussels, reptiles, plant species, or plant communities. Species specific information was not provided for this study.

Few rare species records occur within the study area. Most of the records are outside the limits of the study area, but given the 500' intentional margin of error, any record within 500 feet of the study area could actually occur inside the study area. The margin of error is given so that the exact locations of rare species are kept secret. Rare species information is shown on Figure 4.3 in Appendix A.

4.6 Air Quality

No air quality analysis or study was conducted as part of the Bow-Concord Study. However, the effect on air quality during and after construction of the project was a Public Health criterion in the screening of alternatives. The screening was conducted on a qualitative evaluation of the air quality effects where relieving congestion is typically beneficial for air quality. Air quality analyses will be conducted at a later phase of the project.

4.7 Noise

No noise analysis or study was conducted as part of the Bow-Concord Study. However, the effect on noise levels of an alternative was a Quality of Life criterion in the screening of alternatives. The screening was based on the proximity of an alternative to neighborhoods or businesses where potential increased noise levels as a result of traffic noise could affect the quality of life of residents and workers.

4.8 Conservation/Public Lands

Conservation land within the study area and surrounding region is mapped using information provided by GRANIT. Some of the conservation and public lands within the study area are likely to require review under Section 4(f) of the Department of Transportation Act of 1966 and Section 6(f), which are defined as lands that have been acquired or improved with funds provided by the federal Land and Water Conservation Act. These are shown on Figure 4.3 in Appendix A.

4.8.1 Trail system

Concord enjoys an extensive network of trails on public lands and parks. Trails have not been mapped for this portion of the project, but impacts to trails will be evaluated as alternative assessment proceeds.

4.8.2 Privately Conserved Land

A large parcel of active agricultural land (135 acres) under protection by the Society for Protection of New Hampshire Forests (SPNHF) lies near Horseshoe Pond, partially within the study area.

4.8.3 Public Land

Public lands include land protected by the City of Concord (in part associated with the landfill) north of Exit 13. The point of land east of the sewage treatment plant is also under conservation by the City of Concord, and the Cilley State Forest protects a portion of the land between the Turkey River and I-89, at the southern end of the study area. A small portion of the Bow Town Forest lies within the study area at its southern end.

4.9 Socio-Economic

The socio-economic climate of the Central NH Region is mostly defined by its land use. Land use is determined by population, housing, employment, and zoning. As described in Section 2.4.1, future land use assumptions were developed for use in the transportation model. The purpose of the transportation model is to determine the effect land use will have on transportation and vice versa.

The land use assumptions used for the project design year of 2030 were developed in cooperation and coordination with each of the municipalities in the region. These assumptions reflect the plans each community has for its future. Furthermore, land use assumptions, and their generated traffic, beyond the Central NH Region were developed by the NHDOT statewide model. The statewide model uses land use assumptions generated by each of the nine regional planning commissions in the state.

A review of current and future land use in the region points to a clear pattern. The City of Concord is the employment center of the region. As the state capital it is a magnet for employment and this role is planned to continue. The outlying towns in the region are, and will continue to be, predominantly residential. These land uses create a travel pattern where workers from all directions head for Concord in the morning and leave Concord in the evening heading in all directions.

4.10 Hazardous Materials

An *Environmental Database Study* was conducted for the Bow-Concord Study. The purpose of this study was to identify potential oil and/or hazardous material sites through a database search and a windshield survey. No review of New Hampshire Department of Environmental Services (NHDES) files was performed as part of the *Environmental Database Study*.

The database search identified 382 sites within the study limits. Of the sites identified, fourteen were immediately adjacent to the I-93 corridor. Two of the sites belong to the NHDOT, four are current or former gas stations, and the remaining are commercial properties. Other potential pollution sources were obtained from NH GRANIT data. All of these sites are shown on Figure 4.4 in Appendix A.

4.11 Community Resources

There are many community resources in the study area including schools, parks, recreational facilities, and police and fire stations. Because Concord is the State Capital and the largest

community in Merrimack County, there are many state and county facilities in addition to town and municipal facilities. Important public/community facilities nearby the I-93 corridor in Bow and Concord include:

- State Capital
- Concord City Hall
- Concord Library
- Museum of New Hampshire History
- Merrimack County Courthouse
- NH Technical Institute
- Hesser College
- Baker Free Library

Important parks and recreational facilities along the I-93 corridor in Bow and Concord include:

- Everett Arena
- Water Front Park
- Terrill Park
- Reed Playground

4.12 Cultural Resources

4.12.1 Historic / Architectural

A detailed description of the historic resources can be found in the *Historic Resources Constraints Report* for the project. The following is a summary of the historical findings of this report. Most of this discussion refers to Zone 3 of the report which covers the areas immediately adjacent to the I-93 corridor. This area includes all of the historic resources identified for the project. See Figure 4.5 in Appendix A.

In Downtown Concord, west of the I-93 corridor, there are six densely developed historic neighborhoods. Within this zone there are four districts and four individual properties listed in the National Register of Historic Places, six districts and one individual property determined eligible for the Register, five districts potentially eligible for the Register, and one locally designated historic district. These districts are contiguous to each other and form a nearly continuous band of historic districts the length of the project limits. Some of the identified historical resources in Downtown Concord are shown below in Table 4.1.

Historic Resource	Status
Boston, Concord & Montreal Railroad Line	Potentially eligible for Register
Page Belting Historic District	Listed in Register
B&M Railroad Shops Historic District	Determined eligible for Register
Downtown Concord Historic District	Listed in Register
Hall Street Historic District	Potentially eligible for Register
Concord Gas Company & Holt Brothers Historic District	Determined eligible for Register
South Main Street Historic District	Potentially eligible for Register
South End Historic Neighborhood	Determined eligible for Register

Table 4.1 – Historic Resources

4.12.2 Archaeological

A detailed description of the Archeological resources can be found in the *Phase I-A Preliminary Archeological Reconnaissance Technical Report* for the project. The report summarizes the abundant information that is known about the area from numerous archeological studies conducted over the past thirty years. The report concludes that known and likely pre-contact Native American archeological resources exist throughout the project area. However, the report also revealed extensive disturbance in the area due to land clearing, road construction, farming and river damming where resources are believed to be absent.

Figure 4.5 in Appendix A, Cultural Resources Constraints Plan, indicates the areas of sensitivity of pre-contact Native American archeological resources. It should not be surprising to see these sensitive areas bordering the predominant water bodies in the area, the Merrimack River, Suncook River, and Turkey River.

The *Phase I-A Preliminary Archeological Reconnaissance Technical Report* concludes that additional archeological surveys should be conducted in the sensitive areas that would be impacted by proposed project alternatives.

5.0 Alternative and Component Screening

5.1 Screening Criteria

As discussed in Section 1.4.3, qualitative Alternative Screening Criteria were developed to determine whether an alternative or component was reasonable or unreasonable. The reasonable alternatives would be carried forward for further review in Part B of the project while the unreasonable alternatives would no longer be considered.

The criteria included fifteen categories designed to fully evaluate an alternative's ability to address the stated project problems and goals. The fifteen categories were:

- Access
- Aesthetics
- Community Resources
- Community Vision
- Economic Vitality
- Historic and Archeological Resources
- Implementation
- Mobility
- Natural Environment
- Public Health
- Quality of Life
- Residential Neighborhoods
- Safety
- Support
- Transportation Choice

Each alternative or component was screened by the Planning Group using the same criteria to ensure the credibility of the screening. A colored circle scoring system was used with red indicating a negative score and green indicating a positive score. The scoring went from a full red circle to a full green circle. A full yellow circle was used to indicate a neutral score. Half red or green circles were use to indicate a more modest negative or positive score. Figure 5.1 presents the scoring system in more detail.

Scoring System				
Fatal Flaw Impact Serious Degradation Unreasonable Strong Opposition	Negative Impact Degradation Opposition	Neutral Not Applicable No Impact	Benefit Improvement Enhancement Support	Substantial Benefit Substantial Improvement Reasonable Strong Support

Figure 5.1 - Alternative and Component Screening Scoring System

Each alternative was screened in the same way. The initial screening was conducted by the project team prior to the Planning Group meetings. Twelve of the fifteen categories were part of this initial screening. The initial screening was distributed to the Planning Group members a week before the meeting. At the meeting, each alternative was presented to the group. The alternative was presented along with any traffic or impact information that was available. After the technical information was presented, the Planning Group was asked to comment on the initial screening. This was an open discussion where members would ask the reasoning

behind a particular score for a particular category. In some cases this required looking at the details of the screening. The detailed screening for each alternative was available and in many instances was projected on a screen to facilitate the discussion. If a member felt a score should be changed, a motion was rendered and seconded. The moderator then asked for a consensus vote on the motion.

Once the twelve categories initially screened were agreed to, the remaining categories were screened by the Planning Group during a meeting. The three categories screened in this way were; Community Vision, Quality of Life, and Support. For instance, the Planning Group members representing Bow were asked to score the Community Vision criteria pertaining to Bow. The overall score for each category was determined by consensus.

At the end of this process, each of the fifteen categories was scored by consensus. The moderator then asked for a discussion on whether the alternative was reasonable or unreasonable. In most cases, the final determination was easily determined based on the results of the screening. This process was conducted for eighteen (18) alternatives or components.

In the following sections, the screening results for the alternatives described in Section 3.0 are presented. The discussion focuses on those criteria that led to the final determination. The detailed screening results for each alternative or component can be found in Appendix D.

5.2 Alternatives Required by NEPA Process

There are three alternatives that will be carried forward into Part B because they are a necessary part of the NEPA process, not because the screening characterized them as reasonable. These are the No Build, TDM and TSM Alternatives. The following sections describe the screening of these three required alternatives.

5.2.1 No Build Alternative

The No Build Alternative is the base case that is used for comparison to other alternatives. For the screening, the No Build assumes the increases in growth and travel as described in Section 2.0, but that no improvements have been made to I-93 in Bow and Concord. See Figure 5.2 for the Screening Summary of the No Build Alternative.

From the screening results it is clear that the No Build Alternative does little to address the needs of the corridor. The Mobility and Safety categories got full red scores because travel along I-93 would get more congested and less safe as the volume of traffic increases. The Resource and Community categories were mostly half red because little would be done to improve these. The only category with a positive score was Implementation since the No Build required no effort and had no cost.

5.2.2 Travel Demand Management

The Travel Demand Management (TDM) Alternative did not score well on the Transportation categories because the projected travel demand for the corridor greatly exceeds the benefits gained from demand management. As described in Section 2.5.6, a "proscriptive" model run was conducted assuming a system-wide 10% reduction in trips. A 10% reduction in trips would only result for a highly successful TDM program. The model results indicated that there was enough background demand that even a 10% reduction in travel did little to diminish congestion along I-93. See Figure 5.3 for the Screening Summary of the TDM Alternative.

The screening results for Resource and Community categories were mostly half red because little would be done to improve these. Public Health received a half green score because TDM

SCREENING SUMMARY
NO BUILD ALTERNATIVE

The No Build Alternative is the do nothing option that is used for comparison to the build alternatives. The screening assumes no new facilities are constructed as part of the I-93 Project.

Category	Score					
	🔴	🔴	🟡	🟢	🟢	
Access		X				🔴
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision		X				🔴
Economic Vitality		X				🔴
Historic and Archeological Resources			X			🟡
Implementation					X	🟢
Mobility	X					🔴
Natural Environment		X				🔴
Public Health		X				🔴
Quality of Life		X				🔴
Residential Neighborhoods		X				🔴
Safety	X					🔴
Support		X				🔴
Transportation Choice		X				🔴

The No Build Alternative is required by NEPA for comparison purposes and therefore must be carried forward.	**Required**

Figure 5.2 - No Build Alternative Screening Summary

SCREENING SUMMARY
TRAVEL DEMAND MANAGEMENT ALTERNATIVE

The Travel Demand Management (TDM) Alternative proposes a variety of initiatives to decrease the demand on the transportation system without expanding the roadway network, these include:

- Ride Sharing
- Alternative modes (bus rail, etc.)
- Vanpools
- Shifting work hours
- Congestion pricing of tolls
- Tele-commuting
- Increased enforcement

Category	Score					
	●	◒	●	◒	●	
Access		X				◒
Aesthetics			X			●
Community Resources			X			●
Community Vision		X				◒
Economic Vitality		X				◒
Historic and Archeological Resources			X			●
Implementation		X				◒
Mobility		X				◒
Natural Environment		X				◒
Public Health				X		◒
Quality of Life		X				◒
Residential Neighborhoods		X				◒
Safety		X				◒
Support		X				◒
Transportation Choice				X		◒

The TDM Alternative is required because it is typically an alternative or a component of an alternative in an environmental document.	**Required**

Figure 5.3 - Travel Demand Management Alternative

strategies like car pooling, transit use and tele-commuting would improve the health of the public. Similarly, Transportation Choice received a half green score because of increased transit use. Natural Environment received a half red score because TSM measures would do nothing to address the impact the existing corridor has on the area's most important natural resource, the Merrimack River. Currently, runoff from I-93 goes directly into the river with little treatment.

5.2.3 Transportation System Management

The Transportation System Management (TSM) Alternative did not score well on the transportation categories because the projected travel demand for the corridor could not be addressed with short-term, low cost measures. The Safety category was the exception with a half green score since TDM measures are designed to address safety deficiencies. See Figure 5.4 on page 48 for the Screening Summary of the TSM Alternative.

The screening results for Resource and Community categories were mostly half red because little would be done to improve environmental and community resources by TSM measures. Implementation received a half green because TSM measures are low cost and easy to implement. Several categories like Aesthetics, Community Resources, and Public Health received yellow scores because TSM has no affect on them. Several other categories like Access, Economic Vitality, and Quality of Life received half red scores because TSM does little to improve these. Natural Environment received a half red score because TSM measures would do little to address the impact the existing corridor has on the area's most important natural resource, the Merrimack River. Currently, storm water runoff from I-93 goes directly into the river with little treatment.

5.3 Reasonable Alternatives

There was only one standalone alternative that was deemed reasonable during screening, the Opportunity Corridor Concept Option 1. The following section describes the screening of this alternative.

5.3.1 Opportunity Corridor Concept Option 1

Opportunity Corridor Concept Option 1 scored very well overall. It received full green scores for the transportation categories of Mobility and Safety because it expanded capacity on I-93 while addressing many of the existing safety issues. It received several half green scores for community categories including Aesthetics, Community Vision, Public Health and Residential Neighborhoods because it improved or enhanced each of these. The only red score was a half red for Implementation. This half red score was a result of the expected high cost to lower and shift I-93 in Downtown Concord as well as the disruption to traffic to do this.

The environmental categories received yellow scores. Natural Environment received a yellow score because although the intent would be to enhance and improve certain current deficiencies in runoff treatment, there would be impacts to some resources. It was felt this would be a neutral outcome. Impacts to wetlands and floodplains are expected for Opportunity Corridor Concept Option 1. Historic and Archeological Resources received a yellow score because no impacts are anticipated.

The Support category received a full green score indicating that the entire Planning Group felt this was a reasonable alternative. See Figure 5.5 on page 49 for the Screening Summary of the Opportunity Corridor Concept Option 1 Alternative.

SCREENING SUMMARY

TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVE

The Transportation System Management (TSM) Alternative proposes a variety of short-term, low cost measures to reduce congestion and improve safety on the transportation system, these may include:

- New traffic signals
- Turn lanes
- Intelligent Transportation Systems
- Re-striping lanes
- Ramp metering
- Ramp modifications

Category	Score					
	●	◒	●	◒	●	
Access		X				◒
Aesthetics			X			●
Community Resources			X			●
Community Vision		X				◒
Economic Vitality		X				◒
Historic and Archeological Resources			X			●
Implementation				X		◒
Mobility		X				◒
Natural Environment		X				◒
Public Health			X			●
Quality of Life		X				◒
Residential Neighborhoods		X				◒
Safety				X		◒
Support			X			●
Transportation Choice		X				◒

The TSM Alternative is required because it is typically an alternative or a component of an alternative in an environmental document.	**Required**

Figure 5.4 - Transportation System Management Alternative

SCREENING SUMMARY
OPPORTUNITY CORRIDOR CONCEPT OPTION 1

The Opportunity Corridor Concept was developed by the City of Concord. Option 1 includes all elements of this concept, which proposes the following;

- Six Lanes on I-93
- Westerly shift of I-93
- Lower I-93 between Exits 13 & 15
- Reconfigure Exits 14 & 15
- Upgrade to Exit 12
- Upgrade to I-93/I-89 and Exit 1
- Extend Storrs Street north & south
- Local Connection to Fort Eddy Road
- Multi-modal center
- River Access

Category	Score					
	●	◒	○	◒	●	
Access				X		◒
Aesthetics				X		◒
Community Resources			X			○
Community Vision				X		◒
Economic Vitality				X		◒
Historic and Archeological Resources			X			○
Implementation		X				◒
Mobility					X	●
Natural Environment			X			○
Public Health				X		◒
Quality of Life					X	●
Residential Neighborhoods				X		◒
Safety					X	●
Support					X	●
Transportation Choice				X		◒

Opportunity Corridor Option 1 is deemed Reasonable for further consideration.	**Reasonable**

Figure 5.5 - Opportunity Corridor Concept Option 1

5.4 Reasonable Components

There were several concepts that were deemed reasonable as components to consider along with other alternatives. Some of these concepts were screened while others were identified as reasonable components, even without screening them. These reasonable components that were not screened include:

- Preservation of the rail corridor
- Safety improvements
- Enhanced pedestrian and bicycle facilities
- Travel Demand Management (TDM) strategies

The Planning Group felt all build alternatives should include these components. They are described in Section 3.1.

The following section describes the screening of the additional four components that were considered reasonable. A total of eight components were deemed reasonable.

5.4.1 Transportation System Management

As described in Section 5.2.3, the Transportation System Management (TSM) Alternative did not score well on the transportation categories because the projected travel demand for the corridor could not be addressed with short-term, low cost measures. Refer to the screening discussion in Section 5.2.3 and Figure 5.4. However, using TSM strategies as a part or a phase of another alternative was considered reasonable. The Planning Group felt that if ITS or traffic signal modifications could provide some level of improvement, even in the short term, this was reasonable.

5.4.2 Alternate Land Use

As described in Section 3.5.3, Alternate Land Use would strive to reduce the number of vehicle trips and reduce the level of congestion by concentrating development so that transit, walking and biking could be more accessible. This concept was originally an element of Opportunity Corridor Concept Option 3. The Planning Group felt it was more appropriate to consider it as a separate component.

No specific alternate land use scenarios were developed as part of this study. It was felt that the intent was reasonable and that the details were better left for Part B of the project. Therefore, there was no screening performed for this component. There was consensus among the Planning Group that this was a reasonable component.

5.4.3 I-93 Tunnel

The I-93 Tunnel component would propose placing a portion I-93 through downtown Concord in a tunnel. This component received positive full green scores for the community categories Community Vision, Quality of Life, and Residential Neighborhoods. These scores reflect the desire of the City of Concord to re-connect the downtown to the Merrimack River. This component received one full red score for Implementation because tunnels are expensive to construct and are very disruptive to traffic while they are constructed.

As a component, the I-93 Tunnel received several yellow scores for categories that were not applicable. These include Community Resources, Historic and Archeological Resources, Natural Environment and Transportation Choice.

SCREENING SUMMARY
INTERSTATE 93 TUNNEL ALTERNATIVE

This Alternative would place I-93 in a tunnel as it passed Downtown Concord. The tunnel would be a component of another build alternative.

Category	Score					
	●	◒	○	◒	●	
Access				X		◒
Aesthetics				X		◒
Community Resources			X			○
Community Vision					X	●
Economic Vitality				X		◒
Historic and Archeological Resources			X			○
Implementation	X					●
Mobility					X	●
Natural Environment			X			○
Public Health				X		◒
Quality of Life					X	●
Residential Neighborhoods					X	●
Safety				X		◒
Support				X		◒
Transportation Choice			X			○

The I-93 Tunnel is deemed a reasonable component for further consideration.	**Reasonable**

Figure 5.6 - Interstate 93 Tunnel Alternative

The Support category received a half green score indicating that the Planning Group was mostly in support of this being a reasonable component. See Figure 5.6 on page 53 for the Screening Summary of the I-93 Tunnel.

5.4.4 Rail Transit in I-93 Median

The screening for Rail Transit in the I-93 Median indicates some disagreement over its merits. This component received positive half green scores for categories including Public Health and Quality of Life, and a full green score for Transportation Choice. These scores indicate the perceived benefits of rail travel. However, this component received negative half red scores for Mobility and Natural Environment. The Planning Group felt that the benefits of the rail system would not address the mobility needs of the corridor. The negative Natural Environment score results from the increased impacts associated with a wider corridor.

As a component, Rail Transit received several yellow scores for categories that were not applicable. These include Access, Aesthetics, Community Vision, Safety, and others. The Support category received a half green score indicating that the Planning Group was mostly in support of this being a reasonable component. See Figure 5.7 for the Screening Summary of the Rail Transit in the I-93 Median.

5.5 Unreasonable Alternatives

The careful screening of alternatives resulted in many Alternatives being deemed unreasonable. The reasons for an alternative to be judged as unreasonable were varied and are described in detail in the following sections. The detailed screening for these unreasonable Alternatives can be found in Appendix D.

5.5.1 Opportunity Corridor Concept Option 2

Opportunity Corridor Concept Option 2 is the same as the reasonable Option 1, except that it proposes a five-lane I-93 rather than a six-lane I-93. The fifth lane would be a reversible median lane. The screening for Option 2 is therefore very similar to Option 1. The two categories that received different scores, and resulted in this option being deemed unreasonable, were Implementation and Mobility. Implementation received a full red score because of the cost to construct and maintain the system to reverse the fifth lane twice a day.

Mobility received a half green score, versus a full green for Option 1, because of the reduced capacity provided by this option. Furthermore, the current and future traffic volumes along I-93 through Bow and Concord do not indicate a significant directional split. Reversible lanes are designed for corridors where traffic in the morning peak is in one direction and in the opposite direction for the afternoon peak. This is not the case for this segment of I-93. Concord is the employment center for the region and traffic heads to Concord in the morning and heads away from Concord in the afternoon. The traffic volumes show that there is no directional split on I-93. The volumes even show that for some segments in Concord the morning peak is northbound and for others it is southbound.

The Planning Group felt that this alternative was unreasonable given the lack of a directional traffic volume split on I-93. See Figure 5.8 for the Screening Summary of the Opportunity Corridor Concept Option 2.

5.5.2 Opportunity Corridor Concept Option 3

Opportunity Corridor Concept Option 3 (Option 3) was deemed unreasonable as a standalone

SCREENING SUMMARY
RAIL TRANSIT IN I-93 MEDIAN

This option proposes accommodating a rail transit system in the median of I-93. The transit system would be a component of another build alternative.

Category	Score					
	🔴	◒	🟡	◒	🟢	
Access			X			🟡
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision			X			🟡
Economic Vitality			X			🟡
Historic and Archeological Resources			X			🟡
Implementation	X					🔴
Mobility		X				◒
Natural Environment		X				◒
Public Health				X		◒
Quality of Life				X		◒
Residential Neighborhoods			X			🟡
Safety			X			🟡
Support				X		◒
Transportation Choice					X	🟢

Rail Transit in the I-93 median is deemed a Reasonable component for further consideration.	**Reasonable**

Figure 5.7 - Rail Transit in I-93 Median

SCREENING SUMMARY

OPPORTUNITY CORRIDOR CONCEPT OPTION 2

The Opportunity Corridor Concept was developed by the City of Concord. Option 2 proposes a reversible lane on I-93 and proposes the following;

- Five Lanes on I-93 (One Reversible)
- Westerly shift of I-93
- Lower I-93 between Exits 13 & 15
- Reconfigure Exits 14 & 15
- Upgrade to Exit 12
- Upgrade to I-93/I-89 and Exit 1
- Extend Storrs Street north & south
- Local Connection to Fort Eddy Road
- Multi-modal center
- River Access

Category	Score					
	●	◒	●	◒	●	
Access				X		◒
Aesthetics				X		◒
Community Resources			X			●
Community Vision				X		◒
Economic Vitality				X		◒
Historic and Archeological Resources			X			●
Implementation	X					●
Mobility				X		◒
Natural Environment			X			●
Public Health				X		◒
Quality of Life					X	●
Residential Neighborhoods				X		◒
Safety				X		◒
Support					X	●
Transportation Choice				X		◒

Opportunity Corridor Option 2 is deemed Unreasonable because the expense to construct and operate a reversible lane is not justified for I-93 where the traffic volumes for peak and non-peak directions are not significantly different.	**Unreasonable**

Figure 5.8 - Opportunity Corridor Concept Option 2

alternative, but was deemed reasonable as a component as described in Section 5.4.1. As described in Section 5.4.1, no screening was performed for either alternate land use option.

5.5.3 Opportunity Corridor Concept Option 4

Opportunity Corridor Concept Option 4 (Option 4) is a combination of Opportunity Corridor Concept Option 1 and Route 106 Connector Option 1 as well as revised land use. Opportunity Corridor Concept Option 1 was deemed reasonable while Route 106 Connector Option 1 was deemed unreasonable (see Section 5.5.5). The screening results for Option 4 were therefore mixed. This option received four full green scores and three full red scores. The green scores were similar to those given to Opportunity Corridor Concept Option 1 while the red scores are similar to those given to Route 106 Connector Option 1.

Mobility received a full green score for this alternative. However, the traffic modeling for this alternative was different from that of either Opportunity Corridor Concept Option 1 or Route 106 Connector Option 1. The additional employment and housing development that would occur at Garvin Falls as a result of the added access would generate more traffic. As with Route 106 Connector Option 1, traffic volumes on I-93 south of Exit 13 decreased. However, with Option 4 traffic volumes north of Exit 13 increased. The increase was sufficient enough that additional lanes beyond the six-lane I-93 would need to be considered. The increase in traffic was due to the additional jobs that would be created at Garvin Falls.

Option 4 received full red scores for Historic and Archeological Resources as well as Natural Environment. These negative scores were a result of the impacts to Garvin Falls. As discussed in Section 4.0, Garvin Falls is a large undeveloped area where natural and archeological resources are believed to exist. Implementation also received a full red score because both widening I-93 and constructing the Route 106 Connector would be costly.

The mixed screening results for Option 4 can be summarized in the Support category that received a neutral yellow score. The Planning Group was split on whether this alternative was reasonable or unreasonable. No consensus could be reached with the group on Option 4. See Figure 5.9 for the Screening Summary of the Opportunity Corridor Concept Option 4 Alternative. The final screening from the Planning Group was unresolved as to whether this option should be considered reasonable or unreasonable.

As discussed in Section 1.4., the Planning Group is an advisory committee that provides recommendations to the project's lead agencies, the NHDOT and FHWA. The lead agencies must then decide whether to accept these recommendations. In the case of Option 4, the NHDOT and FHWA deemed it unreasonable because it did not address the mobility needs of I-93 and to a certain extent made traffic worse. Their position on Option 4 was outlined in a paper *Findings Related to Option 4*, which is included in Appendix E. The conclusion of this paper reads:

> *"This option is also in conflict with other elements of the goal statement developed by the entire Planning Group for this specific project. For example, the phrase "…supports economic initiatives…" indicates the project will accommodate economic initiatives and will take into account regional growth and planned development within the design horizon for this project. It should not be construed to mean that the project will promote and facilitate large-scale development independent of any transportation benefit. Furthermore, this alternative does not preserve and/or enhance the Capitol Region communities' natural and historic resources. Therefore, many Planning Group members do not see it as an environmentally acceptable option. Therefore, this alternative does not meet the overall goals of the Bow-Concord I-93 Project, and is not considered reasonable for this project."*

5.5.4 Opportunity Corridor Concept Option 5

Opportunity Corridor Concept Option 5 is similar to the reasonable Option 1 except that it excludes elements such as shifting I-93, lowering I-93, the multi-modal center, and the pedestrian crossing over I-93 to the river. The screening for Option 5 is therefore similar to Option 1. The categories that received different scores and led to the option being unreasonable included Aesthetic, Community Vision, Public Health, and Transportation Choice. These all received lower scores than for Option 1 because of the loss of the multi-model center and the crossing of I-93. These are important elements of the City of Concord's vision for its future. As a result, the Support category received a mixed score of between half red and yellow.

The Planning Group felt that this alternative was unreasonable because it did not address the community visions of Concord. See Figure 5.10 for the Screening Summary of the Opportunity Corridor Concept Option 5.

5.5.5 Route 106 Connector Option 1

Route 106 Connector Option 1 received mixed scores during its screening. It received full red scores for Historic and Archeological Resources and Natural Environment. These negative scores are a result of the impacts to Garvin Falls. As discussed in Section 4.0, Garvin Falls is a large undeveloped area where natural and archeological resources are believed to exist. This option received half green scores for Access, Community Vision, and Transportation Choice. The connector is consistent with the visions of the surrounding communities as documented in their respective master plans.

Mobility received a half red score because the traffic modeling indicated the connector would not reduce traffic on portions of I-93. The modeling indicated the connector would be successful in reducing traffic volumes on I-93 south of Exit 13. The connector would be a good alternative for vehicles that were on US 3 headed to I-93. These vehicles must now stay on Route 3 (Manchester Street) and use Exit 13 to access I-93 and I-89. The Route 106 Connector Option 1 provided better access for these vehicles. However, the traffic modeling indicated little or no change on I-93 north of Exit 13 or on Route 106 north of US 3. The model indicated that the connector was not an attractive alternate for vehicles heading to the northern portion of Route 106 towards Loudon. These vehicles would continue to use I-93.

The Planning Group felt that this alternative was unreasonable because it did not address the mobility issues associated with I-93. The impacts to natural and archeological resources were also viewed as unreasonable by some on the Planning Group. See Figure 5.11 for the Screening Summary of the Route 106 Connector Option 1.

In an effort to determine what level of Route 106 Connector or bypass would be required to avoid the need to widen I-93, an additional option was developed. This Route 106 Bypass would provide a parallel, limited access roadway from the I-93/I-89 Interchange to Exit 3 on I-393. This bypass would be approximately six miles in length. The modeling for this bypass indicated that I-93 would be at capacity with four-lanes and the bypass in place. This demonstrated that the existing Route 106 could not function as an alternate route for I-93 as a completely new route barely accomplished it.

5.5.6 Route 106 Connector Option 2

Route 106 Connector Option 2 received similar scores to Option 1. The scores for Historic and Archeological Resources and Natural Environment were better, only half red, because Option 2 avoided most of Garvin Falls and had only one river crossing as opposed to two.

SCREENING SUMMARY
OPPORTUNITY CORRIDOR CONCEPT OPTION 4

The Opportunity Corridor Concept was developed by the City of Concord. Option 4 includes all elements of this concept in addition to a Route 106 Connector with access to Garvin Falls and Exit 2 ½ on I-393. It proposes the following;

- Six or Eight Lanes on I-93
- Westerly shift of I-93
- Lower I-93 between Exits 13 & 15
- Reconfigure Exits 14 & 15
- Route 106 Connector
- Access to Garvin Falls
- Extend Storrs Street north & south
- Local Connection to Fort Eddy Road
- Multi-modal center & River Access
- Exit 2 ½ on I-393

Category	Score					
	🔴	◓	🟡	◒	🟢	
Access					X	🟢
Aesthetics				X		◒
Community Resources			X			🟡
Community Vision				X		◒
Economic Vitality				X		◒
Historic and Archeological Resources	X					🔴
Implementation	X					🔴
Mobility					X	🟢
Natural Environment	X					🔴
Public Health			X			🟡
Quality of Life					X	🟢
Residential Neighborhoods			X			🟡
Safety					X	🟢
Support			X			🟡
Transportation Choice				X		◒

Opportunity Corridor Option 4 is deemed Unreasonable because it does not meet the overall goals of the project.	**Unreasonable**

Figure 5.9 - Opportunity Corridor Concept Option 4

SCREENING SUMMARY
OPPORTUNITY CORRIDOR CONCEPT OPTION 5

-The Opportunity Corridor Concept was developed by the City of Concord. Option 5 includes most of the elements of this concept except the shifting and lowering of I-93, the multi-modal center, or river access. It proposes the following improvements or provisions;

- Six Lanes on I-93
- Reconfigure Exits 14 & 15
- Extend Storrs Street north & south
- Local Connection to Fort Eddy Road

Category	Score					
Access				X		
Aesthetics		X				
Community Resources			X			
Community Vision	X	X				
Economic Vitality				X		
Historic and Archeological Resources		X				
Implementation			X			
Mobility					X	
Natural Environment			X			
Public Health			X			
Quality of Life				X		
Residential Neighborhoods				X		
Safety					X	
Support		X	X			
Transportation Choice		X				

Opportunity Corridor Option 5 is deemed Unreasonable because it does not provide the community with the type of transportation system it desires.	**Unreasonable**

Figure 5.10 - Opportunity Corridor Concept Option 5

SCREENING SUMMARY
ROUTE 106 CONNECTOR OPTION 1

The Route 106 Connector Option 1 proposes a limited access connector roadway from I-89 to the Route 3/106 Intersection. I-93 would remain four lanes north of I-89 under this alternative.

Category	Score					
	🔴	🟥	🟡	🟩	🟢	
Access				X		🟩
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision				X		🟩
Economic Vitality			X			🟡
Historic and Archeological Resources	X					🔴
Implementation		X				🟥
Mobility		X				🟥
Natural Environment	X					🔴
Public Health			X			🟡
Quality of Life			X			🟡
Residential Neighborhoods			X			🟡
Safety		X				🟥
Support		X				🟥
Transportation Choice				X		🟩

The Route 106 Connector Option 1 is deemed Unreasonable due to its inability to address the future mobility needs of I-93.	**Unreasonable**

Figure 5.11 - Route 106 Connector Option 1

The mobility score was the same as Option 1, half red, for the same reasons. The connector was well used as a bypass for Route 3 traffic but not for I-93 traffic. The inclusion of Exit 11 ½ on I-93 did increase traffic on I-93 south of Exit 12 because it provided an access point from Route 3A north of the Hooksett Tolls. Many vehicles, especially trucks, use this portion of Route 3A to avoid paying the toll.

The Planning Group felt that this alternative was also unreasonable because it did not address the mobility issues associated with I-93. See Figure 5.12 for the Screening Summary of the Route 106 Connector Option 2.

5.5.7 Local Road Improvements

The Local Road Improvements Alternative did not score well during screening. It received no green scores. It received two full red scores for Historic and Archeological Resources and Natural Environment. The negative historic score results from the expected impacts to historic properties that would result from a completed Langley Parkway. The connector from Exit 16 to Route 3 that is part of this alternative would require a crossing of the Merrimack River as well as floodplain impacts. This explains the negative Natural Environment score.

Mobility received a half red score because the traffic modeling indicated the combination of all the local road improvements that are part of this alternative would not address the congestion along I-93. Safety also received a half red because although the existing safety issues would be addressed, the increased congestion would also pose a safety concern.

The Planning Group felt that this alternative was unreasonable because it did not address the mobility issues associated with I-93 and it had substantial resource impacts. See Figure 5.13 for the Screening Summary of the Local Road Improvements Alternative.

5.5.8 Safety Improvements

The screening for the Safety Improvements Alternative was mostly neutral with the exception of two important categories. The Safety category received a full green as expected. However, the Mobility category received a full red score because this alternative would not address the mobility needs of I-93.

The Planning Group felt that this alternative was unreasonable as a standalone alternative because it did not address the mobility issues associated with I-93. See Figure 5.14 for the Screening Summary of the Safety Improvements Alternative.

5.5.9 1992 Feasibility Study

The 1992 Feasibility Study Alternative received extremely mixed scores during its screening. It received full green scores for Access, Mobility, and Safety. These reflect the wide scopeof improvements that are part of this alternative. It received full red scores for Aesthetics, Community Vision, Implementation, and Support. These scores reflect the feeling from thecommunity representatives on the Planning Group that although this alternative addressed the transportation issues of the corridor, it did so at the expense of the surrounding

communities. Transportation Choice received a yellow score because it was felt this alternative focused on automobile travel and did little for other modes of travel. Natural Environment received a yellow because even though there would be impacts to natural resources, enhancements could also be part of the alternative. Historic and Archeologica Resources received a half red score due to expected impacts to historic buildings near Exit 14.

SCREENING SUMMARY
ROUTE 106 CONNECTOR OPTION 2

The Route 106 Connector Option 2 proposes a limited access connector roadway from a new Exit 11 ½ on I-93 to the Route 3/106 Intersection. I-93 would remain four lanes north of I-89 under this alternative.

Category	Score					
	🔴	🟥	🟡	🟩	🟢	
Access				X		🟩
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision				X		🟩
Economic Vitality			X			🟡
Historic and Archeological Resources		X				🟥
Implementation		X				🟥
Mobility		X				🟥
Natural Environment		X				🟥
Public Health			X			🟡
Quality of Life			X			🟡
Residential Neighborhoods			X			🟡
Safety		X				🟥
Support		X				🟥
Transportation Choice				X		🟩

The Route 106 Connector Option 2 is deemed Unreasonable due to its inability to address the future mobility needs of I-93.	**Unreasonable**

Figure 5.12 - Route 106 Connector Option 2

SCREENING SUMMARY
LOCAL ROAD IMPROVEMENTS ALTERNATIVE

The Local Road Improvements Alternative proposes improvements to or construction of new of local roads. I-93 would remain four lanes north of I-89 under this alternative and would include the following:

- Langley Parkway (NW Bypass)
- Exit 16 1/2
- Connector from Exit 16 to US 3
- Extend Storrs Street

Category	Score					
	🔴	🟥	🟡	🟢	🟩	
Access			X			🟡
Aesthetics			X			🟡
Community Resources		X				🟥
Community Vision		X				🟥
Economic Vitality			X			🟡
Historic and Archeological Resources	X					🔴
Implementation		X				🟥
Mobility		X				🟥
Natural Environment	X					🔴
Public Health			X			🟡
Quality of Life		X				🟥
Residential Neighborhoods		X				🟥
Safety		X				🟥
Support		X				🟥
Transportation Choice			X			🟡

The Local Road Improvements Alternative is deemed Unreasonable due to its inability to address future mobility needs of I-93	**Unreasonable**

Figure 5.13 - Local Road Improvements Alternative

SCREENING SUMMARY
SAFETY IMPROVEMENTS ALTERNATIVE

The Safety Improvements Alternative proposes to address the existing safety issues along I-93, I-89 and I-393. I-93 would remain four lanes north of I-89 under this alternative.

Category	Score					
	🔴	🟥	🟡	🟩	🟢	
Access			X			🟡
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision		X				🟥
Economic Vitality			X			🟡
Historic and Archeological Resources			X			🟡
Implementation				X		🟩
Mobility	X					🔴
Natural Environment			X			🟡
Public Health			X			🟡
Quality of Life		X				🟥
Residential Neighborhoods			X			🟡
Safety					X	🟢
Support		X				🟥
Transportation Choice			X			🟡

The Safety Improvements Alternative is deemed Unreasonable due to its inability to address future mobility needs of I-93.	**Unreasonable**

Figure 5.14 - Safety Improvements Alternative

The 1992 Feasibility Study Alternative was deemed unreasonable due to its impact on the communities. See Figure 5.15 for the Screening Summary of the 1992 Feasibility Study Alternative.

5.5.10 Passenger Rail Service

The screening for the Passenger Rail Service Alternative was mostly neutral with several exceptions. The Transportation Choice category received a full green since passenger rail provides greater choice. Implementation received a full red score because there is currently no passenger rail service in the region. Implementing this service would be costly and difficult. Pan Am Railways disagreed with the full red score for Implementation. They believe Passenger Rail should have received a half red score for cost and overall for Implementation. Their contention is that the rail corridor exists and is currently active with freight service. The Implementation would not be as difficult because the rail already exist.

The Mobility category received a half red score because although passenger rail would address a portion of the congestion projected for the corridor, it would not address it completely. As described in Section 2.5.6, a "proscriptive" model run was conducted assuming a system-wide 10% reduction in trips. A 10% reduction in trips would only result for a highly successful transit/rail system. The model results indicate that there is enough background demand that even a 10% reduction in travel does little to diminish congestion along I-93.

The Passenger Rail Service Alternative was deemed unreasonable due to its inability to address the mobility issues associated with I-93. See Figure 5.16 for the Screening Summary of the Passenger Rail Service Alternative.

Pan Am Railways and the CLF feel that Passenger Rail Service should have been considered as a component as well as a standalone alternative. Their belief is that passenger rail along the existing rail corridor is reasonable and should be considered as a component to any build alternative. This will be re-evaluated at the start of Part B.

5.5.11 Shift I-93 to East Side of Merrimack River

Shifting I-93 to the east side of Merrimack River received extremely mixed scores during its screening. Mobility received a full green score because this alternative assumes I-93 would be widened to six lanes if it were relocated. It received a full green score for Quality of Life since separating I-93 from downtown Concord was seem as an improvement for those living and working in Concord. It received a full red for Implementation due to its extremely high cost and disruption during construction.

Natural Environment received a full red due to the substantial impacts associated with this alternative. Moving I-93 requires two crossings of the Merrimack River, the most significant natural resource within the project limits. This alternative would also substantially impact floodplains and farmlands.

The Planning Group felt that this alternative was unreasonable because of the substantial environmental obstacles with moving I-93 across the river. See Figure 5.17 for the Screening Summary of the Shift I-93 to East Side of Merrimack River Alternative.

5.5.12 Move Merrimack River

The Move Merrimack River Alternative did not score well during screening. It received only one green score, a half green for Community Vision. This is due to the fact it addresses Concord's desire to re-connect downtown to the river. Many of the categories received neutral yellow

SCREENING SUMMARY
1992 FEASIBILITY STUDY ALTERNATIVE

The 1992 Feasibility Study proposed a significant reconstruction of I-93 that included an eight lane I-93. The proposed improvements included reconstruction of all exits on I-93 and Exit 1 on I-89.

Category	Score					
	🔴	🔴/🟡	🟡	🟡/🟢	🟢	
Access					X	🟢
Aesthetics	X					🔴
Community Resources			X			🟡
Community Vision	X					🔴
Economic Vitality				X		🟢/🟡
Historic and Archeological Resources		X				🔴/🟡
Implementation	X					🔴
Mobility					X	🟢
Natural Environment			X			🟡
Public Health		X				🔴/🟡
Quality of Life		X				🔴/🟡
Residential Neighborhoods			X			🟡
Safety					X	🟢
Support	X					🔴
Transportation Choice			X			🟡

The 1992 Feasibility Study is deemed Unreasonable due to the impacts to the corridor and its focus on automobile traffic.	**Unreasonable**

Figure 5.15 - 1992 Feasibility Study Alternative

SCREENING SUMMARY
PASSENGER RAIL SERVICE ALTERNATIVE

Passenger Rail Service proposes implementing rail service from the south into Concord. I-93 would remain four lanes north of I-89.

Category	Score					
	🔴	◒	🟡	◒	🟢	
Access			X			🟡
Aesthetics			X			🟡
Community Resources			X			🟡
Community Vision				X		◒
Economic Vitality				X		◒
Historic and Archeological Resources			X			🟡
Implementation	X					🔴
Mobility		X				◒
Natural Environment			X			🟡
Public Health				X		◒
Quality of Life				X		◒
Residential Neighborhoods			X			🟡
Safety			X			🟡
Support		X				◒
Transportation Choice					X	🟢

The Passenger Rail Service Alternative is deemed Unreasonable due to its inability to address the project goals such as improved Mobility and increased safety.	**Unreasonable**

Figure 5.16 - Passenger Rail Service Alternative

SCREENING SUMMARY
SHIFT I- 93 TO EAST OF MERRIMACK RIVER

This Alternative would shift I-93 to the East side of the Merrimack River from north of Exit 12 to Exit 15. I-93 would have six lanes with upgraded exits.

Category	Score					
	🔴	🟥	🟡	🟢	🟩	
Access			X			🟡
Aesthetics		X				🟥
Community Resources			X			🟡
Community Vision		X				🟥
Economic Vitality				X		🟢
Historic and Archeological Resources			X			🟡
Implementation	X					🔴
Mobility					X	🟩
Natural Environment	X					🔴
Public Health				X		🟢
Quality of Life					X	🟩
Residential Neighborhoods				X		🟢
Safety				X		🟢
Support		X				🟥
Transportation Choice			X			🟡

Shifting I-93 to the East side of the Merrimack River is deemed Unreasonable due to environmental obstacles.	**Unreasonable**

Figure 5.17 - Shift I-93 To East of Merrimack River

scores because they were not applicable. It received three full red scores for Implementation, Natural Environment, and Support. These scores reflect the Planning Group's belief that moving the river would be very difficult to permit.

The Planning Group felt that this alternative was unreasonable because of the substantial environmental obstacles with moving the river. See Figure 5.18 for the Screening Summary of the Move Merrimack River Alternative.

5.5.13 Western Beltway

The Western Beltway Alternative did not score well during screening. It did receive two half green scores, for Access and Mobility. However, it received six full red scores and four half red scores. The environmental and community impacts associated with a large bypass were deemed unreasonable.

The Planning Group felt that this alternative was unreasonable because of its substantial environmental and community impacts. See Figure 5.19 for the Screening Summary of the Western Beltway Alternative.

5.6 Screening Summary

In Summary, the screening conducted by the Planning Group, NHDOT and FHWA resulted in a range of reasonable alternatives that included the following:

<u>Reasonable Alternatives</u>
- No Build
- Travel Demand Management
- Transportation System Management
- Opportunity Corridor Concept Option 1

The first three of the above are alternatives that are required to be evaluated in Part B by the NEPA process. In addition, the screening resulted in four reasonable components along with the four that were not screened. All the reasonable components include:

<u>Reasonable Components</u>
- Preservation of the rail corridor
- Safety Improvements
- Enhanced pedestrian and bicyle facilities
- Travel Demand Management (TDM) strategies
- Transportation System Management
- Alternate Land Use
- I-93 Tunnel
- Rail Transit in I-93 Median

The remaining alternatives and components were deemed unreasonable for the reasons discussed in the previous sections. TDM is not included as a reasonable component because it was designated as a necessary component to all build alternatives. TSM was considered reasonable to consider but not necessary.

SCREENING SUMMARY
MOVE MERRIMACK RIVER AWAY FROM I-93

This alternative proposes moving the Merrimack River away from Interstate 93 as it passes through Downtown Concord.

Category	Score					
	●	◒	○	◒	●	
Access			X			○
Aesthetics			X			○
Community Resources			X			○
Community Vision				X		◒
Economic Vitality			X			○
Historic and Archeological Resources			X			○
Implementation	X					●
Mobility			X			○
Natural Environment	X					●
Public Health			X			○
Quality of Life			X			○
Residential Neighborhoods			X			○
Safety			X			○
Support	X					●
Transportation Choice			X			○

Moving the Merrimack River is deemed Unreasonable due to environmental obstacles.	**Unreasonable**

Figure 5.18 - Move Merrimack River Away From I-93

SCREENING SUMMARY
WESTERN BELTWAY ALTERNATIVE

This alternative proposes a new corridor connecting I-89 near Exit 2 to I-93 near Exit 16 around the western side of Downtown Concord. I-93 would remain four lanes north of I-89.

Category	Score					
	🔴	🔴	🟡	🟢	🟢	
Access				X		🟢
Aesthetics		X				🔴
Community Resources	X					🔴
Community Vision		X				🔴
Economic Vitality			X			🟡
Historic and Archeological Resources	X					🔴
Implementation	X					🔴
Mobility				X		🟢
Natural Environment	X					🔴
Public Health			X			🟡
Quality of Life		X				🔴
Residential Neighborhoods	X					🔴
Safety		X				🔴
Support	X					🔴
Transportation Choice			X			🟡

The Western Beltway is deemed Unreasonable due its impacts to neighborhoods, historic properties and natural resources.	**Unreasonable**

Figure 5.19 - Western Beltway Alternative

6.0 Summary

6.1 Purpose and Need

A Purpose and Need statement is a fundamental requirement of the NEPA process that sets the stage for a proposed project. FHWA guidance directs a project sponsor to "identify and describe the proposed action and the transportation problem(s) or other needs which it is intended to address."

The basis for the Purpose and Need statement in the NEPA document for the Bow-Concord project will be the Project Goal Statement described in Section 1.4.2.

Project Goal Statement

The Bow-Concord I-93 Corridor should balance the needs of all users and the surrounding communities by providing a safe, affordable, reliable, environmentally acceptable and community compatible transportation system. The system will offer mobility choices and complement the unique character of the Capitol Region communities. It will support their economic initiatives, preserve and/or enhance their natural and historic resources, facilitate non-vehicular access, and sustain the communities' quality of life, now and into the future.

While the goal statement is a concise statement, the project need will be a more detailed explanation of the need including specific information on traffic volumes, safety and resource issues. It will support the purpose by giving the evidence and facts to support the purpose. The formal NEPA Purpose and Need statement for the project will be developed in Part B.

The CLF would like the Purpose and Need developed in Part B to explicitly state the need to reduce travel demand by promoting compact, mixed-use development patterns. The goal would be to reduce the need for added capacity and reducing greenhouse gas emissions.

6.2 Natural Resource Constraints

The most significant natural resource in the project area is the Merrimack River. Although none of the Range of Reasonable Alternatives is expected to directly impact the river, protecting water quality in the river will likely be a key issue. There are also several segments along I-93 where any widening would likely impact floodplains. These floodplains exist near Exit 12 and are associated with the South End Marsh and the Merrimack River and exist near the I-93/I-89 Interchange and are associated with the Turkey River. The natural resource constraints reflect potential impacts by the Range of Reasonable Alternatives but not those potential impacts by Unreasonable Alternatives.

6.3 Cultural Resource Constraints

The Downtown Concord Historic District, Concord Gas Company & Holt Brothers Historic District, the South End Historic Neighborhood, and various other buildings are historic resources that could be impacted by the Range of Reasonable Alternatives. These resources are along the boundary of I-93 and could be impacted by the widening of I-93 proposed by the alternatives. The remaining historic structures and districts are beyond the expected construction limits.

The area along the Merrimack River has been identified as sensitive for archeological resources. The widening of I-93 could impact these areas. In addition, the lowering of I-93 proposed by Opportunity Corridor Concept Option 1 could also impact these resources. The area near the I-93/I-89 Interchange has also been identified as sensitive. Improvements to the interchange or impacts to the Turkey River, which runs through the interchange, have the potential to impact archeological resources.

The cultural resource constraints reflect potential impacts by the Range of Reasonable Alternatives but not those potential impacts by Unreasonable Alternatives.

6.4 Range of Reasonable Alternatives

The Range of Reasonable Alternatives to be considered in Part B of the Bow-Concord Project is:

Reasonable Alternative	Reasonable Components
• No Build • Travel Demand Management (TDM) • Transportation System Management (TSM) • Opportunity Corridor Concept Option 1	• Transportation System Management (TSM) • Alternate Land Use • I-93 Tunnel • Rail Transit in I-93 Median • Preservation of Rail Corridor • Safety Improvements • Enhanced pedestrian/bicycle facilities • Travel Demand Management (TDM)

6.5 Regulatory Considerations

Because of the scope of this project and the use of federal funds, there are several regulatory processes, permits or statutes that will apply. These are listed below with the responsible agency:

- National Environmental Policy Act (NEPA) - FHWA
- Clean Water Act, Section 404 permit – Army Corp. & EPA
- Clean Water Act, Water Quality Certificate - NHDES
- State Wetlands Dredge and Fill Permit - NHDES
- National Pollutant Discharge Elimination System (NPDES) Permit - USEPA
- National Historic Preservation Act - SHPO
- Section 4(f) of the U.S. Department of Transportation Act - FHWA

6.6 Recommended NEPA Classification

Because the Range of Reasonable Alternatives is not expected to cause significant impacts to resources, it is recommended that the best course of action is to prepare an Environmental Assessment (EA) for the Bow-Concord I-93 Corridor. A primary purpose of an EA is to help determine whether or not an Environmental Impact Statement (EIS) is required. If during the preparation of the EA, it is determined that the proposed action is likely to have a significant impact on the environment, the preparation of an EIS will be required.

The EPA and CLF both believe that an EIS will be required for the project. Before Part B of the project begins, a final determination of the type of environmental document will be made after consultation with all regulatory agencies and stakeholder groups.