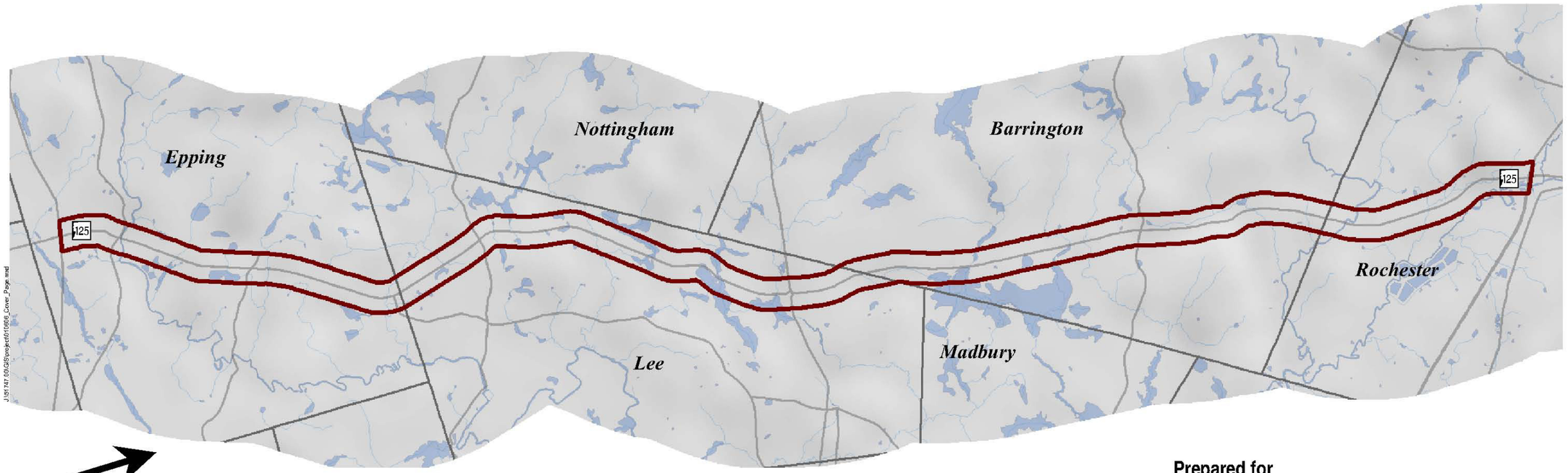
# *NH ROUTE 125 TRANSPORTATION AND LAND USE CORRIDOR STUDY*

## *Phase 2 - Analysis and Planning*

Epping, Lee, Barrington, & Rochester,
New Hampshire




**Prepared for**
Strafford Regional Planning Commission
Dover, New Hampshire

**Prepared by**
*VHB*/Vanasse Hangen Brustlin, Inc.
Bedford, NH

March, 2008

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# Executive Summary

This section provides a brief summary and overview of the study purpose, findings, and recommendations.

## Study Purpose

The purpose of this study is to develop a plan for the NH 125 corridor that better integrates transportation and land use using smart growth strategies and access management techniques to enhance safety and preserve corridor capacity. More importantly the study provides the corridor communities with the guidance and tools to ensure that as development occurs along the corridor, it will occur in a manner that is consistent with the vision and projected growth of each corridor community.

So how should the communities best use this document? The communities should view this report as a living document. The report presents both general and specific recommendations for the corridor. However, it is important to recognize that this is a planning document and that none of the recommendations are "set in stone". The communities will, with the assistance of the Strafford Regional Planning Commission (SRPC), have the opportunity to work with the New Hampshire Department of Transportation (NHDOT) in the implementation of the recommendations in the corridor improvement plan. It will be important for the corridor communities to work together on establishing and maintaining a consistent long-term vision for the corridor.

NH 125 is a state highway but it is also an important local connector through and across each corridor community. For this reason, the corridor communities recognize that each have great influence on how development will occur along the corridor. As development projects are presented along the corridor, it will be important that the strategies, techniques and vision presented in this report be considered by the local land use boards and developers in each community. Decisions relating to site access, traffic control, connectivity, land use, building setbacks, pedestrian needs, and multi-modal strategies will need to be considered within the context of the long-term vision for the corridor.

## Findings

The following are some of the key study findings, which formed the basis for the development of the recommended corridor plan.

**Smart Growth –** The results of the full land use build-out analyses under current zoning revealed a traffic growth potential for the corridor that, if realized, would choke the carrying capacity of the existing corridor or require the type of major roadway widening that would adversely impact the quality of life for corridor communities. It is for this reason that each of the corridor communities should embrace the smart growth principles outlined in the report, including but not limited to, supporting the integration of mixed land uses, preserving open space, and fostering distinctive and attractive development with a strong sense of place.

**Access Management –** A well conceived access management plan would enhance the safe and efficient movement of vehicular traffic and reduce, or at least delay, the need to introduce major roadway widening along the corridor. Working closely with the NHDOT, through the implementation of public roadway improvement projects or in reviewing proposed private development projects, the corridor communities must encourage the construction of connector roadways or internal connections between properties that provide access to signalized intersections. Each community should adopt and consistently apply the provided guidelines for the spacing, dimensions, and the number of driveways for properties located along the corridor. The Memorandum of Understanding, which outlines the agreement between the NHDOT and each of the communities, will need to be adopted by each community.

**Multi-Modal –** To reduce the travel demand along the corridor, travelers need to have timely and convenient choices in their mode of travel. The corridor communities must aggressively pursue the creation of multi-use paths such as those envisioned within the proposed new Barrington Town Center as well as use of the abandoned rail corridor to create an approximately 4-mile long multi-use path to link the Barrington Town Center northward to the Village of Gonic. Corridor communities should work closely with public transit providers in the pursuit of opportunities to provide bus service along the corridor. Additionally, the NHDOT should continue to pursue efforts in locating and constructing a new park and ride facility in the US 4/NH 125 intersection.

**Safety –** One of the more glaring corridor deficiencies, as voiced by attendees at public input meetings, is the absence of turn lanes along the corridor. Given the high traffic volume, relatively high travel speeds, trucking activity and the numerous side streets and driveways, motorists are concerned with stopping in the through lane to turn left from the corridor. The communities should work closely with the NHDOT to develop a program for providing designated turn lanes at major intersections and perhaps extended lengths of a two-way-center turn lane in areas where numerous driveways exists.

**Pedestrian Access –** The NH 125 corridor is currently not pedestrian friendly. Sidewalks, crosswalks, and pedestrian activated traffic signals should be provided in the high pedestrian activity areas of the corridor such as in Epping from Main Street to Route 27, in Lee in the vicinity of the Traffic Circle, in Barrington near Route 9, and in Rochester near the Village of Gonic.

**Community Character –** In developing the corridor plan, it was particularly important that the plan enhances rather than detracts from the distinct character of each of the communities. The plan encourages the use of gateway treatments, which through the use of landscaped medians and other streetscape serve to create a "look and feel" that fits with the character of the community and identifies areas where pedestrian activity is prevalent.

**Project Funding –** Although the corridor plan identifies a long-term plan that would involve substantial and expensive widening of the corridor, it is important to recognize that with the State's current funding short-fall, it is the NHDOT's stated policy that they will focus their limited available funding for NH 125 on projects that enhance the efficiency of the corridor rather than on projects that simply expand or add new lanes. Therefore, it will be important to focus on the smart growth, access management, multi-modal, safety, pedestrian access, and community character elements of the plan first. Additionally, as development proposals come before the Planning Boards of each community, the communities and the NHDOT will have the opportunity to ensure that each development proposal is consistent with the plan's goals and objectives and that each development proposal constructs or funds the corridor improvements that are needed to mitigate the project's traffic impact.

## Recommendations

In general, the long-term plan calls for the placement of well-spaced major intersections, which when placed under traffic signal control, would serve to safely and efficiently accommodate left-turn movements. These **major signalized intersections** would ultimately provide two through lanes and an exclusive left-turn lane in each direction on NH 125. As discussed on page 36 there are a number of alternative cross sections ranging from a 3-lane section with an exclusive left-turn lane, no raised median, and a single through lane in each direction to an ultimate 5-lane section with an exclusive left-turn lane, raised median, two through lanes per direction, and sidewalks. The decisions on the phased implementation of these various cross sections would depend on such factors as available right-of-way, costs, compatibility with other upgrades in the area, and opportunities for private funding through private development off-site mitigation of impact.

**Connector roadways or internal connections** between adjacent properties would provide access to the signalized intersections where left-turn movements can be better accommodated.

The plan also provides specific guidelines for the **placement of driveways** along the corridor. The guidelines cover the spacing and width of driveways as well as the number of driveways that would be permitted on each parcel.

The plan recommends **improved pedestrian and bicycle connectivity** throughout the corridor, including **sidewalks, crosswalks, pedestrian activated traffic signals, the consideration of a pedestrian bridge, designated bicycle lanes** as well as **multi-use paths and trails**. In addition, the plan anticipates a need for future **bus service** and for additional **park-and-ride facilities.**

The recommended roadway cross section provides the flexibility for use of raised **center medians** along particular segments of the corridor or for accommodating left-turn movements with a **center left-turn lane**. Raised concrete center medians could be used along some segments of the corridor while **landscaped medians** could be used in other areas where the purpose would be to complement the aesthetic character of the surrounding land use. Landscaped medians would also serve as **"gateway treatments"** to delineate high activity areas and at **crosswalks** to better alert motorists to pedestrian crossing locations.

In addition to the physical modifications to the corridor, **land use policy recommendations and smart growth principles including mixed-use development, natural resource and open space protection and low impact development** are provided to ensure that the land use policies for each of the four corridor communities are consistent with the long-term vision for the NH 125 corridor.

# Introduction

This section provides a brief introduction to the report including a description of the study corridor and study purpose, a review of the Phase 1 data collection effort, and also includes a discussion on the community involvement process.

## Study Corridor

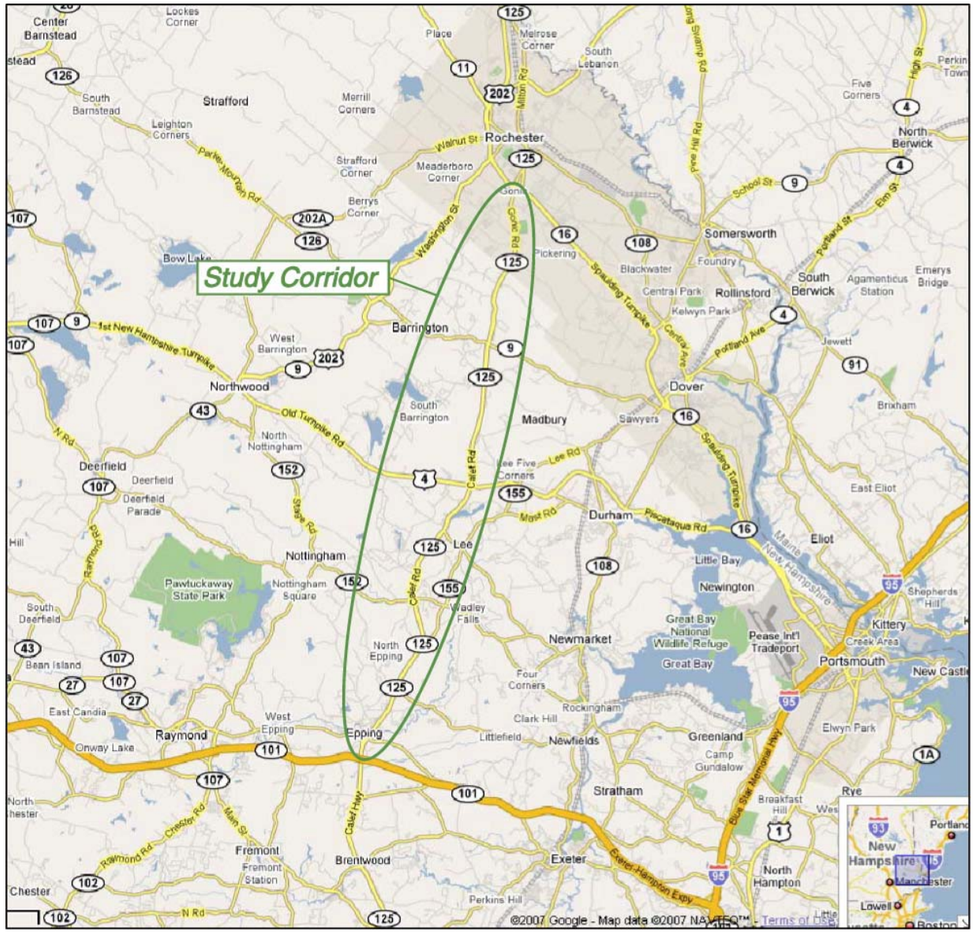
Vanasse Hangen Brustlin, Inc. (VHB) has been retained by the Strafford Regional Planning Commission (SRPC) to conduct a comprehensive transportation and land use study of an approximately 20-mile length of NH 125, which extends from NH Route 101 in Epping to Route 16 in Rochester. The study corridor, which is depicted in Figure 1, extends though the Towns of Epping, Lee, Barrington and the City of Rochester.

The purpose of the study is to develop an innovative plan for the corridor that better integrates transportation and land use using smart growth strategies and access management techniques to enhance safety while preserving corridor capacity. The study was conducted in two separate phases. The data collection effort (Phase 1), which was completed in March 2006, set the stage for the comprehensive study and the development of the corridor plan. The most important product of the Phase 1 data collection effort was the development of an extensive mapping of the corridor's environmental constraints, natural resources, roadway geometrics, and traffic and safety information. This mapping was presented on 11"x17" figures in the Phase 1 report. The mapping was also provided to the SRPC in a GIS format.

The second and final phase of the study (Phase 2 – Analysis and Planning) consisted of an evaluation of existing conditions, an estimate of future corridor conditions including a build-out analysis under current zoning, consideration of various corridor and land use improvement alternatives, and finally the development of the comprehensive corridor improvement plan.

This Phase 2 document along with the Phase 1 document encompasses the entire study. Before moving to the findings of Phase 2, the following section provides a brief summary of types of data that were collected under Phase 1. The base information is presented in greater detail under the Existing Conditions section of the report. Note that the mapping, which is provided in the Phase 1 report, has not been reproduced in this Phase 2 report.

**Figure 1 – Study Corridor**



## Phase 1 Summary

The data collection effort conducted under Phase 1 includes a roadway inventory, traffic volume counts, accident research, travel time surveys, travel speeds, as well as an inventory of environmental resources such as wetlands, floodplains and floodways, groundwater, surface water resources, water supplies, conserved public lands, farmland soils, wildlife and fisheries habitats, threatened and endangered species, hazardous waste, historical/archaeological and land use/socio-economic conditions. In addition to the data collection effort, the Phase 1 report introduces the concept of corridor access management.

The data collection effort serves as the first phase of this comprehensive transportation and land use study of the corridor. The data is provided in an electronic GIS database in addition to being summarized in the Phase 1 report. The summary report was prepared in a format such that if and when a more detailed environmental study (EA or EIS) is needed, much of the data can be easily incorporated into the future environmental study.

Information on the natural and cultural resources contained within the project corridor was obtained from file reviews, agency contacts, GIS database retrieval [primarily GRANIT, NH Department of Environmental Services (NHDES), and NH Fish and Game Department (NHFG)], and field reconnaissance. Parcel, property use, and zoning data were provided by SRPC.

Natural resources were separated into four map sets, including water resources, water use and protection, land use, and wildlife habitat. The grouping of mapped resources into the four map sets is intended to keep similar resources together in some cases (i.e. water resources, wildlife habitat), while in others to keep resources and their anthropogenically imposed restrictions together (i.e. water use and protection).

The report narrative for natural resources follows the order of resources outlined in the map sets. The water resources map set includes wetlands, hydric soils, aquifers broken out by transmissivity ranges, floodplains and floodways, and surface water resources. The water use and protection map set includes NH designated and impaired surface waters, data from the NHDES well inventory, public water supply sources, water treatment facilities and pump houses, well head protection areas, source water protection areas, and contamination sites. Fourth order streams are portrayed in the water resources map set, but are discussed in the water use and protection section of the narrative. The land use map set includes conserved public lands, farmland soils, and urbanized areas. Finally, the wildlife habitats map set shows unfragmented lands, riparian areas, agricultural and open habitats, and potential deer yards.

## Community Involvement Process

The NH 125 Corridor Study was the product of a collaborative effort among the Strafford Regional Planning Commission (SRPC), the New Hampshire Department of Transportation (NHDOT) and the communities of Epping, Lee, Barrington, and Rochester. To ensure a successful and implemental plan required that this collaborative approach was maintained throughout the plan development process. To that end, a Corridor Advisory Committee with representatives of each of the communities and other agencies was formed. The Committee provided valuable insight as to the existing corridor deficiencies and needs, and also served as a sounding board in the development of various corridor improvement alternatives. Members of the Corridor Advisory Committee included:

**Community Advisory Committee Members**

**City of Rochester**
- Rick Healy, City Councilor
- Sandra Breton, Conservation Commission (Alternate)

**Town of Barrington**
- Ed Lemos, Planning Board
- Tom Ursia, Town Planner (Alternate)

**Town of Lee**
- Allan Dennis, Code Enforcement Officer

**Town of Epping**
- Stephen Fournier, Town Administrator

**NHDOT, District 6**
- Allan Garland
- Steve Ireland

**Rockingham Planning Commission**
- David Walker, Senior Transportation Planner

**UNH Transportation Services – Wildcat Transit**
- Mark Hyson
- Dirk Timmons

**COAST (Cooperative Alliance for Seacoast Transportation)**
- Rad Nichols

**Isinglass River Local Advisory Committee**
- Elaine Lauterborn (Rochester)

**Strafford Rivers Conservancy**
- Anna Boudreau, Executive Director
- John Wallace, Land Agent

Throughout the study, a series of Advisory Committee meetings, Public Officials meetings and Public Informational meetings were held. The purpose of these meetings was to present information and most importantly to solicit input from members of the Advisory Committee, public officials and the public in general at various stages of the study. The following is a list of the Community Involvement meetings that occurred during the study.

**Community Involvement Meetings**

| Meeting Type | Location | Date |
|---|---|---|
| Public Informational | Barrington | July 24, 2007 |
| Advisory Committee | SRPC/Dover | August 10, 2007 |
| Advisory Committee | Rochester | September 10, 2007 |
| Public Informational | Barrington | October 4, 2007 |
| Advisory Committee | Rochester | November 16, 2007 |
| Public Officials | Barrington | December 10, 2007 |
| Public Officials | Rochester | December 17, 2007 |
| Public Informational | Barrington | January 16, 2007 |

Lastly, the Strafford Regional Planning Commission, namely Julie LaBranche, Senior Land Use Planner and Project Manager for the study, Cynthia Copeland, AICP, Executive Director, Dale Abbott, Senior GIS/Transportation Analyst, and Myranda McGowan, Transportation Planner served as the "glue" that kept the project together, moving forward, and most importantly kept the corridor communities informed. With the completion of the corridor study, the Strafford Regional Planning Commission will take the study "on the road" – that is, the SRPC will continue to meet with each of the corridor communities in an effort assist the communities with the implementation of the actions and strategies recommended in this report.

# Existing Conditions

This section describes and summarizes the results of the data collection effort. The specific topics described and summarized include: traffic volumes, accident research, travel time surveys, travel speeds, existing conditions operational analysis, field observations, land use, water resources, water use and protection, wildlife, socio-economic resources, historic and archaeological resources.

Much of the data provided in the section was collected under Phase 1. However, the Phase 2 effort included an update of some of the previous collected information. In addition to generally updating field observations, the Phase 2 study included the collection of new traffic volume counts and an updating of the accident research. In addition, the base mapping and corridor improvement plans presented in this report uses updated aerial photography that was recently conducted by the New Hampshire Department of Transportation (NHDOT).

## Traffic Volumes

To determine the existing traffic volume demands and flow patterns along the corridor, a traffic volume count program was conducted between the months of November 2005 and February 2006. Weekday morning (7:00 -9:00 AM) and weekday evening (4:00 -6:00 PM) peak period manual turning movement counts were conducted at fourteen intersections. Three of the fourteen intersections were also selected for Saturday midday (11:00 AM -1:00 PM) counts. To supplement the turning movement counts, 24-hour automatic traffic recorder counts were conducted at eight key locations within the study corridor. A summary of the automatic traffic recorder count data is presented in Table 1.

As shown in the table, the Average Weekday Traffic (AWDT) along NH 125 ranges from a low of approximately 13,300 vehicles per day (vpd) south of NH 9 to a high of 22,800 vpd south of NH 87. The morning peak hour ranged from 7.3 to 8.7 percent of the average weekday traffic while the evening peak hour ranged from 6.8 to 10.0 percent

A review of the count data revealed high levels of truck activity along the corridor with a segment of the corridor in Lee, south of Route 152, showing in excess of 10 percent trucks during the AM peak hour.

Note that for the purpose of verifying the Phase 1 data and to identify any significant growth trends, counts at three of the locations were updated during June 2007. The results revealed a reduction in the volume of traffic at two of the three locations. In 2007, the count located in Epping south of NH 87 revealed an AWDT of 20,800 vpd as compared to the 22,800 vpd and the updated count in Lee south of NH 152 revealed an AWDT of 14,600 vpd as compared to 17,200 vpd. The updated count in Barrington north of Lee Oak Road was slightly higher at 16,400 vpd as compared to the previous count of 15,400 vpd.

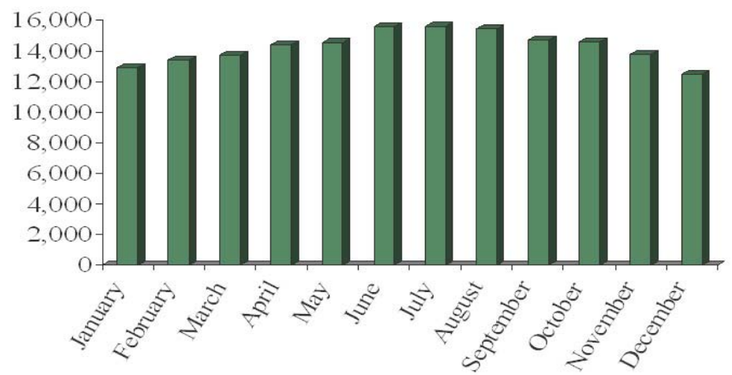
Table 1
Existing Traffic Volume Summary

| | Average Weekday Traffic Volume (vpd) | AM Peak Hour (vph) | Percent of Daily Traffic | PM Peak Hour (vph) | Percent of Daily Traffic |
|---|---|---|---|---|---|
| EPPING | | | | | |
| NH 125 south of NH 87 | 22,800 | 1,800 | 7.9 | 1,910 | 8.4 |
| Lee Hill Road east of NH 125 | 3,500 | 290 | 8.3 | 350 | 10.0 |
| LEE | | | | | |
| NH 125 south of NH 152 | 17,200 | 1,450 | 8.4 | 1,410 | 8.2 |
| NH 125 south of Mitchell Road | 15,500 | 1,350 | 8.7 | 1,330 | 8.6 |
| NH 125 north of US 4 | 13,500 | 990 | 7.3 | 1,170 | 8.7 |
| BARRINGTON | | | | | |
| NH 125 north of Lee Oak Road | 15,400 | 1,290 | 8.4 | 1,390 | 9.0 |
| NH 125 south of NH 9 | 13,300 | 1,100 | 8.3 | 900 | 6.8 |
| ROCHESTER | | | | | |
| NH 125 north of Gear Road | 14,800 | 1,200 | 8.1 | 1,280 | 8.6 |

vph = vehicles per hour
vpd = vehicles per day

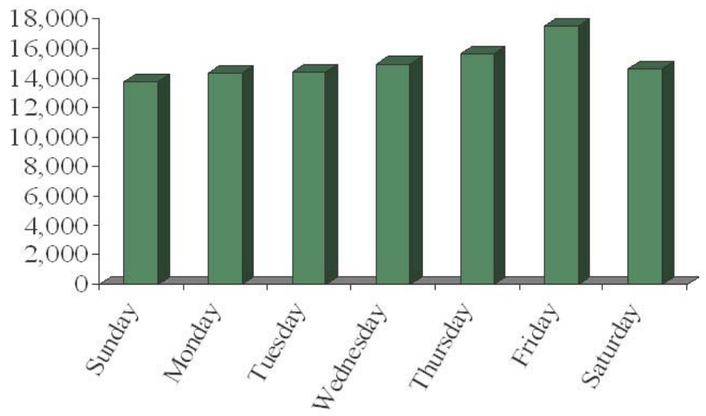
In addition to the daily and peak period traffic volume counts that were conducted for this study, the New Hampshire Department of Transportation (NHDOT) has numerous permanent traffic recorder stations located throughout the state, which provide useful information for identifying traffic flow trends and characteristics. Examination of monthly traffic volume data collected by the NHDOT at its permanent traffic recorder station located along NH 125 in Lee (north of the Traffic Circle) show the highest traffic volumes being recorded during the summer months of June, July and August. This trend is depicted in Figure 2.

**Figure 2**
**Monthly Variations**



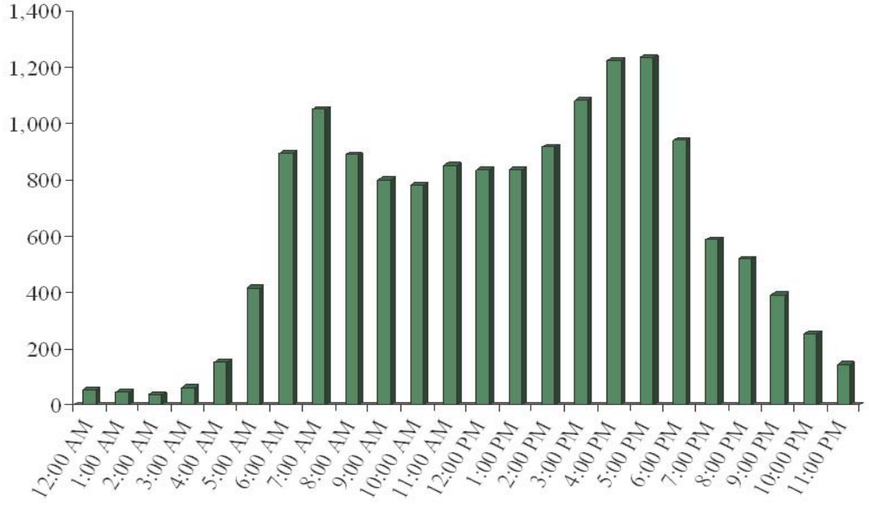
Examination of the daily traffic volume variations at the same location during the month of August 2006, as depicted in Figure 3, show Friday to be the highest volume day of the week with approximately 15,500 vehicles per day (vpd). Traffic volume levels for the remaining days of the week, including Saturday and Sunday, don't show any great variation with daily volumes ranging from approximately 14,300 vpd to 15,600 vpd.

**Figure 3**
**Daily Variations (August)**



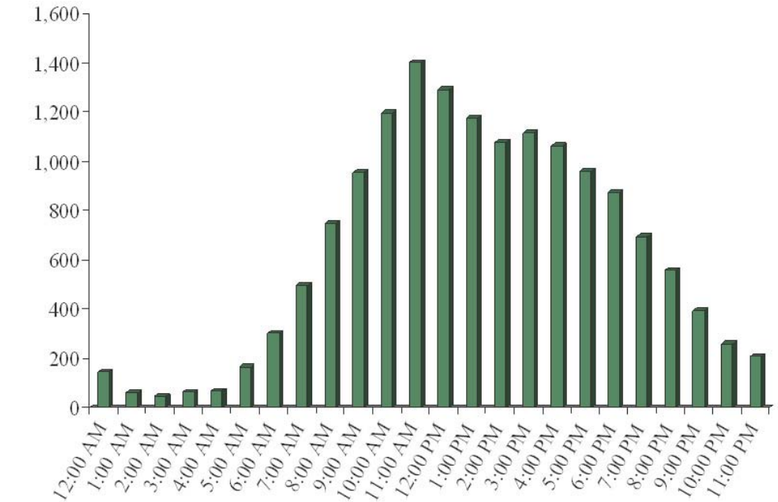

A review of the hourly variations for a typical weekday in August (Wednesday), as depicted in Figure 4, exhibit typical commuter route characteristics with the graph showing distinct AM and PM peak commuter hour activity. Note that the highest recorded traffic volumes occur during the PM peak period. In fact, the PM peak condition extends over a 2-hour (4:00 – 6:00 PM) period.

**Figure 4**
**Hourly Variations (Weekday in August)**




In contrast, on Saturday, the peak volume condition occurs at approximately 11:00 AM and then falls at a relatively constant rate throughout the day.

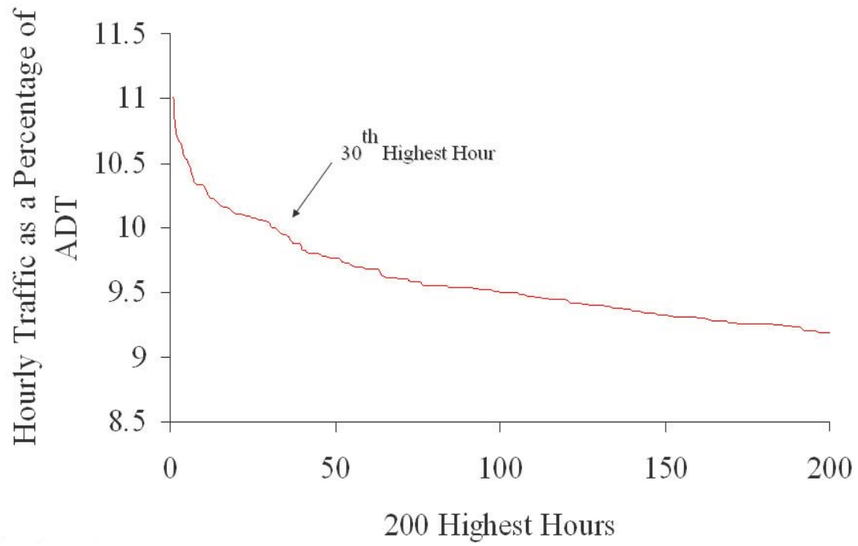
**Figure 5**
**Hourly Variations (Saturday in August)**



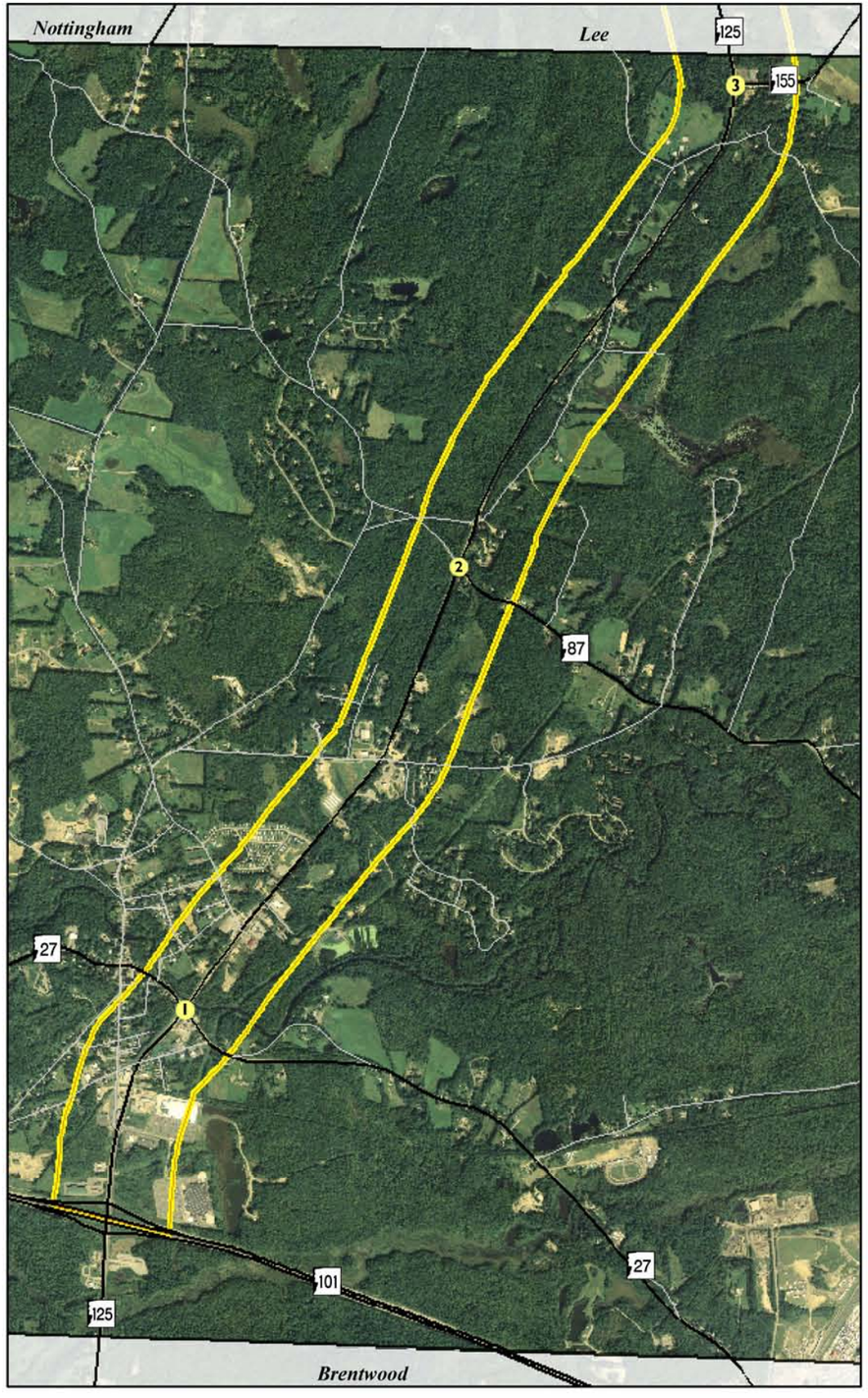

Recognizing that traffic volumes vary throughout the year, throughout the week, and over the course of a day, it is important to establish an appropriate traffic volume condition for the purpose of evaluation. A design based on the highest volume of the year would not be appropriate as designs based on such extreme conditions would result in a poor investment of available funding. Similarly, the average hourly traffic volume would result in an inadequate design. Therefore, the standard for developing an appropriate hourly condition for evaluation and design is what is called the *30th highest hourly volume*.

Given the economic considerations involved in the planning and design of roadways, the 30th highest hour is selected because it reflects a "point of diminishing returns" in that a substantial increase in design requirements would accommodate only a very few periods of higher traffic volumes. This condition is reflected in Figure 6. The curve, which tends to steepen quickly to the left of the 30th highest hour, indicates much higher volumes for the inclusion of only a few higher volume hours, while the curve flattens to the right indicating many hours in which the volume is not much greater than the 30th highest hour. The collected traffic volume counts have been adjusted to reflect a 30th highest hour condition.

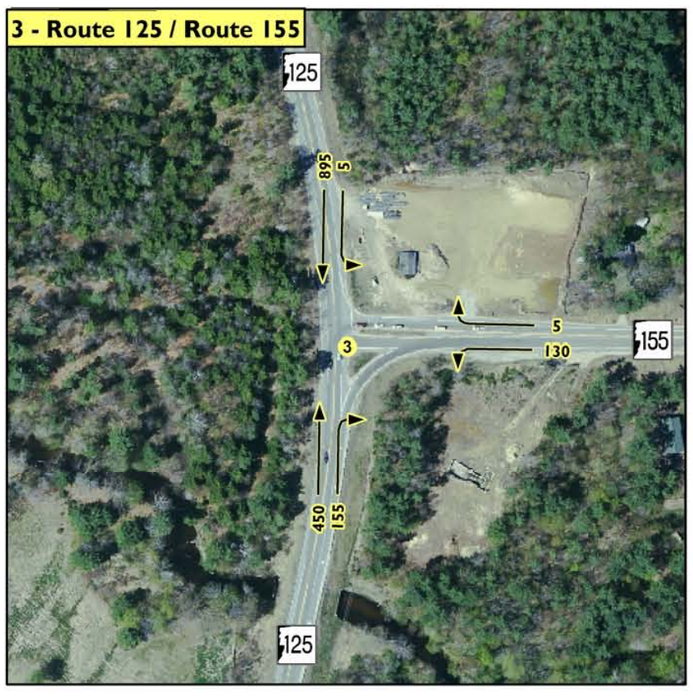
**Figure 6**
**200 Highest Hours of the Year**




The 2007 Existing Weekday morning and evening peak hour turning movement volumes at selected intersections along the corridor are shown in Figures 7 through 14.






**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

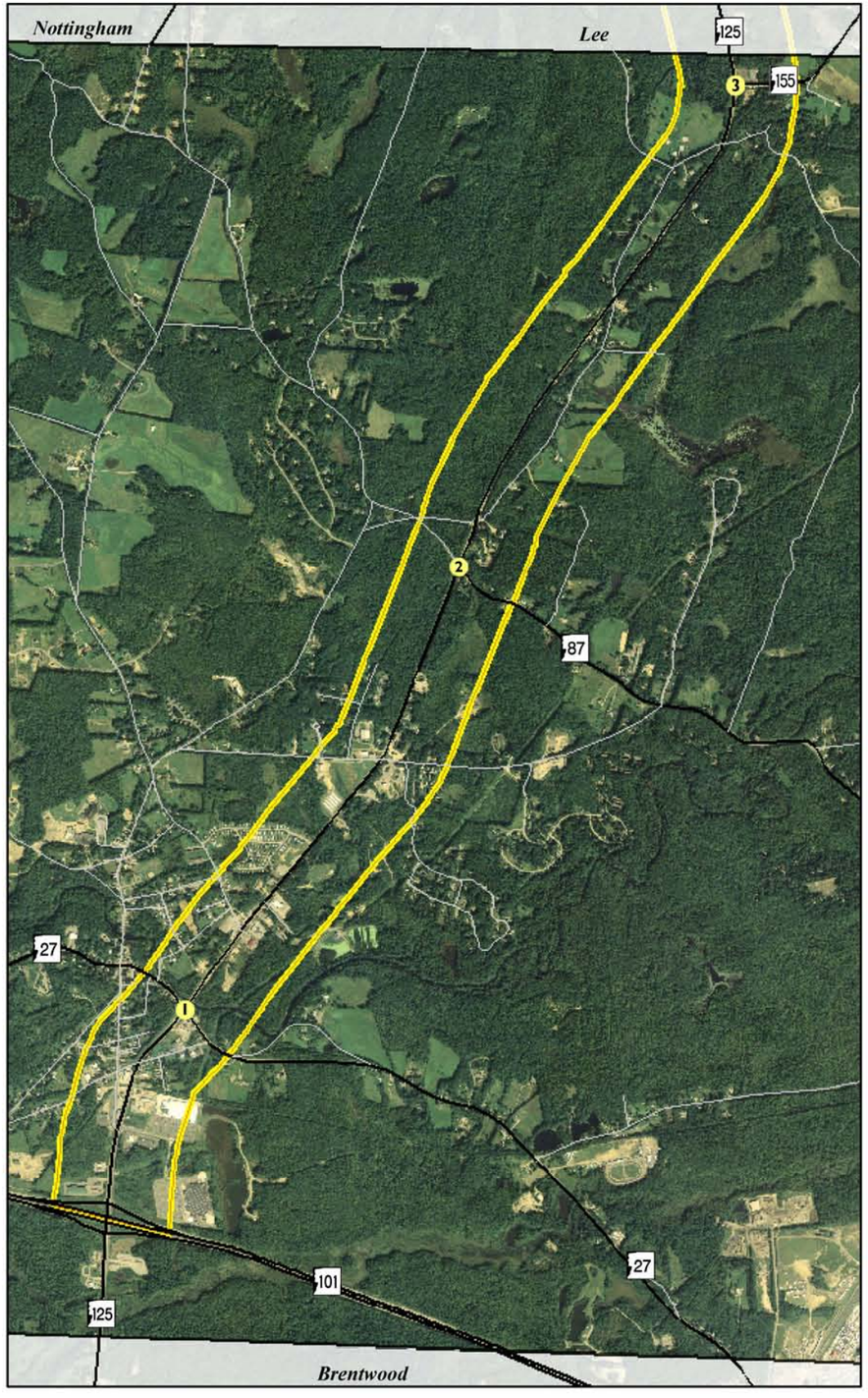
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

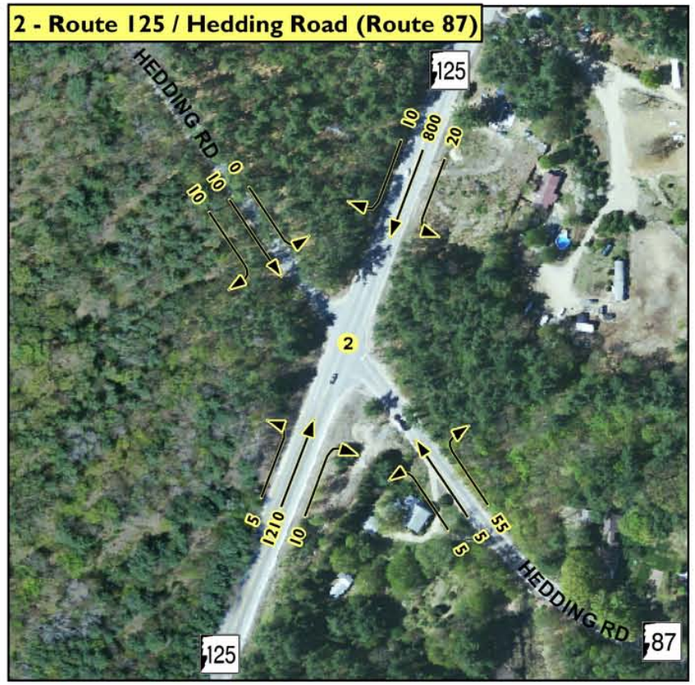
Figure 7

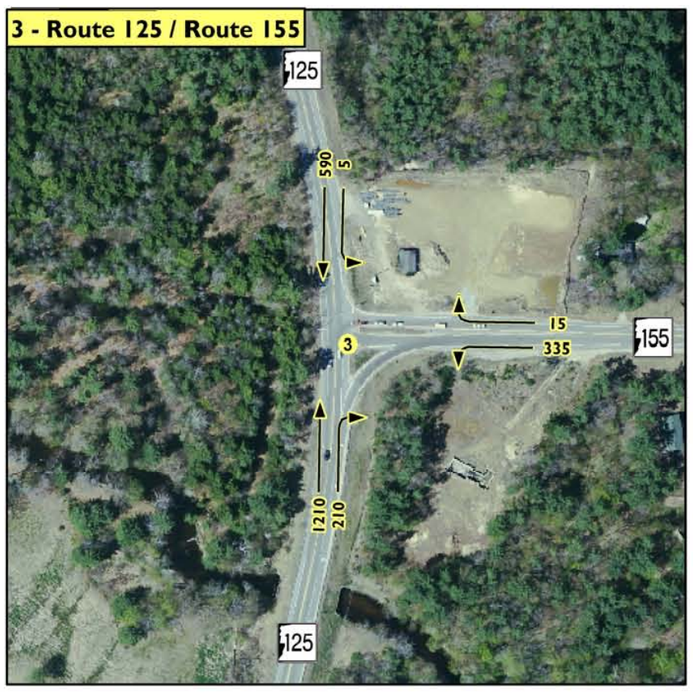
2007 Existing Weekday Morning Peak Hour Traffic Volumes
Epping

NH Route 125
Corridor Management Study








**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

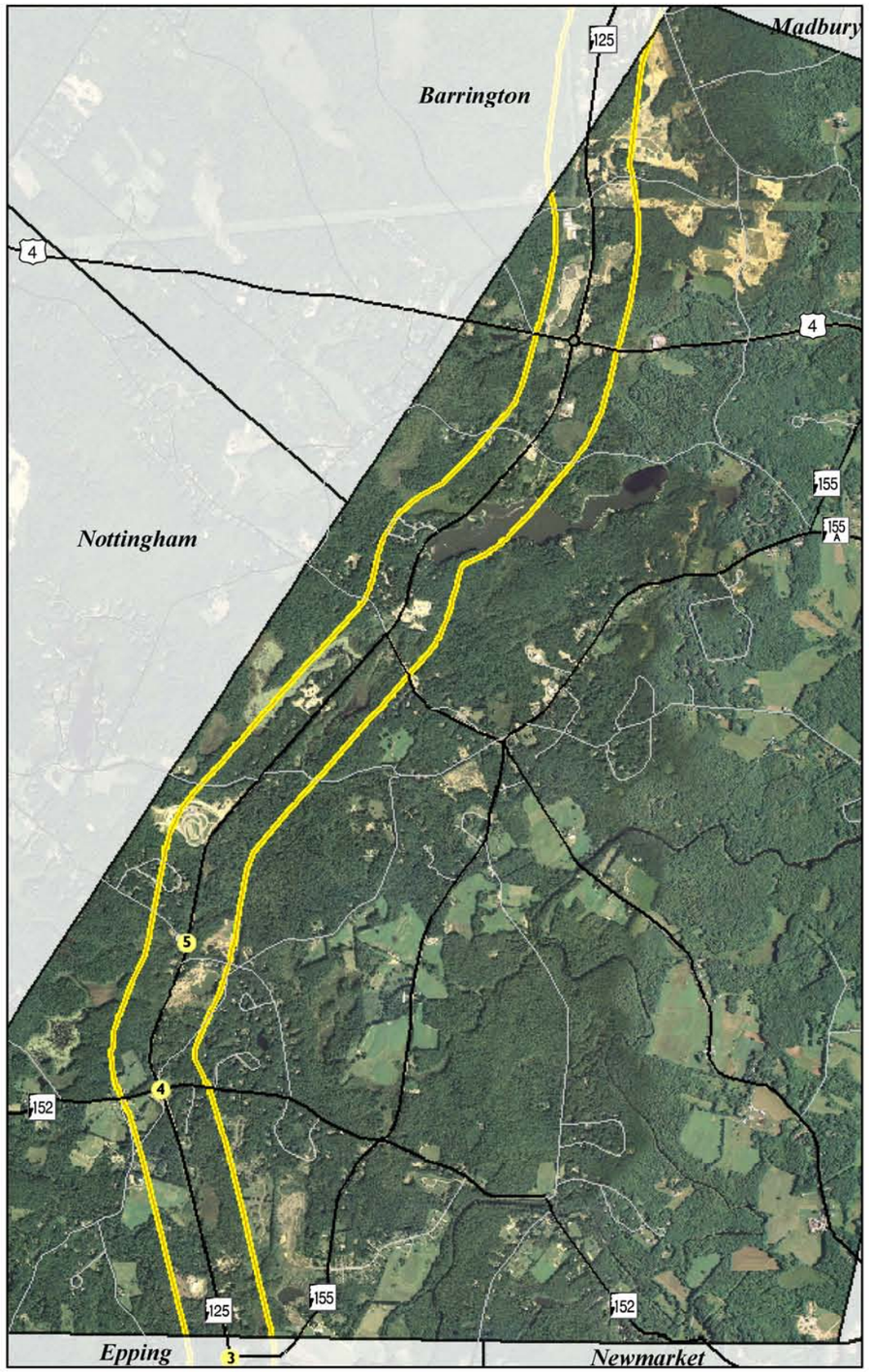
0 250 500 Feet

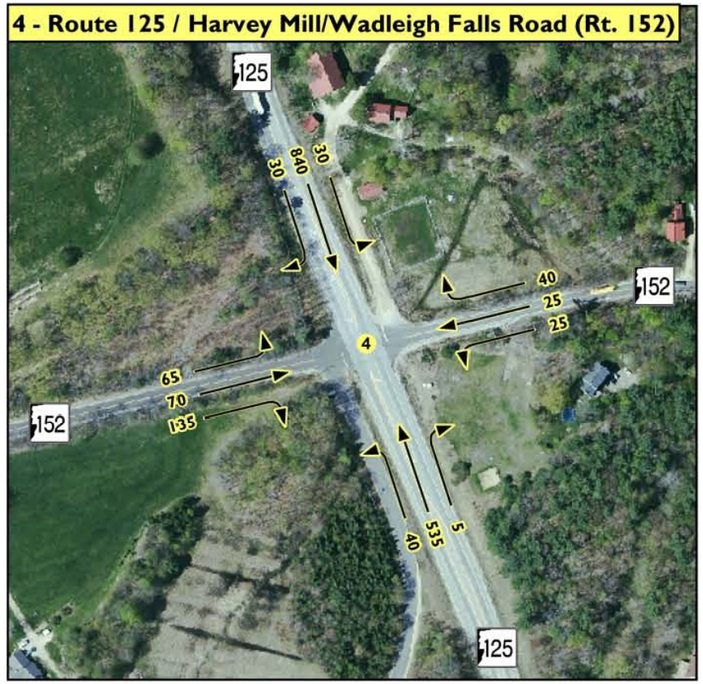
***Vanasse Hangen Brustlin, Inc.***

Figure 8

2007 Existing Weekday Evening
Peak Hour Traffic Volumes
Epping

NH Route 125
Corridor Management Study





**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

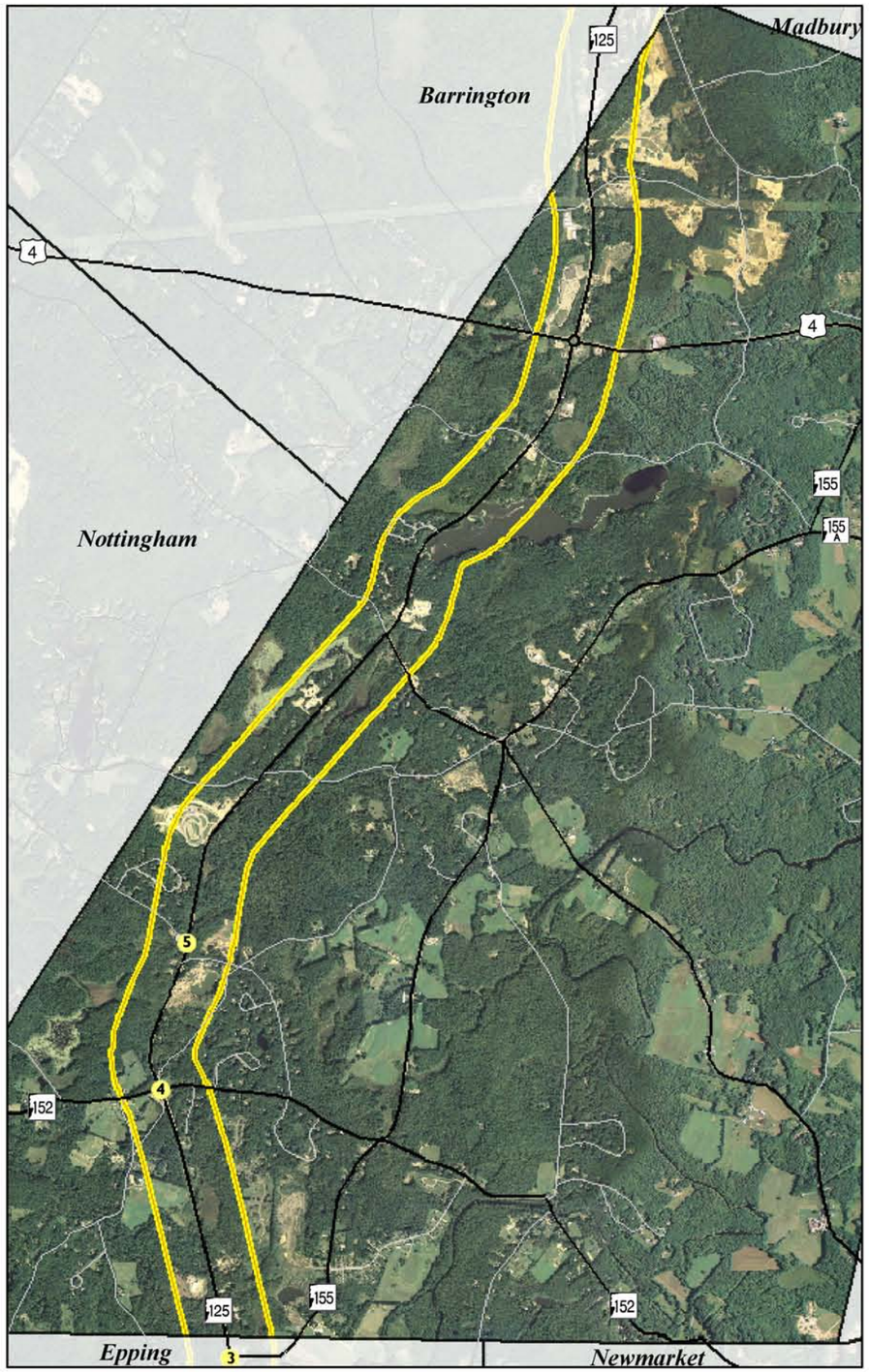
0 250 500 Feet

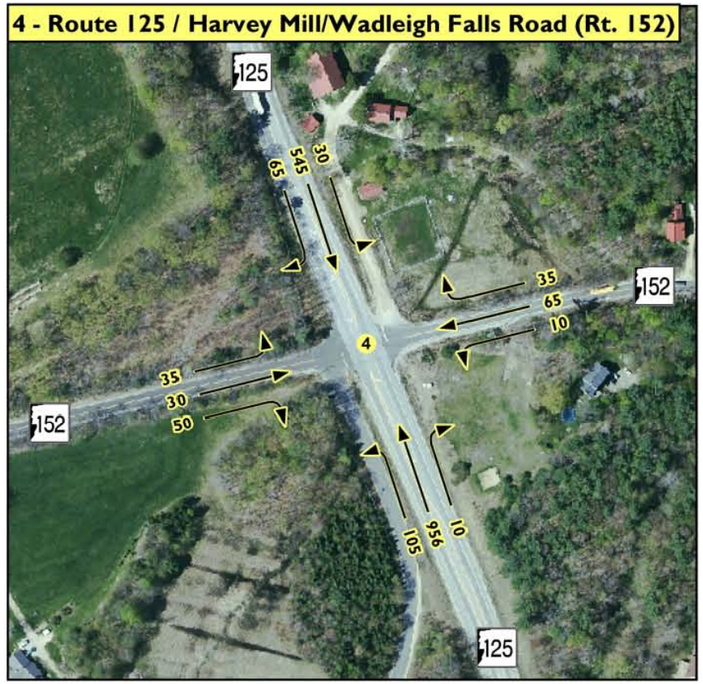
***Vanasse Hangen Brustlin, Inc.***

Figure 9

2007 Existing Weekday Morning Peak Hour Traffic Volumes
Lee

NH Route 125
Corridor Management Study





**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

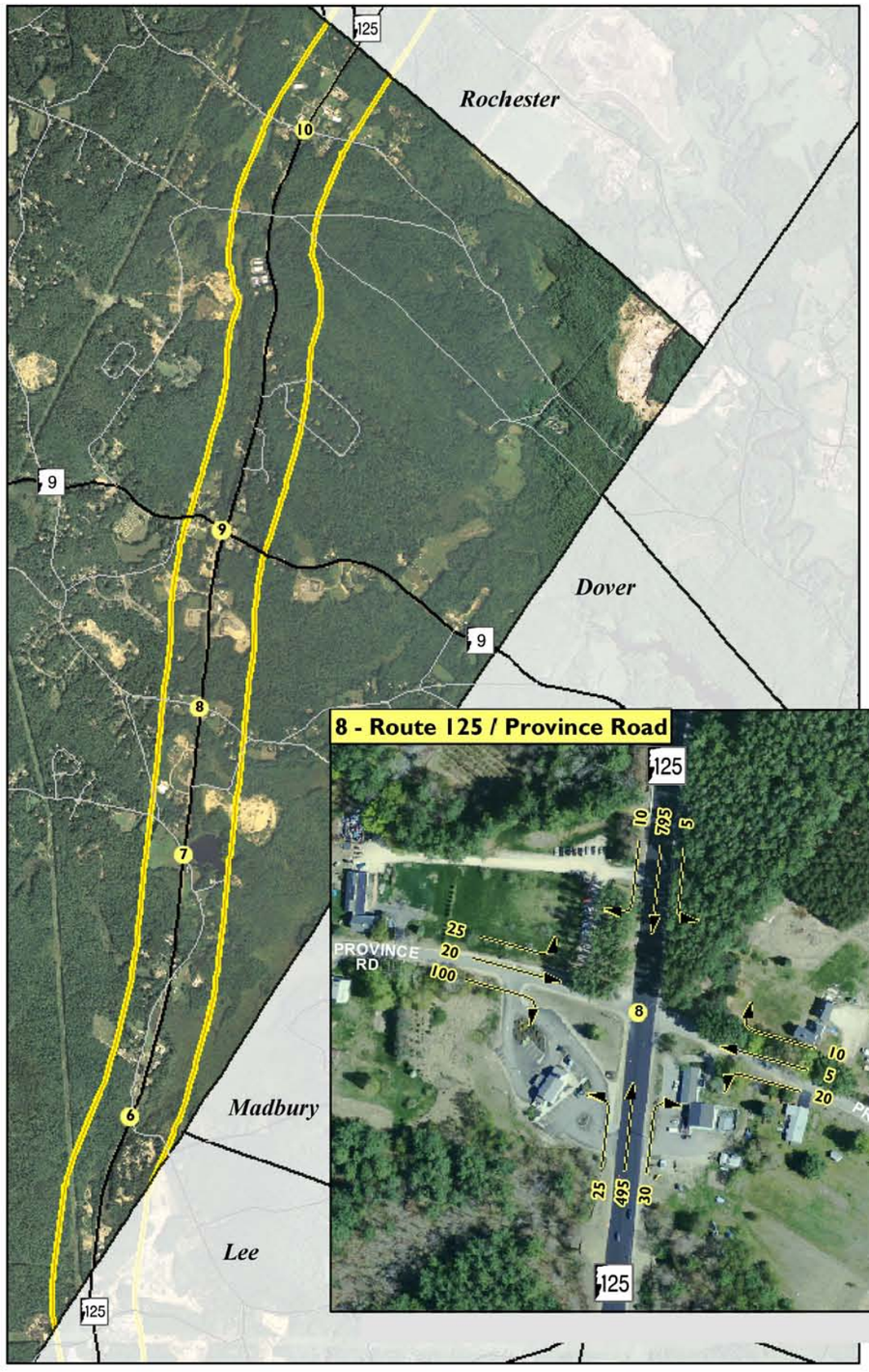
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 10

2007 Existing Weekday Evening
Peak Hour Traffic Volumes
Lee

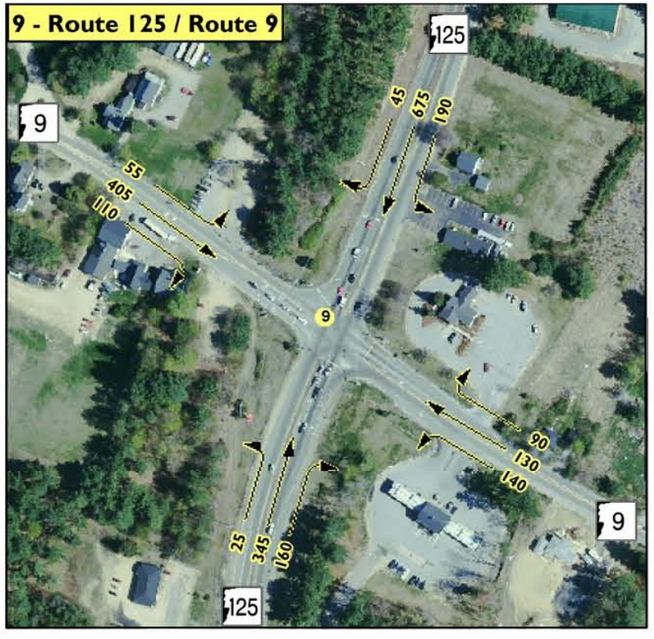
NH Route 125
Corridor Management Study

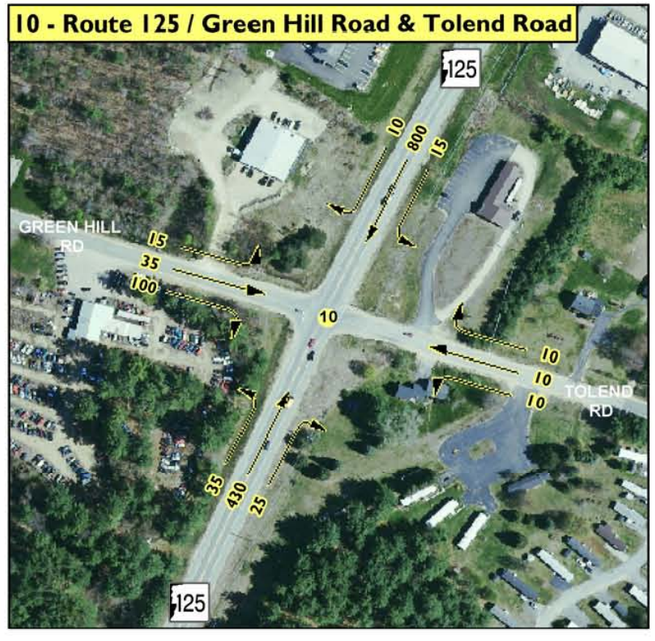











**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

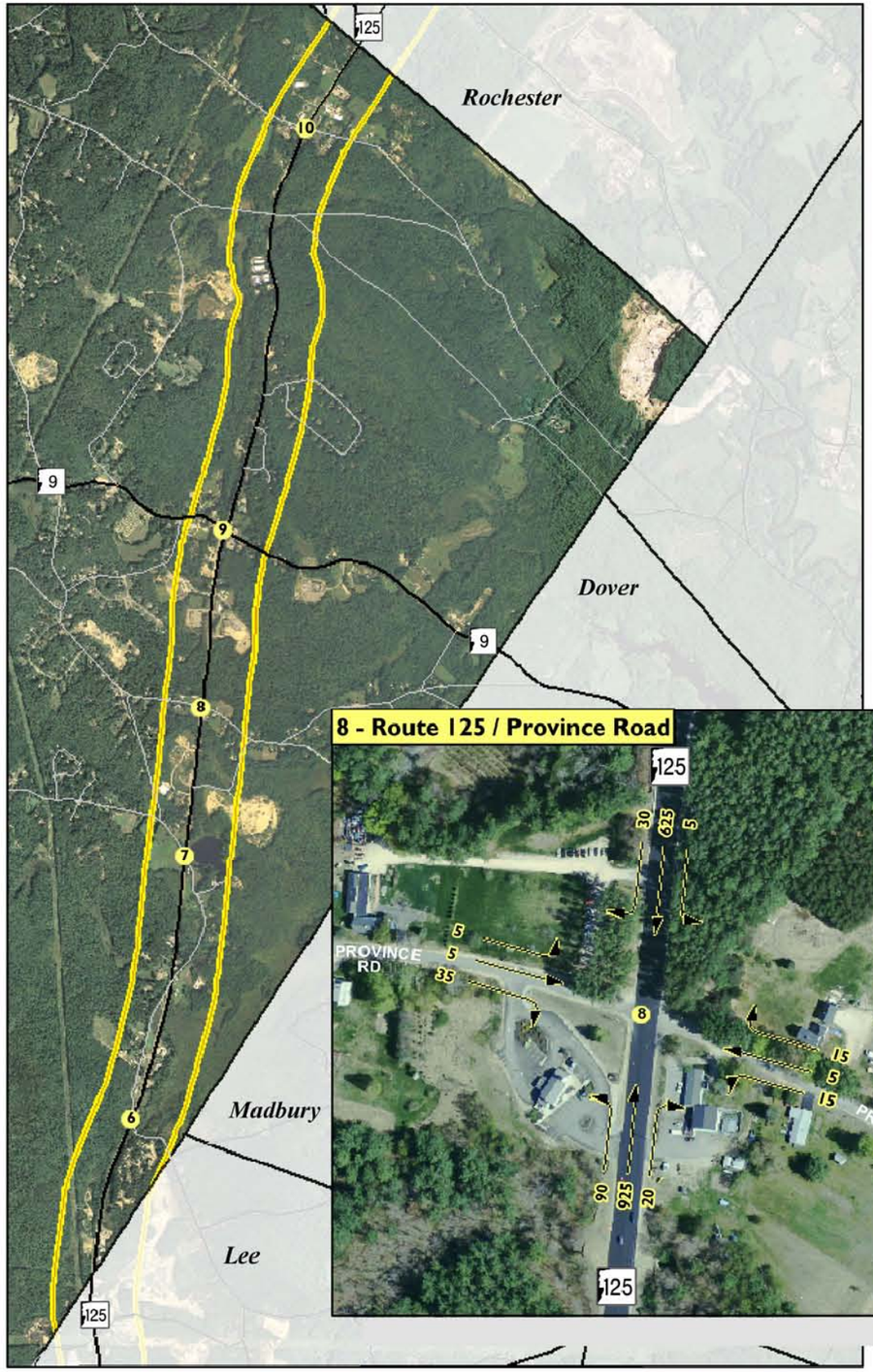
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 11

2007 Existing Weekday Morning Peak Hour Traffic Volumes
Barrington

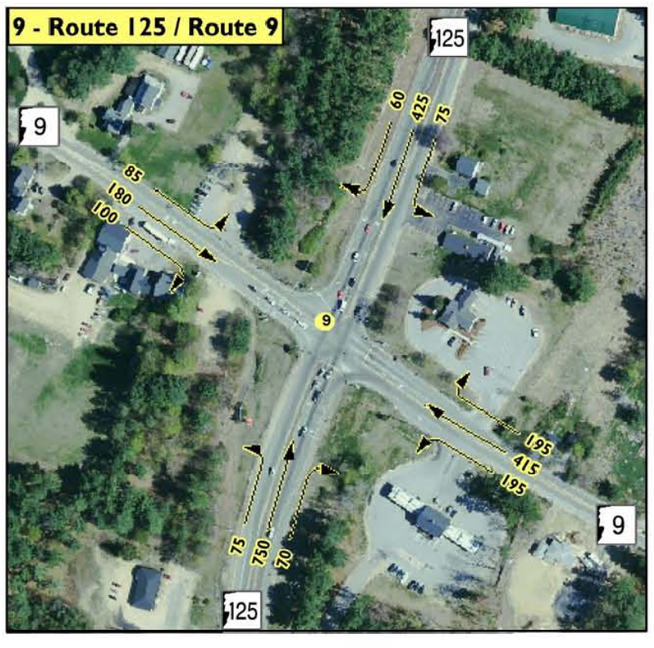
NH Route 125
Corridor Management Study

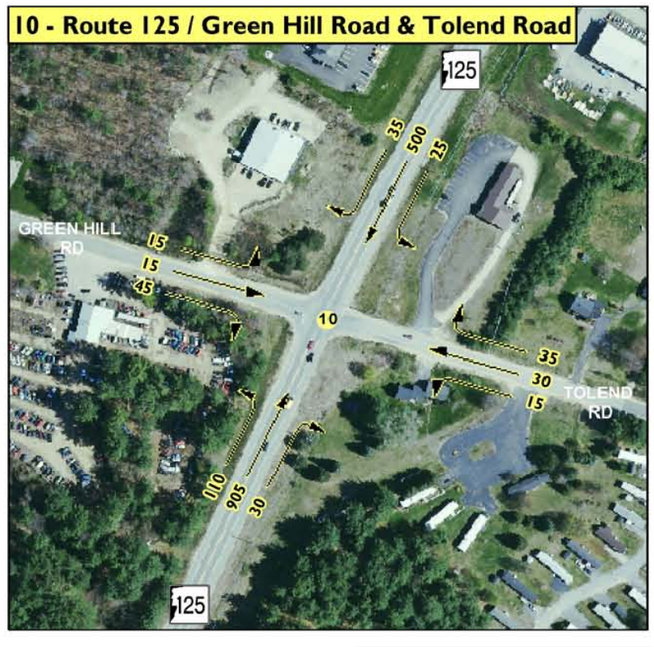











**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

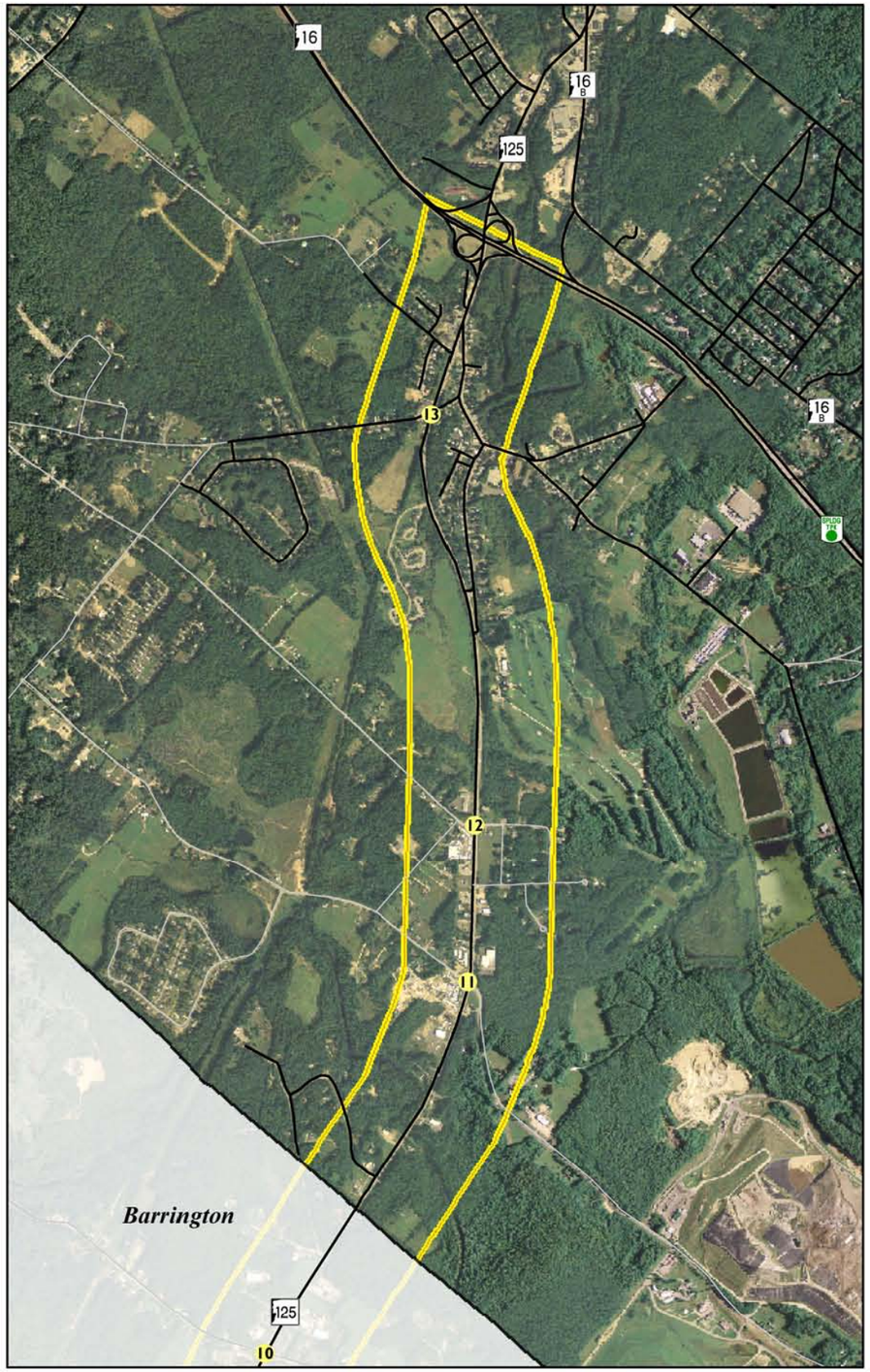
0 250 500 Feet

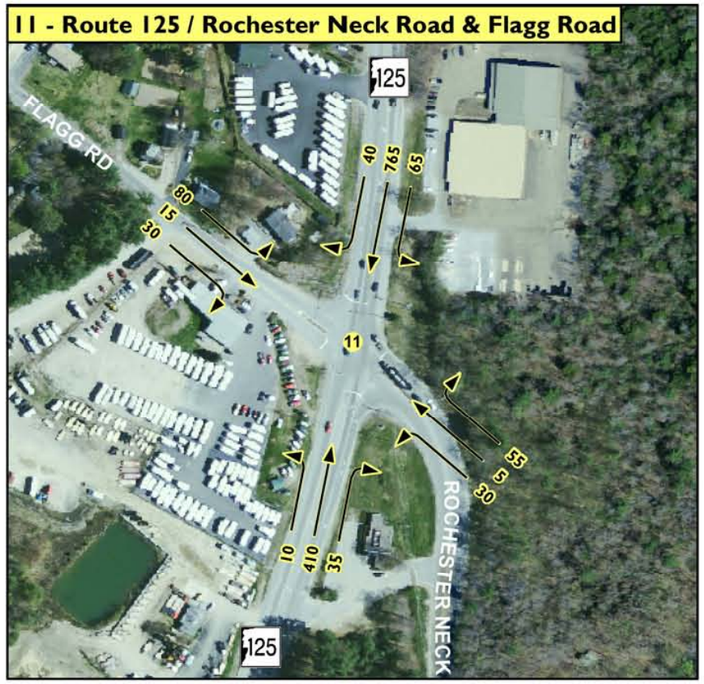
***Vanasse Hangen Brustlin, Inc.***

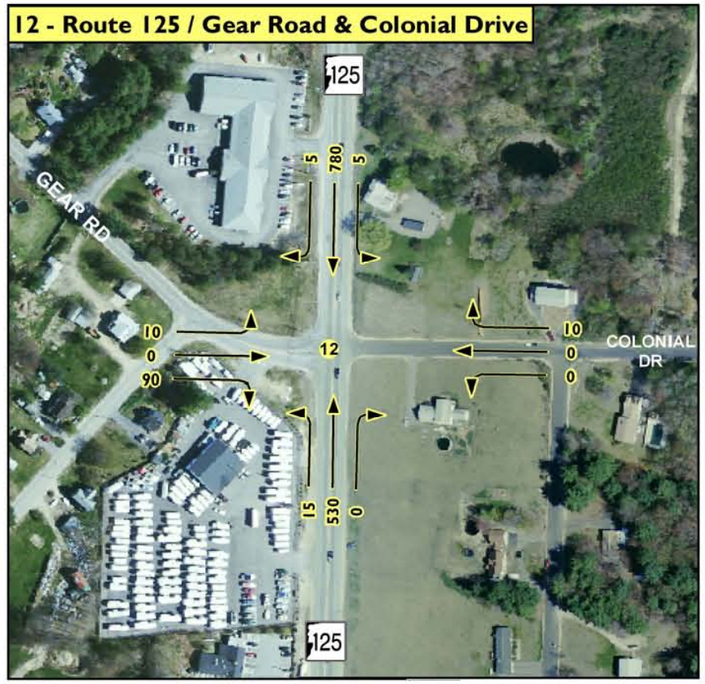
Figure 12

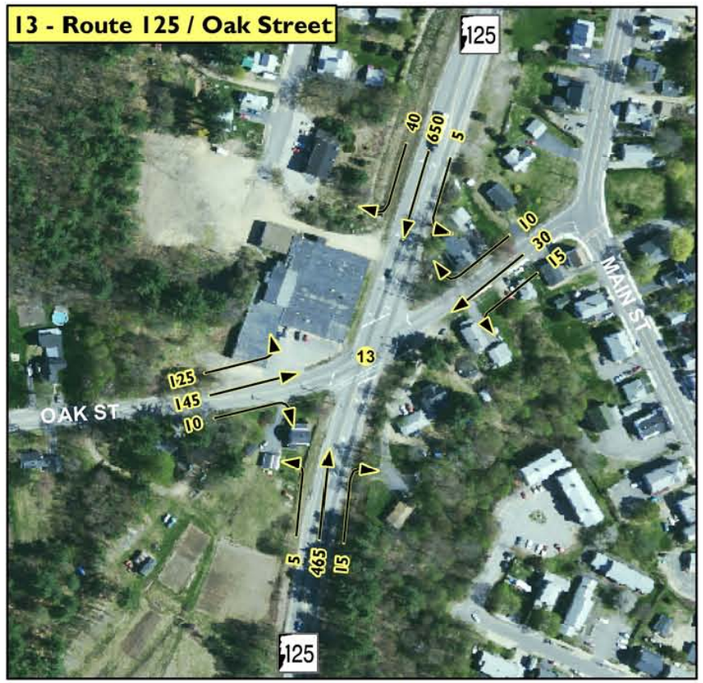
2007 Existing Weekday Evening Peak Hour Traffic Volumes
Barrington

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

0 1,250 2,500 Feet

0 250 500 Feet

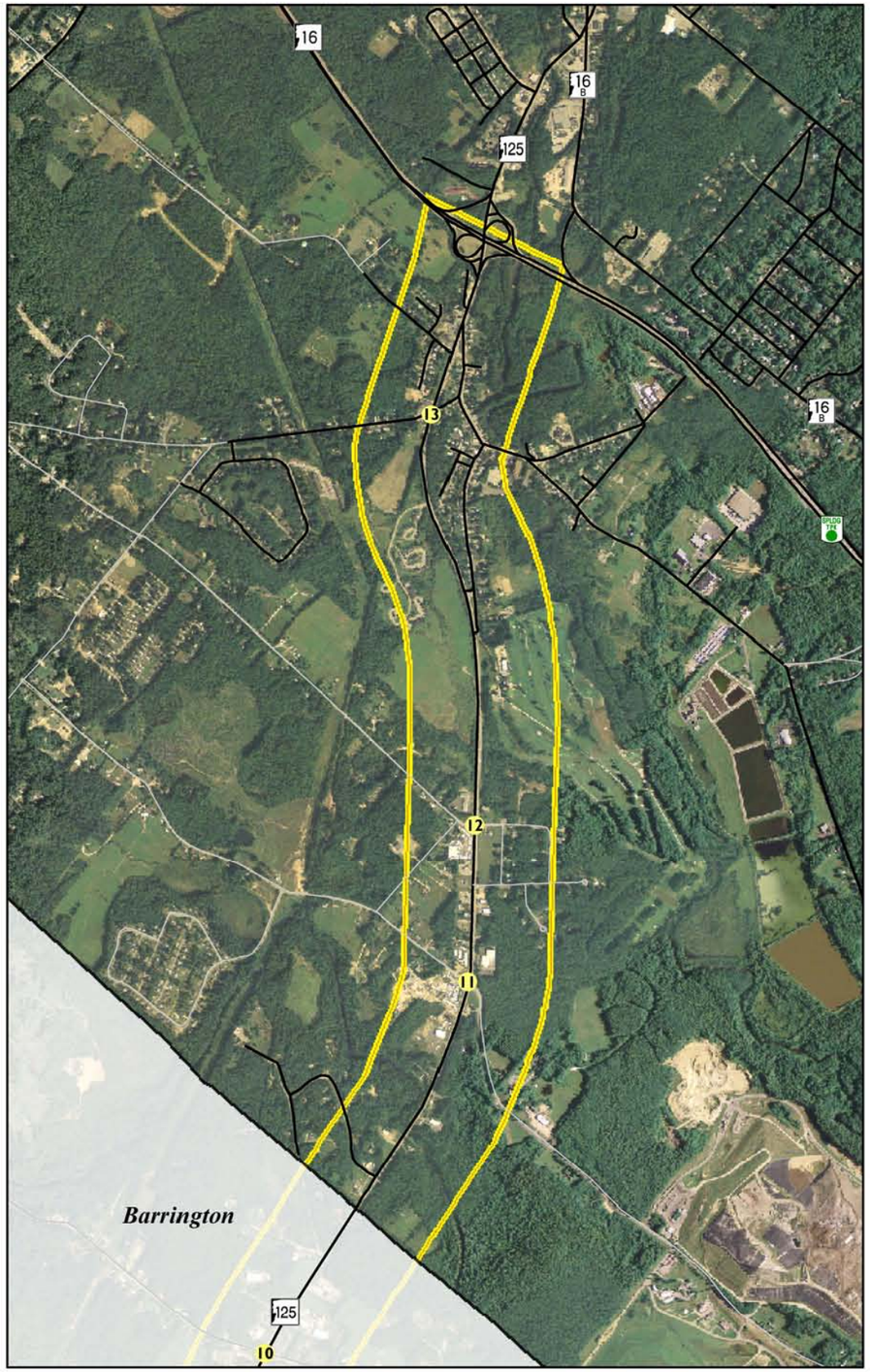
Source: NHGRANIT, VHB, ESRI

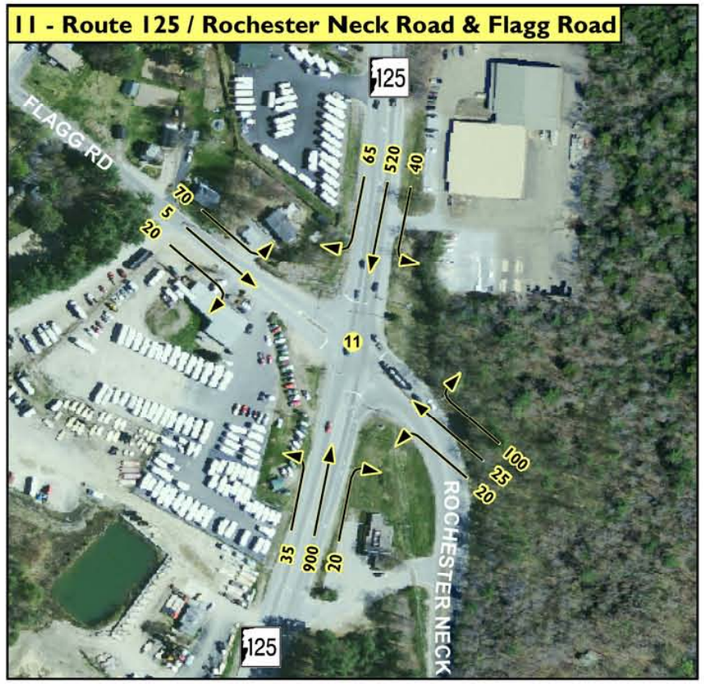
***Vanasse Hangen Brustlin, Inc.***

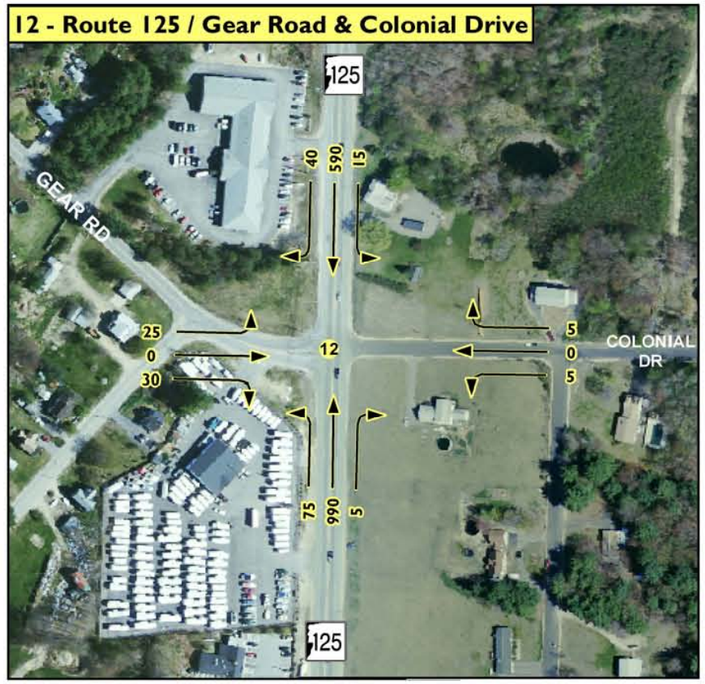
Figure 13

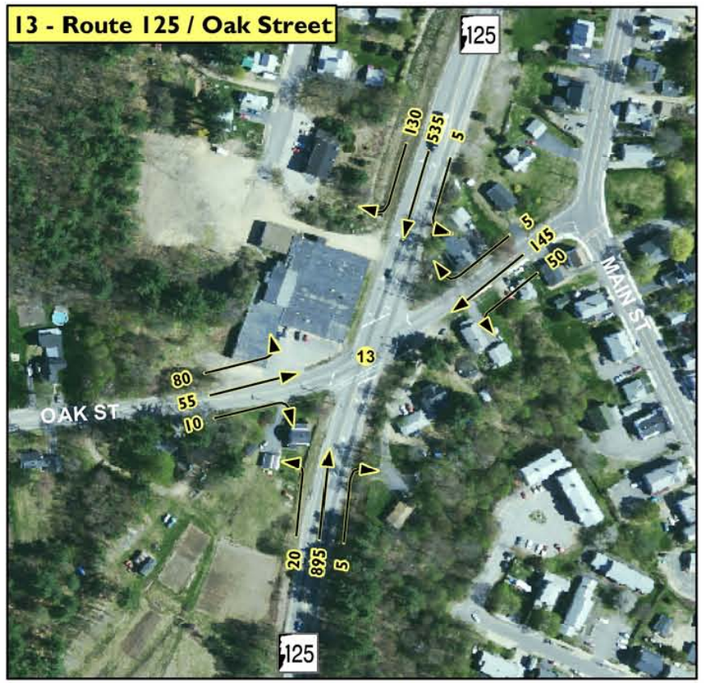
2007 Existing Weekday Morning Peak Hour Traffic Volumes
Rochester

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 14

2007 Existing Weekday Evening Peak Hour Traffic Volumes
Rochester

NH Route 125
Corridor Management Study

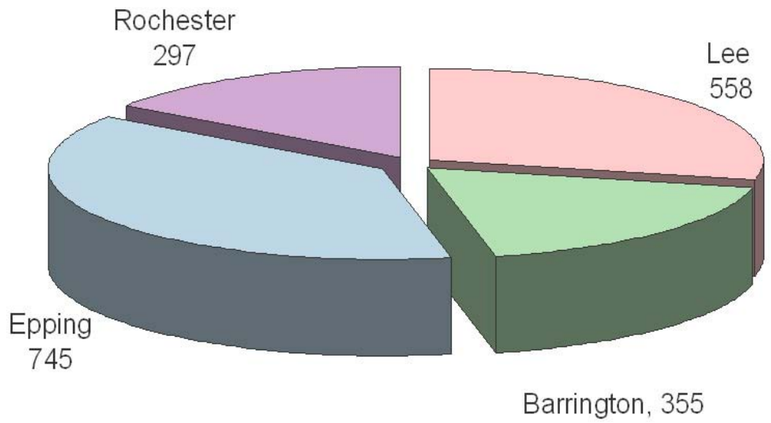
## Accident Research

Accident records provided by the New Hampshire Department of Transportation (NHDOT) were reviewed and evaluated. The records cover the seven-year-period of January 1999 through December 2005. Note that the Phase 1 data collection covered the five-year period that extended to December 2003. The updated data collected under Phase 2 included the additional years of 2004 and 2005.

A total of 1,955 vehicle crashes were reported within the study corridor. High accident locations – defined as averaging 5 or more accidents per year – include the intersections at the McDonald's driveway near NH 101 (5 per year), Route 27 (12 per year), Elm Street (5 per year), and Old Hedding Road (12 per year) in **Epping**; Route 152 (8 per year), George Bennett Road & Mitchell Road (5 per year) and Route 4 (30 per year) in **Lee**; Lee Oak Road (7 per year), Route 9 (11 per year) and Green Hill Road & Tolend Road (5 per year) in **Barrington**; and Rochester Neck Road & Flagg Road (6 per year), Oak Street (6 per year), and Main Street (5 per year) in **Rochester**.

While caution should be applied when attempting to relate accident trends to potential causation, some trends have been identified. However, it is important to note that the vast majority of records list the type and severity of the crashes as unknown. Approximately 25 percent of the reported crashes involved one or more injuries and 1 percent (11 crashes) involved a fatality. The distribution of vehicle crashes throughout the year revealed little seasonal variation. The road surface condition was reported as dry for 1,468 crashes (75 percent), wet for 265 crashes (15 percent), and snow or ice for 176 crashes (9 percent). The road conditions for the 26 remaining crashes (1 percent) are unknown. The total number of crashes along the study corridor is broken out by community in Figure 15.

**Figure 15**
**Vehicle Crash Summary (1999-2005)**




## Travel Time Surveys

Travel time and delay surveys were conducted during the weekday morning (7:00 - 9:00 AM) and weekday evening (4:00 - 6:00 PM) peak periods. The surveys were conducted for the entire length of the corridor in each direction. Two travel runs per direction per time period were performed on Tuesday, October 18, 2005.

The results of the travel time survey are summarized in Table 2. Note that the total travel time indicates the total time for the survey vehicle to travel from one end of the study corridor to the other. The running time indicates the time that the vehicle was moving, while the stopped delay indicates the time that the vehicle was stopped at signalized intersections or other points of congestion.

Table 2
Travel Time Survey

| | | Running Time | Stopped Delay | Total Time |
|---|---|---|---|---|
| AM Peak Period | | | | |
| | Northbound | 25 min. 18 sec. | 2 min. 9 sec. | 27 min. 27 sec. |
| | Southbound | 25 min. 27 sec. | 4 min. 52 sec. | 30 min. 19 sec. |
| PM Peak Period | | | | |
| | Northbound | 26 min. 11 sec. | 3 min. 3 sec. | 29 min. 15 sec. |
| | Southbound | 25 min. 19 sec. | 2 min. 56 sec. | 28 min. 14 sec. |

As shown in the table, the total trip is slower (experiences greater delay) in the southbound direction during the morning period and in the northbound direction during the evening period. However, during the morning, the running time by direction is similar – it's the stopped delay that is substantially higher in the southbound direction. Interestingly, during the evening period, it's the stopped delay that is similar by direction, while the running time is slightly slower in the northbound direction.

## Travel Speeds

Speed measurements were recorded continuously along the corridor over a three-day period (Tuesday, Wednesday, and Thursday) at seven locations. The number of observations per location ranged from over 13,000 at the north end of the corridor to over 22,000 observations at the south end of the corridor. The posted speed limit at these locations ranged from 30 mph to 55 mph.

The results of the measurements revealed that motorists tend to exceed the posted speed limits – particularly in Lee south of NH 152 (in both directions) and in Epping south of NH 87 (in the southbound direction). The results of the speed measurements, presenting the 50$^{th}$ and 85$^{th}$ percentile speeds, are summarized in Table 3. The 50$^{th}$ and 85$^{th}$ percentile speeds

are the speeds at which 50 and 85 percent of the recorded vehicles were traveling at or less than. The 85th percentile speed is generally used for setting speed limits.

Table 3
Observed Travel Speeds

| Location | Northbound 50th Percentile | Northbound 85th Percentile | Northbound Speed Limit | Southbound 50th Percentile | Southbound 85th Percentile | Southbound Speed Limit |
|---|---|---|---|---|---|---|
| EPPING | | | | | | |
| NH 125 South of NH 87 | 44 | 50 | 55 | 60 | 66 | 55 |
| LEE | | | | | | |
| NH 125 South of NH 152 | 50 | 57 | 45 | 60 | 67 | 55 |
| NH 125 South of Mitchell Road | 53 | 59 | 55 | 52 | 57 | 55 |
| NH 125 North of US 4 | 36 | 41 | 30 | 32 | 38 | 30 |
| BARRINGTON | | | | | | |
| NH 125 North of Lee Oak Road | 49 | 55 | 50 | 51 | 55 | 50 |
| NH 125 South of NH 9 | 27 | 39 | 35 | 37 | 43 | 35 |
| ROCHESTER | | | | | | |
| NH 125 North of Gear Road | 51 | 55 | 50 | 48 | 53 | 50 |

## Existing Conditions Operational Analysis

Measuring the volume of traffic along the NH 125 corridor indicates the importance of these intersections to the regional transportation system, but does not necessarily give an indication of the quality of traffic flow. To assess the quality of traffic flow along the corridor, capacity analyses were conducted to determine how well the corridor serves the traffic demands placed upon it. The traffic performance measures and the evaluation criteria used in the operational analyses are based on the methodology presented in the 2000 Highway Capacity Manual.[1]

A primary result of capacity analysis is the assignment of level of service, which is a qualitative measure describing operational conditions within a traffic stream and their perception by a motorist or passenger. Level of service generally describes these conditions in terms of such factors as speed and travel time, density or freedom to maneuver, traffic interruptions, comfort and convenience, and safety and, in so doing, provides an index to quality of traffic flow.

Six levels of service (LOS) are defined[2] ranging in letter designation from LOS A to LOS F, with LOS A representing the best operating condition and LOS F representing the worst. LOS C describes a stable flow condition and is considered desirable for design hour traffic flow. LOS D is generally considered acceptable where the cost and impacts of making improvements to provide LOS C are deemed unjustifiable. Level of Service E reflects a capacity condition.

The results of the 2007 existing condition operational analyses, which were conducted for the key signalized and unsignalized intersections within the study corridor, are summarized in Tables 4 and 5.

Table 4
2007 Existing Signalized Intersection Capacity Analysis Summary

| Location | Period | v/c* | Delay+ | LOS^ |
|---|---|---|---|---|
| NH 125 & NH 27 | AM Peak | 0.89 | 42 | D |
| | PM Peak | 1.18 | 93 | F |
| NH 125 & NH 152 | AM Peak | 0.83 | 22 | C |
| | PM Peak | 0.79 | 18 | B |
| NH 125 & NH 9 | AM Peak | 0.97 | 50 | D |
| | PM Peak | 0.89 | 47 | D |
| NH 125 & Flagg Rd/ Rochester Neck Rd | AM Peak | 0.64 | 18 | B |
| | PM Peak | 0.76 | 18 | B |
| NH 125 & Oak St | AM Peak | 0.76 | 23 | C |
| | PM Peak | 0.77 | 23 | C |

* Volume to capacity ratio

\+ Average delay per vehicle (sec)

^ Intersection Level of Service

The results of the 2007 existing conditions operational analyses at the signalized intersections show that the NH 125/NH 27 intersection in Epping currently operates at LOS F during the weekday PM peak hour and at LOS D during the weekday AM peak hour. The NH 125/NH 9 intersection in Barrington currently operates at LOS D during both the weekday AM and PM peak hours. However, it is worth noting that the intersection is operating at a v/c ratio of 0.97 (97% of capacity) during the AM peak hour. The other corridor signalized intersections of NH 152 in Lee, and Rochester Neck Road and Oak Street in Rochester operate at LOS C or better during the peak hours.

The results of the 2007 existing conditions analyses at the unsignalized intersections (Table 5 on the following page) reveal, not surprisingly, that nearly all side street movements operate at poor levels of service (LOS E and F). In fact, motorists attempting to turn left from side streets onto NH 125 experience very long delays. Additionally, the lack of defined left-turn lanes for motorists turning left from NH 125 onto side streets and driveways create a potentially hazardous condition as these motorists are forced to wait in the high speed through lane. The lack of right-turn deceleration lanes can also be problematic as motorists turning right must decelerate in the through lane.

♦

1 2000 Highway Capacity Manual, Special Report 209, Transportation Research Board, Washington, D.C.
2 Ibid.

Table 5
2007 Existing Unsignalized Capacity Analysis Summary

| | Weekday AM | | | Weekday PM | | |
|---|---|---|---|---|---|---|
| Location / Movement | Demand* | Delay** | LOS*** | Demand | Delay | LOS |
| NH 125 & NH 87 | | | | | | |
| EB from Old Nottingham Road | 10 | 114 | F | 20 | 83 | F |
| WB from NH 87 | 40 | 306 | F | 65 | 162 | F |
| NH 125 & Kelsey Road | | | | | | |
| EB from Kelsey Road | 100 | 41 | E | 35 | 41 | E |
| NH 125 & Lee Hill Road | | | | | | |
| WB from Lee Hill Road | 135 | 17 | C | 350 | - | F |
| NH 125 & Lee Oak Road/ Pierce Road | | | | | | |
| EB from Pierce Road | 5 | 16 | C | 5 | 13 | B |
| WB from Lee Oak Road | 50 | 42 | E | 185 | 53 | F |
| NH 125 & Beauty Hill Rd/ Winkley Pond Rd | | | | | | |
| EB left/through from Beauty Hill Rd | 135 | 357 | F | 60 | 430 | F |
| EB right from Beauty Hill Road | 80 | 21 | C | 30 | 13 | B |
| WB from Winkley Pond Road | 0 | 0 | A | 10 | 73 | F |
| NH 125 & Province Road | | | | | | |
| EB from Province Road | 145 | 157 | F | 45 | 53 | F |
| WB from Province Road | 35 | 182 | F | 35 | 230 | F |
| NH 125 & Green Hill Rodd/ Tolend Rd | | | | | | |
| EB from Green Hill Road | 150 | 153 | F | 75 | 512 | F |
| WB from Tolend Road | 30 | 161 | F | 80 | 435 | F |
| NH 125 & Gear Road/ Colonial Drive | | | | | | |
| EB from Gear Road | 100 | 28 | D | 55 | 180 | F |
| WB from Colonial Drive | 10 | 15 | B | 10 | 86 | F |

* Demand expressed in vehicles per hour.

** Delay expressed in seconds per vehicle.

*** Level of service.

## Field Observations

In addition to conducting traffic volume counts, researching vehicle crash data, conducting travel time surveys, measuring travel speeds, and conducting operational analyses for the key signalized and unsignalized intersections along the corridor, general field observations were conducted. These field observations consisted of driving and walking the corridor in an effort to gain a better understanding of how the corridor currently functions and its existing deficiencies. The following are some of the observations that were noted.

- *Absence of turn lanes* – Given the high traffic volume demand, relatively high travel speeds, trucking activity, numerous side streets and driveways, and high turning movement activity, the absence of turn lanes – particularly left-turn lanes - is one of the more glaring corridor deficiencies.

- *Lack of access control* – Although there are areas along the corridor where interconnections between parcels allow for improved access to the corridor, much of the corridor consists of numerous uncontrolled and isolated curb-cuts.

- *Poor intersection alignment* – Several corridor side streets intersect NH 125 at a skewed angle, which can limit available sight distance. The limited sight distance is not only potentially hazardous but it also reduces the effective capacity of the intersection. Some of these intersections include: Railroad Avenue, Old Hedding Road, and North River Road in Epping; West Mill Road and Pinkham Road in Lee; Pierce Road, Winkley Road, Beauty Hill Road in Barrington; and Oak Street in Rochester.

- *Poor Pedestrian Accommodations* – There are few locations along the corridor where pedestrians would feel comfortable crossing NH 125.

## Land Use

### Zoning and Property Use

Zoning and land use in each of the four communities varies significantly. The Epping section of the study corridor, particularly at the NH 101 interchange is highly developed, and additional development is in the permitting pipeline. The corridor becomes less developed as one travels north toward Lee. The NH 125 corridor in Lee is generally more residential and rural in character (with the exception of the area near the Lee traffic circle), which is dictated in part by natural resource constraints including wetlands and aquifer recharge areas. Barrington has some commercial development along the corridor while the Rochester segment of the study corridor, particularly near Route 16, has a more urbanized feel.

Using the zoning ordinances as a guide, one can better determine the types of land uses that one can expect to be developed over time. For each municipality, VHB identified the zoning districts that appear to fall within the 2,000 foot swath of land that falls within 1,000 feet of each side of NH 125. This is based upon the most current zoning map available for each municipality.

After identifying the applicable zoning districts, the zoning ordinance was reviewed to identify the land uses allowed by right and special exception in each district. These are summarized in the tables for each municipality. Additionally, dimensional regulations for the land use categories are included. For the purposes of the build-out analysis to follow, only the main land uses are listed, rather than every use.

In three of the communities (Epping, Barrington and Rochester), the entire corridor is essentially zoned for both residential and commercial development, while Lee and Rochester also preserve a mix of residential or agricultural uses. In Epping, the zoning varies from Industrial Commercial, Highway Commercial, to Residential Commercial. A small area along the west side of NH 125 in Epping, just south of the intersection with NH 27, remains zoned as High Density Residential. In Lee, the corridor is zoned Residential from the town line with Epping to just south of the Lee traffic circle, where it becomes Commercial. This results in approximately 75 percent of the corridor through Lee being Residential and the remaining 25 percent being Commercial. In Barrington, almost the entire corridor is zoned as Business, with some adjacent General and Neighborhood Residential, and only two small areas just north of the town line on the west side of the highway are zoned Industrial. In Rochester, starting from the city line, land within approximately 200 feet on both sides of the highway is zoned Business 2 before changing to Agricultural from Gear Road north to just past the Rochester Country Club. At that point it becomes High Density Residential with an extensive complex of apartments and condominiums on the west side of the roadway. In Gonic (a village of Rochester), the zoning once again becomes Business 2 changing to either Low or High Density Residential just south of the intersection of Grove Street. From that point northward, the corridor reverts to Business 2.

The zoning regulations for each municipality are summarized in the tables below.

Table 6
Epping Zoning Districts

| Zoning District | Permitted Uses | Special Exceptions | Notes |
|---|---|---|---|
| Highway-Commercial Zone | Retail, professional establishments, community buildings, hotels, restaurants, wholesale, private schools, health care facilities, industry | | |
| Residential-Commercial Zone | Single family, churches, duplex housing | Hotels, wholesale, retail, professional establishments, restaurants, multi-family | Multi-family housing has its own lot and setback requirements |
| Central Business Zone | Retail, professional establishments, community buildings, hotels, restaurants, multi-family, single family veterinary clinics, private schools, health care facilities, duplex housing | | Note: See Article 6 for manufactured housing, multi-family and, duplex housing use regulations |
| High Density Residential Zone | Single family, multi-family, duplex housing, municipal buildings, day care facilities, health care facilities, convenience stores | Private schools, group or shared homes, expansion of non-conforming structures, dual use | Note: See Article 6 for manufactured housing, multi-family and, duplex housing use regulations |
| Residential Zone | Single family, duplex housing, municipal buildings, day care facilities, kennels, health care facilities | Private schools, multi-family, expansion of non-conforming structures, dual use | Note: See Article 6 for manufactured housing, multi-family and, duplex housing use regulations |
| Rural Residential Zone | Single family | Expansion of non-conforming structures, dual use | Note: See Article 6 for manufactured housing, multi-family and, duplex housing use regulations |

Table 7
Epping Dimensional Regulations

| Zoning District | Minimum Lot Size (in square feet) | Minimum Setbacks (in feet) | | | Minimum Frontage (in feet) | Max. Lot Coverage | Max Bldg. Height |
|---|---|---|---|---|---|---|---|
| | | Front | Side | Rear | | | |
| Highway-Commercial Zone | 87,120 | 100 feet from the centerline of all existing roads and 75 feet from the centerline for proposed (non-existing) internal roads Class V or greater | 25 | 50 | 200 | 60% | 35 feet |
| Residential-Commercial Zone | 87,120 | 100 feet from the centerline of all existing roads and 75 feet from the centerline for proposed (non-existing) internal roads Class V or greater | 25 | 50 | 200 | 60% | 35 feet |
| Central Business Zone | 20,000 sf per dwelling unit | 15 feet However, any property that has frontage on, or abuts, Route 125 (Calef Highway) shall have a minimum setback of 100 feet from the centerline of Route 125 | 10 | 10 | 100 | 75% | 35 feet |
| High Density Residential Zone | 20,000 | 25 feet However, any property that has frontage on, or abuts, Route 125 (Calef Highway) shall have a minimum setback of 100 feet from the centerline of Route 125 | 15 | 25 | 100 | 40% | 35 feet |
| Residential Zone | 60,000 | 25 | 25 | 20 | 200 | 30% | 35 feet |
| Rural Residential Zone | 88,000 | 30 | 25 | 25 | 200 | 30% | 35 feet |

Table 8
Lee Zoning Districts

| Zoning District | Uses Allowed | Notes |
|---|---|---|
| Residential Zone (Zone A) | Residential, agricultural , municipal buildings and structures, churches on a site approved by the Planning Board | Multifamily per Article XI and VII. Duplexes on lots greater than 5 acres with 4.0 acres of contiguous developable land area, or as approved by cluster residential subdivision. |
| Commercial Zone (Zone C) | Any industrial or commercial use on a site approved by the Planning Board | When a parcel is split by zones, it shall be considered wholly in that zone which comprises 75% or more of the total acreage of the parcel under consideration |
| Wet Soils Conservation Zone | None that relate to potential build-out | |
| Aquifer Conservation District | Low density residential, multi-family in Zone A; industrial or commercial in Zone C subject to specific environmental standards | |

Table 9
Lee Dimensional Regulations

| Zoning District | Minimum Lot Area (in square feet) | Minimum Setbacks (in feet) | | | Frontage (in feet) | Total impervious Coverage |
|---|---|---|---|---|---|---|
| | | Front | Side | Rear | | |
| Residential (Zone A) | 85,000 | 50 | 25/35 | 25/35 | 250 | |
| Commercial (Zone C) | 85,000 | 125 | 50<br>100 when abutting residential | 50<br>100 when abutting residential | 250 | 25%,<br><br>10%<br>In Aquifer Conservation District |

Table 10
Barrington Zoning Districts

| Zoning District | Permitted Uses | Conditional Approval of P.B. |
|---|---|---|
| Base Zoning | | |
| General Residence (GR) | Residential:<br>Conservation Subdivisions, Single family, two family<br><br>Agricultural:<br>Agricultural uses, farms<br><br>Industrial:<br>Excavation operations<br><br>Public/Institutional:<br>Municipal Buildings | Residential: Multifamily, retirement housing<br><br>Commercial:<br>Automobile parts and supplies, professional offices/clinics, conference centers, gasoline stations, health care facilities, health clubs, hotels and inns, museums, packaging and delivery services, publishing, repair services, restaurants, retail<br><br>Industrial:<br>Contractors storage,<br>light manufacturing,<br>research and development, truck terminals, wholesale uses, warehouse operations<br><br>Public/Institutional:<br>Churches,<br>educational institutions |
| Neighborhood Residential (NR) | Residential:<br>Conservation Subdivisions, Single family, two family<br><br>Agricultural:<br>Agricultural uses, farms<br><br>Industrial:<br>Excavation operations<br><br>Public/Institutional:<br>Municipal buildings | Residential: Multifamily Housing, Retirement Housing<br><br>Commercial:<br>Automobile parts and supplies, professional offices/clinics, conference centers, gasoline stations, health care facilities, health clubs, hotels and inns, museums, packaging and delivery services, publishing, repair services, restaurants, retail<br><br>Industrial:<br>Contractors storage,<br>light manufacturing,<br>research and development, truck terminals, wholesale uses, warehouse operations<br><br>Public/Institutional:<br>Churches,<br>educational institutions |

Table 10 Continued

| | | |
|---|---|---|
| Village District (VD) | Residential:<br>Retirement Housing, single family, two family<br><br>Agricultural:<br>Agricultural uses, farms<br><br>Commercial:<br>Banks, professional offices/clinics, conference centers, health care facilities, health clubs, inns, mixed use developments, movie theaters, museums, packaging and delivery services, publishing, repair services, restaurants, retail<br><br>Public/Institutional:<br>Churches, Educational Institutions, Municipal Buildings | Commercial:<br>Automobile parts and supplies |
| Regional Commercial (RC) | Residential:<br>Multifamily, retirement housing, single family, two family<br><br>Agricultural:<br>Agricultural uses, farms<br><br>Commercial:<br>Sale of auto parts and supplies, banks, professional offices/clinics, conference centers, funeral homes, gasoline stations, health care facilities, health clubs, inns, hospitals, hotels, mixed use developments, movie theaters, museums, packaging and delivery services, publishing, restaurants (inc. drive through), retail, service for autos, nurseries<br><br>Industrial:<br>Contractor storage yard, excavation operations, light manufacturing facilities, research and development, truck terminals, wholesale uses, warehouse operations<br><br>Public/Institutional:<br>Churches, educational institutions, municipal buildings | |

Table 11
Barrington Dimensional Regulations

| Zoning District | Minimum Lot Area (in square feet) | Minimum Setbacks (in feet) | | | Frontage (in feet) | Max. Lot Coverage<br><br>Note definition for lot coverage | Max Bldg. Height |
|---|---|---|---|---|---|---|---|
| | | Front | Side | Rear | | | |
| General Residence (GR) | 80,000 | 40 | 30 | 30 | 200 | 40% | 35 ft / 2.5 stories |
| Neighborhood Residential (NR) | 80,000 | 40 | 30 | 30 | 200 | 40% | 35 ft / 2.5 stories |
| Village District (VD) | 30,000 | 20 | 15 | 15 | 75 | 50% | 40 ft / 3 stories |
| Regional Commercial (RC) | 40,000 | 75 | 30 | 30 | 200 | 50% | 40 ft / 3 stories |

Table 12
Rochester Zoning Districts

| Zoning District | Uses Allowed |
|---|---|
| Agriculture | Single- and two-family dwellings, B & B, farm, kennel, recreation, school, church |
| Residence 1 | Single-family dwelling, farm, recreation, school, church |
| Residence 2 | Single-, two-, and multi-family dwellings, lodging house, B & B, farm, recreation, school, church |
| Business 1 | Single-, two-, and multi-family dwellings, hotel, retail, office, farm, theater, recreation, school, church |
| Business 2 | Single-, two-, and multi-family dwellings, hotel, retail, office, auto services, farm, theater, recreation, school, church |
| Industry 1 | Industry, warehouse, truck terminal |
| Industry 2 | Industry, warehouse, truck terminal |
| Industry 3 | Industry, warehouse, truck terminal |

Table 13
Rochester Dimensional Regulations

| Zoning District | Minimum Lot Area (in square feet) | | | Minimum Setbacks (in feet) | | | Frontage (in feet) | Max. Lot Coverage |
|---|---|---|---|---|---|---|---|---|
| | No water or sewer | Water or sewer | Both water and sewer | Front | Side | Rear | | |
| Agriculture | 40,000 | 30,000 | 20,000 | 35 | 25 | 50 | 150 | 30% |
| Residence 1 | 40,000 | 30,000 | 10,000 | 25 | 10 | 25 | 100 | 30% |
| Residence 2 | 40,000 | 30,000 | 6,000 | 15 | 8 | 25 | 60 | 30% |
| Business 1 | - | - | - | - | - | 25 | - | 75% |
| Business 2 - Residential | 40,000 | 30,000 | 6,000 | 15 | 8 | 25 | 60 | 40% |
| Business 2 | - | - | - | - | - | 25 | - | 50% |
| Industry 1 | 40,000 | 30,000 | 20,000 | 25 | 10 | 25 | 100 | 40% |
| Industry 2 | 40,000 | 30,000 | 20,000 | - | - | 25 | - | 60% |
| Industry 3 | 40,000 | 30,000 | 20,000 | 25 | 10 | 25 | 100 | 60% |

## Water Resources

Water resources along the corridor including wetlands, hydric soils, aquifers broken out by transmissivity ranges, floodplains and floodways, and surface water resources are described in the following sections.

### Wetlands

Wetlands within the project corridor were mapped using both the National Wetlands Inventory (NWI) mapping completed in the 1980's, and the NHFG Coarse Filter Analysis of Potentially Significant Wildlife Habitats wetland layers (9/22/04). For this study's base mapping purposes, the NWI and NHFG wetlands layers were merged into a composite wetlands layer. All wetlands within the project area consist of freshwater wetlands.

### Regulatory Overview

The following sections provide an overview of federal, state and local regulations governing the protection of wetland resources within the study corridor.

#### Federal

Federal protection of wetlands is regulated under Section 404 of the Clean Water Act and Section 10 of the Federal Rivers and Harbors Act. The USACOE is charged with the duty of overseeing and regulating activities in wetlands at the federal level. The USEPA also reviews projects that may impact wetlands and has review authority over discharges they find unacceptable.

#### State

The State of New Hampshire regulates activities in wetlands under RSA 482-A:1 which grants regulatory authority to the New Hampshire Wetland Bureau (NHWB). Under this statute, all proposals to dredge or fill wetlands must be permitted by the NHWB.

#### Local

Communities in New Hampshire possess, at minimum, recommendation authority to the NHWB as to whether a permit to dredge or fill wetlands should be issued. The bulk of this recommendation responsibility is placed on the local conservation commissions. Individuals concerned with the protection of wetlands for certain projects, generally express their concerns through the local commissions. Communities also have the ability to enact their own ordinances to regulate activities in wetlands. Barrington has executed local review of state-designated prime wetlands pursuant to RSA 482-A. The remaining communities in the study corridor have not opted to establish prime wetlands.

##### Epping

The Town of Epping preserves and protects wetlands within its municipal boundaries through Article 10 – Epping Wetlands Ordinance of the Town of Epping Zoning Ordinance. Wetlands are defined in accordance with New Hampshire RSA 482-A. The Town of Epping Zoning Ordinance considers "established and seasonal wetlands" for protection.

The ordinance establishes a 15-foot setback from wetlands or the "side setback of the underlying zone", whichever is greater, in which excavation, filling, dredging or construction of structures, etc. are not permitted. For wetlands greater than 10,000 square feet or wetlands that are contiguous with the Lamprey River, a 50-foot construction setback is established. Conditional Use Permits are granted for a reduction in the setback or to permit a fill, dredge, or construction operation, provided certain conditions are met.

Several rivers in Epping are also protected by Article 9 – Riverbank Protection District. The Riverbank Protection District regulates the use of land within 100 feet of the banks of the Lamprey River, North River, Pawtuckaway (Stingy) River, and the Piscassic River. Banks are determined by mean Spring High Water. Under Article 9, no permanent structures can be built within the District. A Special Exception may be granted for those uses that are "necessary for the legitimate use" of the rivers, except that no structures can be built on water, have running water, have a septic system, or be used for human habitation.

### Lee

The Town of Lee preserves and protects wetlands within its municipal boundaries through Article XV – Wet Soils Conservation Zone (formerly Wetlands Conservation Zone) of the Town of Lee Zoning Ordinance. Wet Soils are those that are poorly or very poorly drained as defined by the Soil Drainage Class Interpretive Limits section of Site-Specific Soil Mapping Standards for New Hampshire and Vermont, Version 2.0 January, 1999, published by the Society of Soil Scientist of Northern New England (SSSNNE Special Publication #3), or the current version of this publication. The Wet Soils Conservation Zone also includes those areas such as swamps, marshes, and bogs.

Permitted uses, including certain agricultural and conservation activities which do not require the erection or construction of any structures or buildings, nor alter the natural surface configuration by the addition of fill or by dredging, are allowed within Wet Soil Conservation Zones. Under the Special Provisions section of the ordinance, no septic tank or leach field may be constructed or enlarged closer than 125 feet to any wetland. Also, no structure with the exception of wells and well houses are allowed within 75 feet of the Wet Soils zone. Special Exceptions may be granted for certain activities (roads, utility easements, water impoundments, fire ponds, etc.) within 75 feet of the Wet Soils zone.

The shoreland of several rivers and ponds are also protected in Article XIV - Shoreland Conservation District of the Lee Zoning Ordinance. The Shoreland Conservation District establishes protection for all land located within 100 feet of the shores of the Lamprey River, Little River, North River, Oyster River, Dube Brook, Chesley Brook and Wheelwright Pond. Shore is defined as the average high water line of the aforementioned bodies of water. Wells, unpaved footpaths, and dry hydrants (if necessary) are permitted within the Shoreland Conservation District. The construction of roads, driveways, parking areas, waste disposal systems, excavation/fill (unless approved by Conservation Commission), and the cutting/removal of more than 50 percent of the vegetation are prohibited within the Shoreland Conservation District. Exceptions to the vegetation cutting prohibition may be considered for permitted uses.

### Barrington

The Town of Barrington preserves and protects wetlands within its municipal boundaries through Article 9 – Wetlands Protection District Overlay (WDO) of the Town of Barrington Zoning Ordinance. Wetlands are defined and regulated in accordance with NHDES and USACOE requirements. In addition to state and federally jurisdictional wetlands, certain wetlands are also designated as Prime Wetlands in accordance with NHDES statutes. Prime Wetlands were formally designated in January 1991.

The WDO establishes a 50-foot buffer from the edge of wetlands. Buffers greater than 50 feet from the edge of vernal pools may be required by the Planning Board. A minimum buffer of 100 feet is established for Prime Wetlands. Buffers are not established for the following: manmade ditches and swales, sedimentation/detention basins or ponds, manmade agricultural/irrigation ponds and swales, fire ponds and cisterns, septage and manure lagoons, silage pits, or isolated wetlands or surface waters of 3,000 square feet or less that do not meet the definition of a swamp, marsh, bog or vernal pool.

The WDO establishes certain permitted uses and structures (silviculture, agriculture, drainage ways, open space, conservation areas, etc.) within wetlands and their buffers. No structures, impermeable surfaces, parking spaces, or construction-related activities are permitted unless a Special Use Permit is obtained from the Planning Board.

### Rochester

The City of Rochester preserves and protects wetlands within its municipal boundaries through Chapter 42.19 – Conservation Overlay District of the City of Rochester Zoning Ordinance. Wetlands are defined and regulated in accordance with NHDES and USACOE requirements. Conservation Overlay (CO) Districts include rivers, lakes, ponds, perennial streams, vernal pools, all jurisdictional wetlands and the surrounding upland areas of each of these resources. CO Districts are also established for 75-foot buffers from the ordinary high water (OHW) mark of the Cocheco River, Salmon Falls River and Isinglass River. 50-foot buffers are established for named streams and surface water from OHW mark of Axe Handle Brook, Heath Brook, Hurd Brook, Willow Brook, Clark Brook, Baxter Lake, Rochester Reservoir, Hanson Pond, Little Long Pond, Champlin Pond, and no name pond south of Champlin Pond.

Certain wetlands are exempted from protection under the zoning ordinance. These include: wetlands less than 0.5 acre in size, except vernal pools; wetlands resulting from constructed drainage structures including swales, ditches, basins, actively maintained agricultural/irrigation ponds, and septage lagoons.

Permitted uses within CO Districts include wildlife habitat development and management, conservation areas, nature trails, passive recreation and educational activities, seasonally permitted hunting and fishing, forestry, including logging and tree farming, etc. Alteration of land surface, application of herbicides, and heavy equipment operation are not permitted within 25 feet from the edge of the wetland.

Conditional Use Approvals may be granted for construction of roads, access ways, drainage ways, pipelines, and other uses provided that certain conditions are met. Buffer reductions are also allowed on a case-by-case basis for no more than one-half of the buffer area.

## Existing Conditions

Approximately 540 acres of wetlands are mapped by NWI and/or NHFG within the study corridor. Table 14 summarizes the extent of wetlands within the study corridor by town.

Table 14
NWI & NHFG Wetlands within the Study Corridor by Community

| Community | Area (Acres) | % Study Corridor Mapped as Wetland |
|---|---|---|
| Lee | 229.1 | 15.1 |
| Barrington | 201.7 | 14.2 |
| Epping | 87.7 | 7.9 |
| Rochester | 20.4 | 3.1 |

### Hydric Soils

Hydric soils, which are poorly or very poorly drained soils where wetlands are found, were mapped to show potential wetland areas that are not captured in the NWI/NHFG composite layer. Hydric soils data was provided by NH GRANIT, and is based upon NRCS soil surveys of Rockingham and Strafford Counties.

### Aquifers

Information on groundwater resources in the form of aquifers mapped by the US Geological Survey were retrieved from the NH GRANIT database. The review of this resource indicates that the project corridor is underlain by stratified drift aquifers that are important water supply sources throughout much of its length.

### Regulatory Overview

Groundwater resources within the corridor consist of stratified-drift aquifers, and the municipal, community, and private supply wells that pump water from them. These groundwater resources are regulated under the New Hampshire Groundwater Protection Act, 1991, which empowers local municipalities to regulate land uses in certain cases.

## Existing **Conditions**

The retreating glacier left two major types of deposits on the New Hampshire landscape: till and stratified drift (USGS 1995). Till is comprised of unsorted material of varying size from clay to boulders that were directly deposited by the melting glacier. In contrast, stratified drift is well sorted material where water flowing from the melting glacier deposited layers of both sands and gravels. These deposits are frequently noticeable as landscape features like kame terraces, eskers, outwash plains and deltas. Because of their porosity, stratified drift deposits typically store vast quantities of groundwater that when discharging to the surface, provide a cold-water "base flow" to streams and hydrological support for many of the most valuable wetlands. The stratified drift aquifers also provide excellent opportunities for the development of drinking water wells. Approximately 14 percent of New Hampshire is underlain by stratified drift aquifers (USGS 1995).

The relative importance of a stratified drift deposit as a water supply is typically measured by its "transmissivity" or rate at which water can flow laterally through the deposit. This transmissivity is directly related to the potential "yield" of the aquifer.

The following transmissivities (as measured in square feet per day) were mapped for the stratified drift aquifers along the corridor. All areas with no designation are considered to be overlain with till.

1. 0 to 2,000 sf/day – low to moderate yields
2. 2,000 to 8,000 sf/day –transmissivities above 2000 sf/day are generally
3. considered a "major aquifer" (USGS 1995)
4. 8000+ ft2/day (and up to 26,000 sf/day or greater)–providing the very highest yields.

Table 15 lists the transmissivities of stratified drift aquifers within the study corridor by community.

Table 15
Transmissivities of Stratified Drift Aquifers
within the Study Corridor by Community

| Community | Transmissivity Range (ft2/day) | Areas within Study Corridor (acres) |
|---|---|---|
| Epping | 0 - 2000 | 348.6 |
| Lee | 0 - 2000 | 466.1 |
| Barrington | 0 -2000 | 995.0 |
| Barrington | 2000 – 8000 | 59.2 |
| Rochester | 0 – 2000 | 522.4 |
| Rochester | 2000 – 8000 | 22.8 |
| Rochester | 8000+ | 5.2 |

### Floodplains and Floodways

Floodplains (100 year) and floodways were mapped using NH GRANIT provided layers for Rockingham and Strafford Counties.

### Regulatory Overview

Federal projects potentially affecting floodplains require an evaluation under the provisions of Executive Order 11988, Floodplain Management, May 24, 1977. The regulation that sets forth the policy and procedures of this order is "Floodplain Management and Protection of Wetlands," 44 CFR §9, which is under the authority of the Federal Emergency Management Agency (FEMA).

A "100-year floodplain" is defined as having a one percent chance of flooding in any particular year. The "floodway" is a regulatory limit established by FEMA in which any encroachment cannot result in more than a 1.0 foot increase in surface water elevation. In

most cases, the floodway approximates the actual channel of the watercourse. The floodway and the so-called "floodway fringe," comprise the 100-year floodplain. By definition, the floodway fringe can be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point.

The NH GRANIT database was used to identify 100-year floodplains and floodways within the study corridor. Mapped floodplain and floodway data provided by NH GRANIT utilizes published Flood Insurance Rate Maps (FIRM) distributed by FEMA.

## Existing Conditions

Floodplains and floodways are listed by community in the following table.

Table 16
NH GRANIT Floodplains and Floodways
within the Study Corridor by Community

| Community | 100-year Floodplain Area (acres) | Floodway Area (acres) |
|---|---|---|
| Epping | 162.9 | 9.9 |
| Lee | 148.3 | 0 |
| Barrington | 50.1 | 0 |
| Rochester | 29.4 | 18.2 |

NH GRANIT Data based on FIRM distributed by FEMA.

## Surface Water Resources

Surface water resources within the study corridor were mapped using water body and stream network data provided by NH GRANIT. Additionally, 4th order streams, designated rivers, and surface water classifications within the study corridor were identified. A summary of existing surface water resources are provided in the following sections.

## Regulatory Overview

Surface water quality regulations are administered by the NHDES Watershed Management Bureau. Any discharge to a surface water resource is subject to NHDES Surface Water Quality Regulations (Env-Ws 1700). These regulations established water quality standards for various physical, biological and chemical parameters for the protection of aquatic life and human health that vary depending on their designated use classification. Class A is the highest classification and designates water quality that is uniformly excellent and potentially acceptable for water supply uses after adequate treatment. Roughly 85 percent of the Class A waters are designated as such to provide stricter water quality standards on public water supplies. Discharge of sewage or waste into Class A waters is prohibited. Class B waters are considered acceptable for swimming, fishing, and water supplies after adequate treatment. Discharges to Class B waters are allowed provided that such discharges do not violate the established water quality standards. Under Section 401 of the Federal Clean Water Act, NHDES must certify that federal actions (i.e., FHWA funding or USACOE permitting) comply with the state water quality standards. In addition, federal and state law can provide additional regulatory protection through the National Wild and Scenic River Program or the NH Rivers Management Program, and under the Magnuson Stevens Act, concerning essential fish habitat.

## Existing Conditions

The major water bodies within the study are listed in Table 17.

Table 17
Surface Waters within the Study Corridor by Community

| Community | Water Body | 4th Order* | Designated River** | Class*** |
|---|---|---|---|---|
| Epping | Piscassic River | | | A |
| Epping | Lamprey River | √ | √ | B |
| Epping | Rum Brook | | | B |
| Epping/Lee | North River | √ | | B |
| Lee | Little River | | | B |
| Lee | Wheelwright Pond | | | A |
| Lee | Oyster River | | | A |
| Barrington | Pierce Brook | | | A |
| Barrington | Bellamy River | | | A |
| Barrington | Winkley Pond | | | A |
| Barrington | Bumford Brook | | | A |
| Barrington | Mallego Brook | | | A |
| Barrington | Green Hill Brook | | | B |
| Rochester | Isinglass River | √ | √ | B |
| Rochester | Cocheco River | | | B |

Notes: * Fourth order stream data is from NHFG and the 1995 Memorandum from the Office of State Planning regarding Fourth Order Streams in New Hampshire. Fourth order streams will be discussed in more detail in the Water Use and Protection section, below.
** Designated River data was provided by NHDES, and will be discussed in the Water Use and Protection section, below.
*** Water classifications are from Ken Edwardson, NHDES (Pers. Communication, 2006)

Water body areas within the study corridor are provided by community in Table 18.

Table 18
NH GRANIT Water Bodies within the Study Corridor by Community

| Community | Area (Acres) | % Study Corridor Mapped as Water Body |
|---|---|---|
| Lee | 144.0 | 9.5 |
| Barrington | 67.6 | 4.8 |
| Epping | 41.9 | 3.8 |
| Rochester | 20.1 | 3.1 |

Total stream lengths within the study corridor are provided by community in Table 19.

Table 19
Length of NH GRANIT Streams within the Study Corridor by Community

| Community | Length of Mapped Streams (miles) |
|---|---|
| Lee | 5.32 |
| Barrington | 5.01 |
| Epping | 3.27 |
| Rochester | 3.60 |

## Water Use and Protection

The water use and protection map set (provided in the Phase 1 report) includes rivers designated under the NH Rivers Management and Protection Program; section 303(d) impaired surface waters; 4th order streams protected under the Comprehensive Shoreland Protection Act; and rivers included on either the Wild and Scenic Rivers System or listed in the Nationwide Rivers Inventory, both overseen by the National Park Service. In addition, public water supplies and treatment facilities, including their Drinking Water Protection Areas (WHPA/SWPA), and recorded Hazardous Materials and Contamination Sites are identified.

### NH Designated Rivers

There are two rivers in the study corridor that are designated for protection under the state's Rivers Management and Protection Program: The Lamprey River is designated from the Epping/Lee town line to the Durham/Newmarket town line and the Isinglass River is designated from the outflow of Bow Lake Dam in Strafford to its confluence with the Cocheco River in Rochester. The Rivers and Management Program is overseen by NHDES' Watershed Management Bureau with a Rivers Coordinator as head. Activities on or along the designated rivers are regulated by both a Rivers Management Advisory Committee as well as local committees.

### 4th Order Streams

All fourth order streams or higher (not already protected under the Rivers Management and Protection Program) as well as all officially designated public water bodies (i.e., great ponds and some artificial impoundments) are regulated under the state's Comprehensive Shoreland Protection Act (CSPA). This law establishes restrictions and setbacks for various activities from the water's edge. In the study corridor, only the Lamprey River, North River, and Isinglass River are listed as being 4th order or higher streams. None of the ponds are designated.

### Wild and Scenic Rivers & Nationwide Rivers Inventory

Under the National Wild and Scenic Rivers System Program, the National Park Service oversees and regulates proposed development on or along specially designated river segments nationwide. To date, only two rivers in New Hampshire have been formally designated as Wild and Scenic Rivers (WSRs): the Lamprey River and Wildcat Brook (in Jackson). The entire length of the Lamprey River from the Bunker Pond Dam in West Epping to the river's confluence with the Piscassic River near the Durham-Newmarket town line is designated as a Wild and Scenic River.

The following rivers within the corridor also have river reaches that are listed on the Nationwide Rivers Inventory (NRI): Piscassic River, Lamprey River (already officially designated as Wild and Scenic), North River, Isinglass River, and Cocheco River. This inventory lists river segments that are currently under study for possible future designation as Wild and Scenic Rivers.

### 303(d) Impaired Waters

Under Section 303(d) of the federal Clean Water Act, states are required to develop a list of waterways that do not meet the water quality standards for which they are designated, i.e., are "impaired." The New Hampshire Department of Environmental Services (NHDES) has listed 5,001 water bodies in the state as impaired. Ultimately, every state will establish a discharge limit on the contaminants causing the impairment. This limit is called a Total Maximum Daily Load [TMDL].

Five streams within the project area were listed in 2004 by NHDES as 303(d) impaired waters. These are listed by impairment in Table 20.

Table 20
2004 NHDES 303(d) Impaired Waters within the Study Corridor by Community

| Community | Stream, Length | AU Category | Assessment Unit | Impairment, Cause, Suspected Source |
|---|---|---|---|---|
| Epping | Lamprey River, 2,138' | NH Rivers | NHRIV600030703-15 | Aquatic Life, pH, unknown<br>Fish Consumption, Mercury, Atmospheric deposition-toxics<br>Primary Contact Recreation, E. coli, unknown |
| Lee | Little River, 11,328' | NH Rivers | NHRIV600030707-07 | Aquatic Life, pH, unknown<br>Fish Consumption, Mercury, Atmospheric deposition-toxics<br>Primary Contact Recreation, E. coli, unknown |
| Lee | Oyster River, 7,944' | NH Rivers | NHRIV600030902-03 | Aquatic Life, pH, unknown<br>Fish Consumption, Mercury, Atmospheric deposition-toxics<br>Primary Contact Recreation, E. coli, unknown<br>Secondary Contact Recreation, E. coli, unknown |
| Rochester | Isinglass River, 2,746' | NH Rivers | NHRIV600030607-10 | Aquatic Life, pH, unknown<br>Fish consumption, mercury, Atmospheric deposition-toxics |
| Rochester | Cocheco River, 10,333' | Impoundment | NHIMP600030607-02 | Fish Consumption, Mercury, Atmospheric deposition-toxics<br>Primary Contact Recreation, E. coli, unknown |

## Water Supply & Consumption

NHDES maintains information on public and private water supplies, treatment facilities and pump houses, drinking water protection areas (WHPA/SWPA), and hazardous materials and contamination sites. GIS attribute data tables for NHDES Well Inventory records, NHDES Public Water Supply records, and NHDES Contamination Sites, all within the NH 125 study corridor are provided in the Phase 1 report.

## NHDES Well Inventory

Since 1984, all wells installed in New Hampshire, whether private or public, must be registered with NHDES. Since this registration only dates back 20 years, a large number of residential wells are not listed and will not be seen on the GIS layer and are not included in Table 21, which shows a tally of wells within the study corridor by proposed use and community.

Table 21
NHDES Well Inventory within the Study Corridor by Proposed Use and Community

| Proposed Use of Well | Epping | Lee | Barrington | Rochester |
|---|---|---|---|---|
| Domestic | 5 | 51 | 18 | 4 |
| Small Community Water Supply | 1 | | | |
| Commercial | 2 | 4 | 2 | |
| Industrial | | 1 | | |
| Institutional | | 1 | | |
| Test/Exploration | | 1 | 3 | 1 |
| Abandoned | 1 | 2 | 1 | |

## Drinking Water Protection Areas (DWPAs)

A number of public and private water supply wells are located immediately adjacent to or a very short distance from the existing NH 125 roadway. Of particular note are the public wells or "public water systems." Public wells are classified as:

1. "community water systems" (C) that have at least 15 service connections used by year-around residences or that regularly serve at least 25 year-round residents, such as condominium complexes and mobile home parks;
2. "transient, non-community water systems" (N) that serve hotels, restaurants, campgrounds and similar establishments; and
3. "non-transient, non-community water systems" (P) that serve 25 people or more for over 6 months such as schools, hospitals, and businesses.

NHDES has established Drinking Water Protection Areas (DWPAs) around all active community (C) and non-transient/non-community (P) public water systems to protect them from possible contamination. Transient, non-community systems (N) are not protected. For surface water supplies, a drainage area is defined around the source called a Source Water Protection Area (SWPA), while for wells, a radius is defined forming a circular Well Head Protection Area (WHPA). The radius is determined, in general, by the type, capacity, and depth of the well.

Guidelines for protecting groundwater resources when planning transportation improvement projects can be found in Recommendations for Implementing Groundwater Protection Measures When Siting or Improving Roadways, (NHDES, November 1995). The report, which is part of a Memorandum of Agreement (MOA) between the New Hampshire Department of Transportation (NHDOT) and NHDES, defines four levels of protection along

with suggested BMPs. These protection measures are summarized in Table 22. The levels of protection are dictated by the type of groundwater resource or well size, distance of the roadway from the well or source, whether the well is up or down gradient from the roadway, and whether there is an impermeable layer between the roadway and well.

All groundwater resources in New Hampshire have at least Level 1 recommended protection. The recommendations are considered goals and there is an acknowledgment that it may be impractical to implement them in all situations.

Table 22
Summary of Groundwater Protection Measures and Applicability[1]

| Protection Level | Level 1 | Level 2 | Level 3 | Level 4 |
|---|---|---|---|---|
| Applicability | • Statewide | • Wellhead protection areas<br>• Locally-designated groundwater/ aquifer protection areas<br>• GA1 areas | • Within 1,000 ft. of large C or P well<br>• Within 500 ft. of a small C or P well | • Within 400 ft., of a large C or P well<br>• Within 200 ft. of a small C or P well. |
| Exceptions | • Where higher level measures apply | • Where a competent impermeable layer exists between groundwater protection area and road's drainage area<br>• Level 3 or 4 areas | • Where a competent impermeable layer exists between well screen and road's drainage area<br>• Bottom of well is above elevation of highway<br>• Overburden well and WHPA does not include highway drainage area<br>• Level 4 areas | • Where bottom of well is above highway elevation |
| Stormwater Treatment BMPs, e.g., Grassed Swales | X | X | | |
| Non-Structural Measures[2] | | X | X | X |
| Lined Grassed Swales Lined Snow Storage Areas. Runoff Diverted to Extent Possible | | | X | |
| Raised Railings | | | X | X |
| Closed Drainage System Outletting Outside Level 4 Area | | | | X |

1 Source: = Recommendations for Implementing Groundwater Protection Measures when Siting or Improving Roadways (DES, November, 1995)
2 Includes measures such as providing site specific information to officials that will assist in isolating a spill, reductions in salt application rates, etc.

## Existing Conditions

Public water supplies within the study corridor are listed by type and community in Table 23.

Table 23
NHDES Public Water Supplies within the Study Corridor by Type and Community

| | Public Water Supply System Type | | | | |
|---|---|---|---|---|---|
| Town | Community | Non-Transient, Non-Community | Transient, Non-Community | Active | Inactive |
| Epping | 6 | 4 | 11 | 11 | 10 |
| Lee | 8 | 2 | 5 | 13 | 2 |
| Barrington | 2 | 4 | 10 | 14 | 2 |
| Rochester | 0 | 0 | 2 | 2 | 0 |

Treatment Facilities and pump houses within the study corridor are listed by type and community in Table 24.

.

Table 24
NHDES Treatment Facilities and Pump Houses within the Study Corridor by Type and Community

| | Public Water Supply System Type | | | | |
|---|---|---|---|---|---|
| Community | Community | Non-Transient, Non-Community | Transient, Non-Community | Active | Inactive |
| Epping | 2 | 1 | 58 | 7 | 1 |
| Lee | 1 | 0 | 4 | 4 | 0 |
| Barrington | 1 | 1 | 2 | 4 | 0 |
| Rochester | 0 | 0 | 0 | 0 | 0 |

WHPAs within the study corridor are summarized by type and community in Table 25.

Table 25
Well Head Protection Corridors within the Study Corridor by Type and Community

| Community | System Type | Area (acres) |
|---|---|---|
| Epping | Community-Resident | 633.6 |
| Epping | Non-Community/Non-Transient | 100.0 |
| Lee | Community-Resident | 730.7 |
| Lee | Non-Community/Non-Transient | 269.6 |
| Barrington | Community-Resident | 122.4 |
| Barrington | Non-Community/Non-Transient | 185.4 |

### Hazardous Materials and Contamination Sites

Table 26 summarizes the number and type of contamination sites located in the study corridor by community. Contamination sites within the study corridor are included in the table below and were identified using the NHDES database.

Table 26
NHDES 11/04 Contamination Sites within the Study Corridor by Community and Contamination Type

| Contamination Type | Epping | Lee | Barrington | Rochester |
|---|---|---|---|---|
| Ether | 1 | | | 1 |
| Nom-Petroleum Contamination (HAZWASTE) | 4 | | 1 | 2 |
| Non-Hazardous, Non-Sanitary Holding Tank | 1 | 1 | 1 | |
| Initial Response Spill | | 1 | | |
| Leaking Underground Storage Tank (LUST) | 7 | 3 | 2 | 2 |
| Leaking Residential or Commercial Heating Oil Tank | 3 | 2 | | 2 |
| Unsolicited Site Assessment | | 1 | | |
| Oil Spill or Release | 1 | | | |
| Underground Injection Control (UIC) | 9 | 3 | 2 | 2 |
| UIC/LUST | 1 | | | |
| UIC/HAZWASTE | | | 1 | |

## Conservation Land

The land use map set provided in the Phase 1 report includes conserved public lands, farmland soils, and urbanized areas. These resources are discussed in detail in the following sections.

### Conserved Public Lands

Conserved public lands were obtained from NH GRANIT in March, 2006. The conserved public lands dataset that is presented here was last updated on January 4, 2006.

### Regulatory Overview

#### LCHIP & LCIP Properties

The occurrence of any properties in the corridor acquired under either the Land and Community Investment Program (LCHIP) or the Land Conservation Investment Program (LCIP) was determined by reviewing the NH GRANIT database of conserved public lands. One LCIP property was identified within the study corridor. The property is referred to as the Claridge parcel. It is located in Lee, with approximately 21.5 acres located within the study corridor. The entire Claridge parcel is approximately 80.5 acres. The Town of Lee Conservation Commission is the managing agency for this property.

#### Section 4(f) National Transportation Act

Section 4(f) of the Department of Transportation Act of 1966 states "… special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites." Regulations governing 4(f) implementation specify that there can be no taking of public park or recreation lands or impairment of wildlife and waterfowl refuges or historic sites without a thorough investigation into all prudent and feasible alternatives. Such alternatives may range from project modifications to "no build". If it is determined that no prudent and feasible alternatives exist and that public park or recreation lands, wildlife and waterfowl refuges, or historic sites must be acquired or impaired, the FHWA must demonstrate that implementation of other alternatives would result in extraordinary cost, and/or social, economic, or environmental impacts. In addition, the proposed project or program must include all possible planning to minimize harm to the sites.

#### Section 6(f) Land and Water Conservation Act

Section 6(f) lands are defined as lands that have been acquired or improved with funds provided by the federal Land and Water Conservation Act. The U.S. Department of the Interior, National Park Service has jurisdiction over these lands. Section 6(f) lands cannot be converted to another use without replacement by land that is of comparable value and use. A review of NH GRANIT's conserved public lands data resulted in the identification of one property that was acquired through the Land and Water Conservation Fund. The property is referred to as the Alfred C. Durgin Preserve, located in Lee. Approximately 5.1 acres of the preserve is located within the study corridor. The entire preserve area is approximately 20 acres. The Town of Lee is the primary protecting entity of this parcel.

#### Other Conserved Lands

Other conserved lands include those lands not owned by the federal government under Section 4(f) or Section 6(f). These conservation lands are municipally owned and maintained.

### Existing Conditions

The amount of conserved land in each community within the study corridor is shown in Table 27. The largest number of properties totaling the greatest area of conservation lands (53.3 acres) exists in Epping. Rochester has the fewest number of properties with a total of 2 acres within the study corridor.

Table 27
Conserved Public Lands within the Study Corridor by Protection Program and Community

| Town | Protection Program | Number of Properties | Total Area (acres) |
|---|---|---|---|
| Epping | No Acquisition Program Noted | 5 | 56.7 |
| Lee | LCIP | 1 | 21.5 |
| Lee | LWCF | 1 | 5.1 |
| Lee | PAPR | 1 | 54.3 |
| Lee | No Acquisition Program Noted | 4 | 8.3 |
| Barrington | No Acquisition Program Noted | 3 | 95.6 |
| Rochester | No Acquisition Program Noted | 2 | 2.0 |

LCIP: Land Conservation Investment Program
LWCF: Land & Water Conservation Fund
PAPR: Program Agriculture Preservation Restoration

## Farmland Soils

Important Farmland Soils as defined by the Farmland Protection Policy Act (FFPA) were mapped for the study corridor using the NRCS based soils mapping available from NH GRANIT. Farmland soils that overlap lands mapped by the SRPC as developed were removed from the dataset, as they have already been developed into non-agricultural uses. There are four types of important farmland soils defined as follows (7 CFR 657.5):

1. "Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water)…In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air… are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding."

2. "Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location [such as nearness to markets], growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, fruit, and vegetables."

3. "Additional farmland of statewide importance …is land, in addition to prime and unique farmlands, that is of statewide importance for the production of food, feed, fiber, forage, and oil seed [sic] crops…Generally, [these farmlands] include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods.

4. "Additional farmland of local importance…[includes] certain additional farmlands for the production of food, feed, fiber, forage, and oilseed crops…"

This section will document the NRCS mapped farmland soils within the study corridor.

## Regulatory Overview

The Farmland Protection Policy Act (FPPA) of 1984 [Section 1539-1549, Public Law 97-98, 95 Statute 1341-1344 (7 USC. 4201 et seq.)] provides guidelines to federal agencies involved in projects that may convert existing or potential farmland areas to non-agricultural uses. The FPPA directs federal agencies to "*…(a) identify and take into account the adverse effects of their programs on the preservation of farmland, (b) to consider alternative actions, as appropriate, that could lessen adverse effects, and (c) to ensure that their programs, to the extent practicable, are compatible with State and units of local government and private programs and policies to protect farmland…*" (7 CFR 658.1). FHWA's Technical Advisory T6640.8A (October 30, 1987) further directs that impacts on farmlands be assessed as part of the environmental assessment for all transportation projects.

## Existing Conditions

Farmland soils as defined by NRCS are listed for each study corridor community by importance in Table 28.

Table 28
NH GRANIT Farmland Soils within the Study Corridor by Community

| Town | Farmland Importance | Area (acres) |
|---|---|---|
| Epping | Prime | 47.5 |
| Epping | Statewide | 27.7 |
| Epping | Local | 153.3 |
| Lee | Prime | 43.5 |
| Lee | Statewide | 24.4 |
| Lee | Local | 351.0 |
| Barrington | Prime | 20.8 |
| Barrington | Statewide | 16.7 |
| Barrington | Local | 224.1 |
| Rochester | Prime | 42.8 |
| Rochester | Statewide | 31.5 |
| Rochester | Local | 171.7 |

NH GRANIT Data based on NRCS soil surveys of Rockingham and Strafford Counties.

## Wildlife

The US Fish and Wildlife Service and the NH Natural Heritage Inventory (NHI) document the presence of federal and state listed rare, threatened, and endangered species, respectively. A review of their databases will be presented in the following section. Additionally, wildlife habitats identified by the New Hampshire Fish and Game Department are mapped, which show unfragmented lands, riparian areas, agricultural and open habitats, and potential deer yards.

### Rare, Threatened and Endangered Species

Letters were sent to the US Fish and Wildlife Service (USFWS), NH Fish and Game Department (NHFG), and the NHI to request information regarding federally and state listed rare, threatened, or endangered species, or exemplary natural communities within the study corridor.

Responses were received from the USFWS and NHI. The USFWS notes the presence of the small whorled pogonia (*Isotria medeoloides*) in the area around the Town of Lee, within approximately one mile of the NH 125 corridor. This orchid is a federally threatened species that occurs in young and maturing stands of mixed hardwood and mixed hardwood/softwood forests. The USFWS also notes the presence of the New England cottontail (*Sylvilagus transitionalis*) at a site immediately adjacent to NH 125 in Lee. The New England cottontail is not a federally listed species, however, a petition request for its listing was submitted to the USFWS that has initiated a full status review by the Service.

The results of NHI's database review are included in Table 29.

Table 29
NHI Database Review Results in the vicinity of the Study Corridor

| Species (*Scientific name)* | Status |
|---|---|
| Brook Floater (*Alasmidonta varicosa*) | State Endangered |
| Engelmann's Quillwort (*Isoetes engelmannii*) | State Endangered |
| Knotty Pondweed (*Potamogeton nodusus*) | State Endangered |
| Tufted Loosestrife (*Lysimachia thyrsiflora*) | State Threatened |
| Banded Sunfish (*Enneacanthus obesus*) | Rare Species* |
| Blanding's Turtle (*Emydoidea blandingii*) | Rare Species*, 3 Reports |
| Grasshopper Sparrow (*Ammodramus savannarum*) | State Threatened |
| New England Cottontail (*Sylvilagus transitionalis*) | Rare Species* |
| Northern Black Racer (*Coluber constrictor*) | Rare Species*, 2 Reports |
| Spotted Turtle (*Clemmys guttata*) | Rare Species*, 2 Reports |
| Wood Turtle (*Glyptemys insculpta*) | Rare Species*, 4 Reports |
| Atlantic white cedar - yellow birch – pepperbush swamp (Natural Community) | Exemplary Natural Community* |

* Exemplary natural community or a rare species tracked by NHI that has not yet been added to the official state list,

### Wildlife Habitat

Information from the New Hampshire Fish and Game Department's Coarse Filter Analysis of Potentially Significant Wildlife Habitats (9/22/04) was used to map important or potentially significant wildlife habitat within the study corridor. This mapping displays a variety of habitat features, of which the following layers were incorporated into the Wildlife Habitat Maps. Note that wetlands provide additional wildlife habitat.

1. Unfragmented habitat blocks >25 acres in size.
2. Riparian corridors (i.e., vegetated areas along streams or rivers that are considered valuable as travel lanes for wildlife). In any new highway construction or improvements where a riparian corridor is crossed, the regulatory agencies now insist that wildlife access as well as fish passage is provided.
3. Agriculture and other non-forested lands.
4. Uncommon habitat types (e.g., pine barrens, salt marsh, etc.). There are no habitats of this type in the NH 125 corridor.
5. South-facing slopes (important when identifying potential overwintering habitat for white-tailed deer).
6. Co-occurrence of the above habitat features overlaid on the unfragmented blocks of habitat. This layer was not used in lieu of the separate layers above.

A developed lands GIS data layer was provided by Strafford Regional Planning Commission to exclude areas previously mapped as wildlife habitat and since developed, or incorrectly mapped as wildlife habit in the first place. Unfragmented habitat blocks, south facing slopes, and agricultural and open habitats were manipulated to exclude data within the SRPC developed lands GIS layer. The riparian corridor layer does not exclude the developed lands layer because whether or not the riparian corridor has been encroached upon, in most cases it will continue to serve as a travel corridor for wildlife in some capacity. Table 30 lists unfragmented habitats, riparian corridors, and south facing slopes within the study corridor by community. Table 31 lists agricultural and open habitats within the study corridor by type and community.

Table 30
NHF&G Wildlife Habitat within the Study Corridor by Community

| Community | Area of Unfragmented Habitat Blocks (acres) | Area of Riparian Corridors (acres) | Area of South Facing Slopes (acres) |
|---|---|---|---|
| Epping | 294.6 | 140.9 | 14.9 |
| Lee | 557.7 | 286.0 | 16.2 |
| Barrington | 537.2 | 357.0 | 18.2 |
| Rochester | 146.9 | 129.7 | 12.2 |

Table 31
NHF&G Agricultural and Open Habitats within the Study Corridor by Type and Community

| | Agricultural and Open Habitat Type | | |
|---|---|---|---|
| Community | Agricultural (acre) | Cleared/Open/Other (acres) | Disturbed |
| Epping | 36.0 | 145.8 | 12.7 |
| Lee | 25.6 | 139.7 | 42.7 |
| Barring | 26.5 | 118.7 | 15.7 |
| Rochester | 32.4 | 89.4 | 1.3 |

## Socio-economic Resources

Census 2000 data was collected for Epping, Lee, Barrington, and Rochester to provide a sense of the socio-economic conditions within the study corridor. Of particular interest are total housing units, occupancy rates, property values, number of employees, and types of businesses. These parameters are included in Tables 32 and 33.

Table 32
Census 2000 Data: Total Housing Units, Occupancy Rates, Property Values and Number of Employees

| Socio-economic Parameter | Epping | Lee | Barrington | Rochester |
|---|---|---|---|---|
| Total Housing Unit | 2,215 | 1,534 | 3,147 | 11,836 |
| Occupancy Rates | 2,047 | 1,466 | 2,756 | 11,434 |
| Property Values | 132,600 | 169,300 | 136,400 | 99,400 |
| Number of Employees | 3,196 | 2,401 | 4,314 | 15,252 |

Table 33
Census 2000 Data: Types of Business

| | Number , Percent | | | |
|---|---|---|---|---|
| Industry | Epping | Lee | Barrington | Rochester |
| Agriculture, Forestry, Fishing and Hunting, and Mining | 12,4% | 27,1.2% | 86,2% | 119,0.8% |
| Contractor | 252,8% | 95,4.1% | 365,8.6% | 767,5.2% |
| Manufacturing | 634,20.2% | 270,11.7% | 760,18% | 3525,24% |
| Wholesale Trade | 136,4.3% | 51,2.2% | 78,1.8% | 384,2.6% |
| Retail Trade | 502,16% | 245,10.6% | 584,13.8% | 2394,16.3% |
| Transportation, Warehousing, and Utilities | 162,5.2% | 44,1.9% | 268,6.3% | 634,4.3% |
| Information | 83,2.6% | 69,3% | 37,0.9% | 807,2.8% |
| Finance, Insurance, Real Estate, and rental leasing | 158,5% | 148,6.4% | 168,6.3% | 846,5.8% |
| Professional, Scientific, management, administrative, and waste management services | 204,6.5% | 312,13.5% | 349,8.3% | 997,6.8% |
| Educational, Health, and Social Services | 547,17.4% | 687,29.8% | 887,21% | 2549,17.4% |
| Arts, Entertainment, Recreation, Accommodation, and Food Services | 222,7.1% | 129,5.6% | 197,4.7% | 852,5.8% |
| Other Services (except public administration) | 131,4.2% | 63,2.7% | 150,3.6% | 567,3.9% |
| Public Administration | 100,3.2% | 165,7.2% | 192,4.5% | 627,4.3% |

## Urbanized Areas

For Census 2000 (the most recent decennial survey), the Census Bureau classifies as "urban" all territory, population, and housing units located within an urbanized area (UA) or an urban cluster (UC). It delineates UA and UC boundaries to encompass densely settled territory, which consists of:

- Core census block groups or blocks that have a population density of at least 1,000 people per square mile and
- Surrounding census blocks that have an overall density of at least 500 people per square mile

In addition, under certain conditions, less densely settled territory may be part of each UA or UC.

Census 2000 UA data was obtained from the New Hampshire Department of Transportation. The data reveals that the majority of the study corridor is not within a UA. At the northern most limit of the study corridor, 308.7 acres of Rochester are designated as a UA.

## Historic and Archaeological Resources

An analysis of known historic and archaeological resources within the Study Corridor was conducted to identify potential constraints on future transportation improvements. This effort included review of the NH Division of Historical Resources (NHDHR) historic resource inventory files, the NH State Register of Historic Places, and the National Register of Historic Places. A reconnaissance-level historic resource survey of the study corridor was also conducted to ensure comprehensive coverage of historic resource constraints. The survey identified buildings and structures that met the minimum age eligibility requirement for listing in the National Register of Historic Places (50 years), but that were not included in the NHDHR inventory files.

### Historic Resources

#### National Register of Historic Places

The study corridor contains one property listed on the National Register of Historic Places. The ca. 1787 Richard Hayes House at 184 Gonic Road in Rochester was individually listed on the National Register of Historic Places in 1986. The Hayes House is significant as a well preserved example of Federal style architecture.

#### NH DHR Historic Resource Inventory

The NHDHR historic resource inventory files contain information about historic resources within the study corridor for the Town of Lee, the Town of Barrington, and the City of Rochester. There are no historic properties recorded in the inventory files within the study corridor in the Town of Epping. Review of previous documentation of historic resources within the study corridor revealed two historic districts that were recommended or determined eligible by NHDHR for the National Register of Historic Places. A complete listing of individual properties previously identified within the study corridor is provided in the Phase 1 report.

A town-wide overview of historic resources in Barrington identified a portion of the village of East Barrington at the intersection of Route 9 (Franklin Pierce Highway) and NH 125 as an historic district. Known as **Calef's Corner**, this area developed in the late 19th century around the ca. 1860 Calef's Store and the Worcester, Nashua, and Rochester Railroad Depot constructed in the 1870s. The potential district includes approximately fifteen historic structures.

NHDHR determined the Village of **Gonic** in the City of Rochester eligible for the National Register in 2005 for its architectural and historical significance. NHDHR is still determining the boundaries of the district and contributing and non-contributing resources within the district.

#### Local Designations

The Town of Epping established a local historic district in 1979 along a portion of Main Street and Exeter Road called the Epping Historic District. The district contains residential, civic, and commercial buildings and is governed by the Epping Historic District Commission. This district is not listed on the NH State or National Registers of Historic Places.

## Field Reconnaissance

A reconnaissance-level historic resource survey of the study corridor was conducted on December 20, 2005 to identify buildings and structures that meet the minimum age eligibility criteria for listing in the National Register of Historic Places (50 years), but that are not included in the NHDHR inventory files. The condition of properties and historic areas previously inventoried or identified in the NHDHR historic resource inventory was also verified during the survey.

The reconnaissance survey identified or verified, mapped, and digitally photographed 112 individual properties and 7 groupings of historic properties within the study corridor. A listing of all properties and groupings identified and reviewed during the survey is included in Phase 1 report.

## Identified Historic Resource Constraints

Based on review of the NH State and National Registers of Historic Places, the NHDHR historic resource inventory, and the results of the field reconnaissance survey, the study corridor contains one building listed on the National Register of Historic Places; one historic district determined eligible for the National Register of Historic Places by the NHDHR, one locally designated historic district, and 44 individual buildings and 4 historic areas within the study corridor that appear eligible for the National Register based on visual analysis by VHB staff or previous survey.[3] The address, areas (s) of significance, and previously listed, eligible, or inventoried status of each of these properties is shown in Table 34.

If improvements within the study corridor involve federal or state permitting or funding, effects on properties and districts listed on or determined eligible for listing on the National Register of Historic Places resulting from improvements within the Study corridor would require review by the NHDHR. Any adverse effects to National Register-listed or National Register-eligible properties or districts would require resolution by avoidance or the resources, minimization of adverse effects, and/or mitigation of adverse effects. This review process may require additional documentation of historic resources in the study corridor according to NHDHR requirements.

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3 Visual analysis of eligibility for the National Register of Historic Places undertaken for this assessment was based on architectural features, level of integrity, and obvious association with known historic contexts in the Study Corridor communities. No research or detailed investigation was conducted on individual properties. Visual observation of National Register eligibility results a recommendation for eligibility only. Recommendations must be reviewed by NHDHR to result in an official eligibility opinion.

Table 34
Properties and Districts Listed on or Eligible for Listing on the National Register of Historic Places

| Map or Survey # | Address or Area Name | City or Town | Significance | Previously Inventoried, Determined Eligible or Listed on NRHP |
|---|---|---|---|---|
| n/a | Epping Historic District and Main Street Area | Epping | Community/Town Planning, Architecture, Transportation | Town of Epping local historic district |
| 3 | Shapiro Wagman Shoe Company<br>75 Railroad Avenue | Epping | Shoe Manufacturing | |
| 5 | 56 Main Street | Epping | Architecture: Greek Revival with Queen Anne updates | |
| 7 | 6 Acre Street | Epping | Architecture: Queen Anne | |
| 8 | 38 Exeter Road | Epping | Architecture: Federal | |
| 22 | 275 Calef Highway | Epping | Architecture: Colonial Revival | |
| 29 | 5 Hedding Road | Epping | Architecture: Federal with Italianate updates | |
| 30 | 10 Hedding Road | Epping | Architecture: 18th c. cape form dwelling | |
| 31 | Cemetery<br>North side of Hedding Road, app. 600 feet south of Calef Highway | Epping | Information Potential: planning of family cemeteries, previous settlement of area | |
| n/a | River Road Area | Epping | Agricultural history in Epping, late 18th-mid 19th century architectural styles and farm layouts, intact agricultural landscapes | |
| 33 | 245 North River Road (within River Road Area) | Epping | Architecture: Federal, History of agriculture in Epping | |
| 34 | 264 North River Road<br>(within River Road Area) | Epping | Architecture: Greek Revival with Italianate updates, New England barn; History of agriculture in Epping | |
| 35 | 270 North River Road<br>(within River Road Area) | Epping | Architecture: Federal, New England barn; History of agriculture in Epping | |
| 36 | 288 North River Road<br>(within River Road Area) | Epping | Architecture: Greek Revival, New England barn; History of agriculture in Epping | |
| 37 | 314 North River Road<br>(within River Road Area) | Epping | Architecture: Federal | |
| 38 | Cemetery<br>East side of Calef Highway, app. 600 feet north of North River Road<br>(within River Road Area) | Epping | Information Potential: planning of family cemeteries, previous settlement of area | |
| 39 | 326 North River Road<br>(within River Road Area) | Epping | Architecture: Colonial Revival | |
| 40 | Dow Farm<br>336 North River Road<br>(within River Road Area) | Epping | Architecture: Federal with Queen Anne updates, New England barn; History of agriculture in Epping | |
| 41 | 352 North River Road<br>(within River Road Area) | Epping | Architecture: Federal, New England barn; History of agriculture in Epping | |
| 42 | Riverslea Farm<br>362 North River Road<br>(within River Road Area) | Epping | Architecture: Federal, arrangement of farm buildings; History of agriculture in Epping | |

| Map or Survey # | Address or Area Name | City or Town | Significance | Previously Inventoried, Determined Eligible or Listed on NRHP |
|---|---|---|---|---|
| 44 | East side of High Road, app. 0.45 miles south of Harvey Mill Road | Lee | Architecture, History of agriculture in Lee | Planning Survey, #17 |
| 45 | East side of High Road, app. 0.3 miles south of Harvey Mill Road | Lee | Architecture, History of agriculture in Lee | Planning Survey, #16 |
| 47 | 9 Harvey Mill Road | Lee | Architecture: 1 ½-story Half-house form | |
| 48 | 16 Harvey Mill Road | Lee | Architecture: Federal, New England barn; History of agriculture in Lee | Planning Survey, #8 |
| 49 | Cemetery<br>West side of Calef Highway, app. 600 feet north of Harvey Mill Road | Lee | Information Potential: planning of family cemeteries, previous settlement of area | |
| 50 | Jenkins House and Plummer's Store<br>67 Demerit Avenue | Lee | Architecture: Greek Revival with Italianate updates, New England barn; History of agriculture in Lee, History of commerce in Lee | Planning Survey, #6 and #7 |
| 51 | 9 Wadleigh Falls Road | Lee | Architecture: Queen Anne and Italianate, Eaves-front bank barn; History of agriculture in Lee | Planning Survey, #20 |
| 52 | Cemetery<br>South side of Wadleigh Falls Road, app. 600 feet south of Calef Highway | Lee | Information Potential: planning of family cemeteries, previous settlement of area | |
| 58 | Bennett House<br>South side of George Bennett Road, app. 800 feet east of Calef Highway | Lee | Architecture: Georgian cape | Planning Survey, #53 |
| 61 | North side of Stepping Stone Road, app. 600 feet west of Calef Highway | Lee | Architecture: Federal; attached outbuildings | Planning Survey, #3 |

| Map or Survey # | Address or Area Name | City or Town | Significance | Previously Inventoried, Determined Eligible or Listed on NRHP |
|---|---|---|---|---|
| 64 | Cemetery<br>Southeast corner of Calef Highway and Lee Oak Road | Barrington | Information Potential: planning of family cemeteries, previous settlement of area | Barrington Town-wide |
| 65 | J.B. and A.D. Pierce House<br>3 Pierce Road<br>(in Pierce Road Area) | Barrington | Architecture: Greek Revival with Italianate updates | Barrington Town-wide |
| 66 | Cemetery<br>East side of Pierce Road, app. 1,500 feet north of Calef Highway<br>(in Pierce Road Area) | Barrington | Information Potential: cemetery planning, previous settlement of area | |
| 68 | 34 Pierce Road<br>(in Pierce Road Area) | Barrington | Architecture: Greek Revival, high-drive bank barn; History of agriculture in Barrington | Barrington Town-wide |
| 70 | 7 Winkley Pond Road | Barrington | Architecture: expanded Federal-era cape dwelling; New England barn; possible shoe shop; History of shoe outwork in Barrington | Barrington Town-wide |
| 75 | Pond View Farm<br>35 Winkley Pond Road | Barrington | History of agricultural production in Barrington | Barrington Town-wide |
| 79 | 113 Province Road | Barrington | Architecture: Colonial Revival | Barrington Town-wide |
| 81 | Taylor House<br>116 Province Road | Barrington | Architecture: Colonial Revival | Barrington Town-wide |
| 83 | Young House<br>92 Province Road | Barrington | Architecture: Hall and parlor plan dwelling | Barrington Town-wide |
| n/a | Calef's Corner Area<br>App. 15 buildings, including two Calef Houses (late 19th c.) | Barrington | Community Planning, Architecture, Commerce | Barrington Town-wide – Recommended eligible for the National Register by surveyor |
| 87 | 125 Franklin Pierce Highway | Barrington | Architecture: Colonial Revival | Barrington Town-wide |

| Map or Survey # | Address or Area Name | City or Town | Significance | Previously Inventoried, Determined Eligible or Listed on NRHP |
|---|---|---|---|---|
| 88 | 130 Franklin Pierce Highway | Barrington | Architecture: Colonial Revival | Barrington Town-wide |
| 91 | 1 Century Pine Road | Barrington | Architecture: Ranch | |
| 92 | West side of Calef Highway, app. 1,000 feet south of Green Hill Road | Barrington | Architecture: Greek Revival | Barrington Town-wide |
| 95 | 221 Tolend Road | Barrington | Architecture: Greek Revival | Barrington Town-wide |
| n/a | Cemetery Road-Gear Road Area | Rochester | French-Canadian immigration and settlement | Gonic Manufacturing Company Dams/Village of Gonic Project Area Form (more study required) |
| 98 | Mont-Calvaire Cimetiere Northeast corner of Cemetery Road and Flagg Road | Rochester | Information Potential: Catholic culture and religious practice in Rochester | Rochester Town-wide |
| n/a | Richard Hayes House 184 Gonic Road | Rochester | Architecture: Federal | Listed on National Register of Historic Places |
| n/a | Oak. St.-Grove St. Area (West Gonic) | Rochester | Association with history of shoe manufacturing | Gonic Manufacturing Company Dams/Village of Gonic Project Area Form (more study required) |
| 106 | 271 Grove Street (in Oak. St.-Grove St. Area) | Rochester | Architecture: Craftsman | Rochester Town-wide |
| n/a | Gonic Village | Rochester | Textile manufacturing, evolution of waterpower resources along the Cocheco River; New England mill architecture, industrial worker housing | Rochester Town-wide and Gonic Manufacturing Company Dams/Village of Gonic Project Area Form - determined eligible for the National Register by NHDHR |

## Archaeological Resources

Review of archaeological base maps on file at the NHDHR revealed eight recorded archaeological sites within or adjacent to the study corridor. These sites are presented in Table 35 below. Two of these sites are noted in associated archaeological survey reports as being destroyed, and two other sites are noted in associated archaeological reports as being disturbed, with no further investigation required. More investigation by a qualified archaeologist would be required to determine the presence of unrecorded archaeological resources within the study corridor, site significance, and archaeological constraints. A bibliography of archaeological reports consulted is included in the Phase 1 report.

If improvements within the study corridor involve federal or state permitting or funding, effects on archaeological resources listed on or determined eligible for listing on the National Register of Historic Places resulting from improvements within the study corridor would require review by the NHDHR. Any adverse effects to National Register-listed or National Register-eligible archaeological sites would require resolution by avoidance or the resources, minimization of adverse effects, and/or mitigation of adverse effects. This review process will require additional documentation of archaeological resources in the study corridor according to NHDHR requirements.

Table 35
Recorded Archaeological Sites Within and Adjacent to the Study Corridor

| Site Number | Town (USGS Quad) | Description | Date of Recordation | Condition/Status (if known) |
|---|---|---|---|---|
| 27ST0027 | Barrington (Dover West) | Prehistoric | 1979 | Unknown |
| 27ST0028 | Barrington (Dover West) | Prehistoric | 1978 | Possibly disturbed due to highway work |
| 27ST0042 | Barrington (Dover West) | Prehistoric | 2003 | Disturbed |
| 27ST0043 | Barrington (Dover West) | Prehistoric | 2003 | Disturbed |
| 27ST15 | Lee (Barrington) | Historic – headstones and gravestones | 1971 | Unknown |
| 27ST7 | Rochester (Rochester) | Prehistoric – single artifact | 1992 | Destroyed |
| 27ST8 | Rochester (Rochester) | Prehistoric – single artifacts | 1992 | Destroyed |
| 27ST64 | Rochester, Gonic Village (Rochester) | Historic – sawmill site | 2005 | Unknown |

# Future Conditions

To consider the potential impact of future travel demand along the corridor, a comprehensive land use build-out analysis was conducted. This section describes the methodology used to estimate the full build-out potential, the associated traffic volume demand that would be generated by the full-build-out, and finally the resulting operational conditions under a full-build.

## Build-out Analysis

Using the GIS data and constraint mapping that was prepared for the Phase 1 study a maximum land use build-out analysis for the corridor was conducted. This was done by first reviewing current zoning and land use regulations for each community and then determining the developable land on a parcel by parcel basis by subtracting out various environmental and infrastructure constraints such as publicly owned land, conservation easements and restrictions, utility easements, wetlands, drinking water protection areas, floodplains, steep slopes, etc. A 10 percent reduction in the developable land was applied to the aggregate land area to account for roadways.

The build-out analysis grouped the potential land use into three broad categories: residential, retail, and office/industrial. These categories were selected because the traffic generating characteristics for each differ substantially. The corridor maps depicting the full build-out by land use category are provided in Figures 16 through 25.

The results of the full build-out analysis suggest that under current zoning, the study corridor could produce additional development consisting of:

- over 2,000 residential units,
- approximately 6.3 million square feet of retail space, and
- over 8.2 million square feet of office/industrial use.

Note that this is not a certain projection of growth for the corridor or even a likely scenario. In fact, it is unlikely that every parcel along the corridor would be developed to its maximum potential within a reasonable design horizon of 20-30 years or beyond. However, it does suggest that the corridor has the potential for substantial growth and therefore, the time to plan is now. Corridor communities with the most substantial developable land along the corridor are Epping and Barrington. Less developable land is located along the corridor in Lee and in Rochester due to environmental and infrastructure constraints.

The Alternatives Evaluation section of this report describes a procedure that was used to arrive at a more likely build-out scenario (refer to page 32).

## Traffic Volume Projections (on current zoning)

Having established the maximum build-out under current zoning at over 2,000 residential units, approximately 6.3 million square feet of retail space, and over 8.2 million square feet of office/industrial use, the next step is to convert this potential build-out to vehicle-trips. To estimate the vehicle-trip generating potential for the full build-out, standardized Institute of Transportation Engineers (ITE) trip generation formulas were applied to the three broad land use categories. Adjustment factors were applied to account for multi-purpose trips as well as for pass-by type trips associated with the retail land use.

As shown in Table 36, the full build-out of the corridor would be expected to generate approximately 9,280 vehicle-trips (6,840 entering and 2,440 exiting) during the weekday AM peak hour and approximately 16,490 vehicle-trips (5,970 entering and 10,520 exiting) during the weekday PM peak hour. These are very high volume levels and again it is highly unlikely that all of the corridor parcels would develop to their maximum potential. However, if they did, this is the level of new traffic that could be generated.

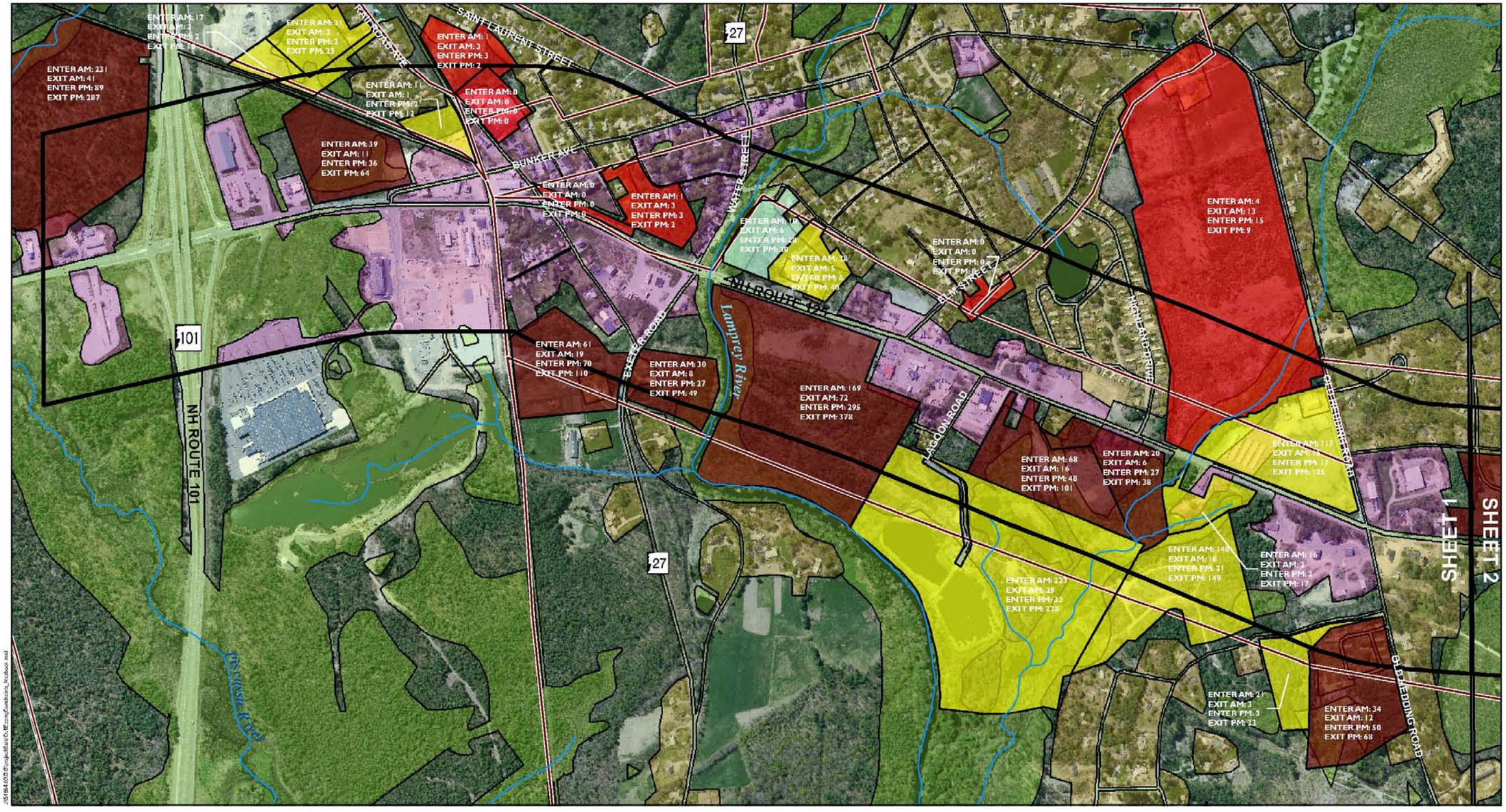
Table 36
Trip Generation Summary

| | | |
|---|---|---|
| AM Peak Hour | | |
| | Enter | 6,840 |
| | Exit | 2,440 |
| | Total | 9,280 |
| PM Peak Hour | | |
| | Enter | 5,970 |
| | Exit | 10,520 |
| | Total | 16,520 |

## Future Operational Analysis (on current zoning)

A level of service analysis, similar to that completed for the existing conditions analysis, was conducted for the future full build-out condition. This evaluation consisted of a traffic volume condition where the full build-out trip generation was added to the existing corridor volumes. For the purpose of this evaluation, no other general background growth or traffic growth from corridor communities were included.

The results of the operational analyses showed all existing intersections in the study area would be reduced to a failure condition. In fact, a cursory evaluation as to what type of additional capacity improvements could be provided to accommodate the full build-out revealed that even a widening of NH 125 to a full five-lane cross section would not be enough to obtain acceptable operating conditions along the corridor. These results confirm the conclusions that the vehicle-trip estimates generated by the full-build-out analysis are unrealistic.




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

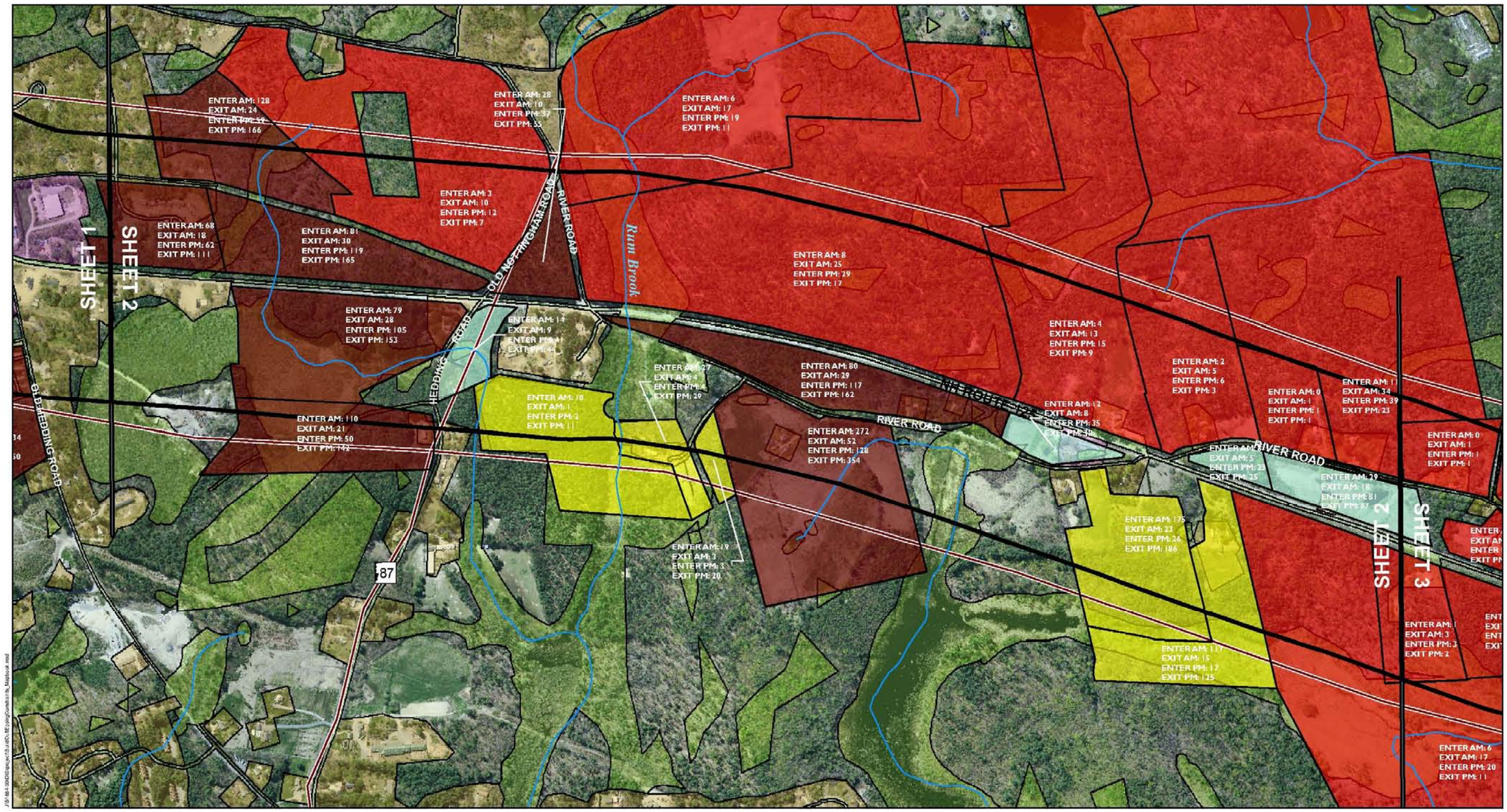
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 16

Build Out Analysis
Epping

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

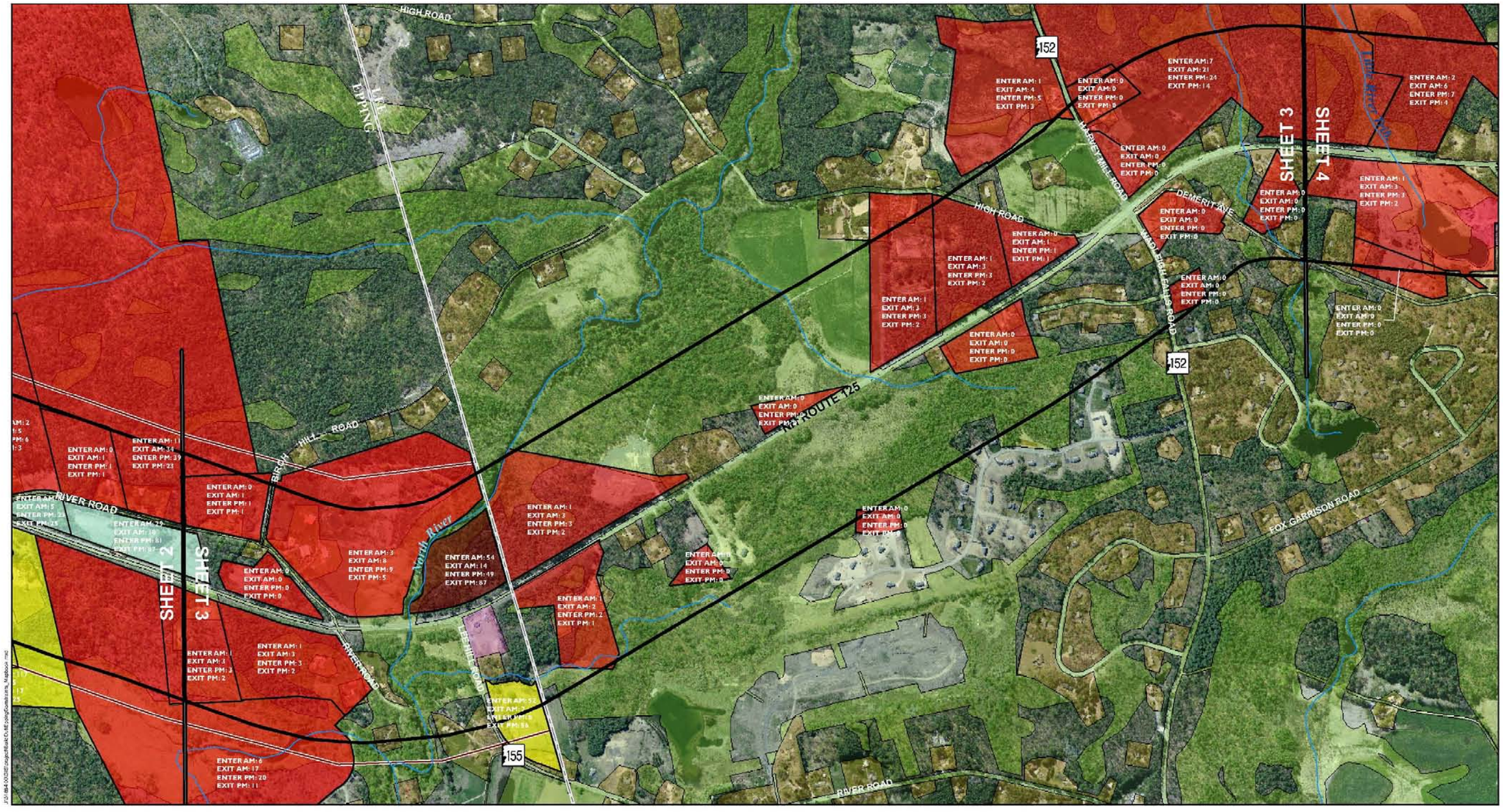
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 17

Build Out Analysis
Epping

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

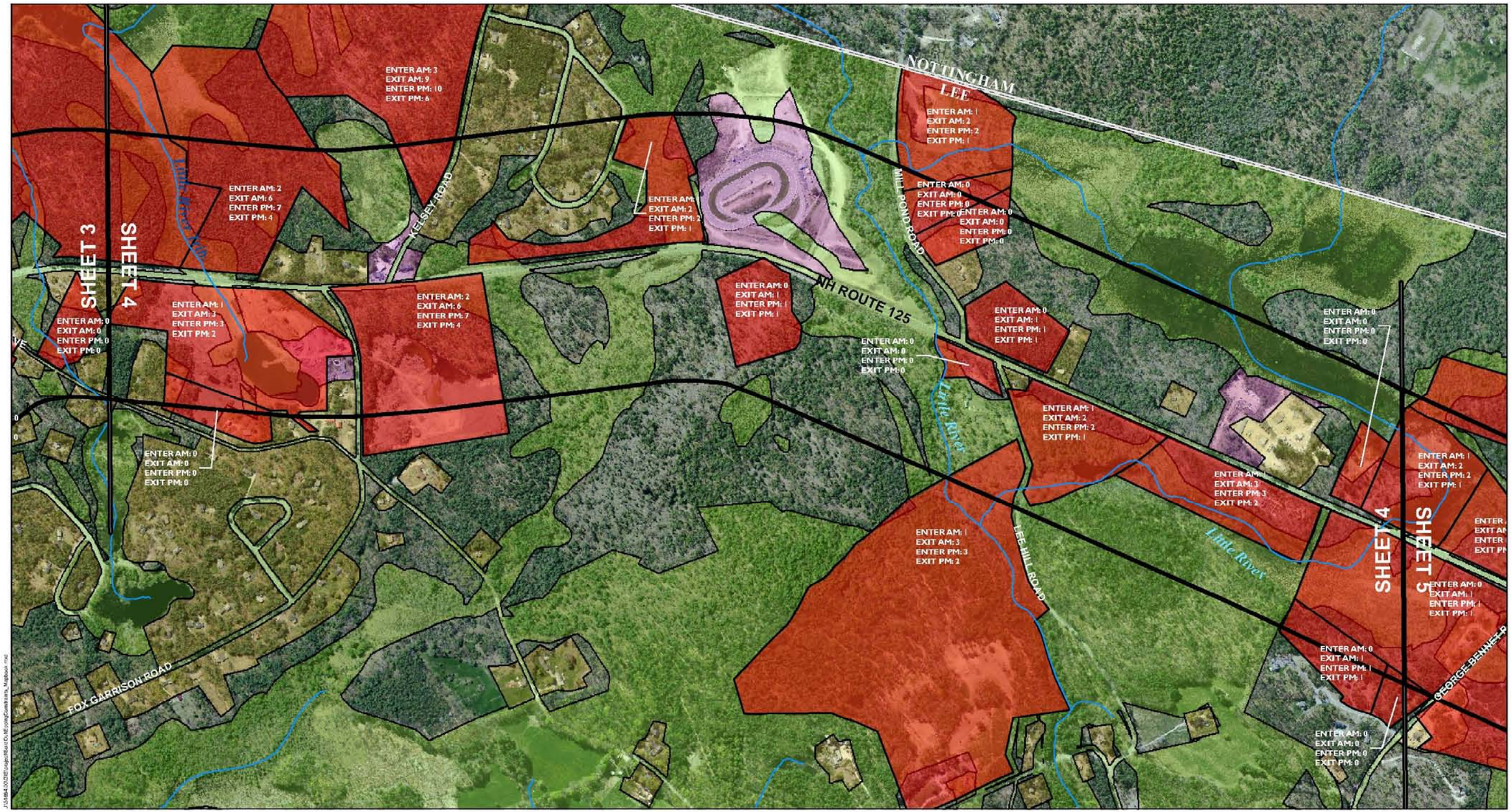
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 18

Build Out Analysis
Epping/Lee

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

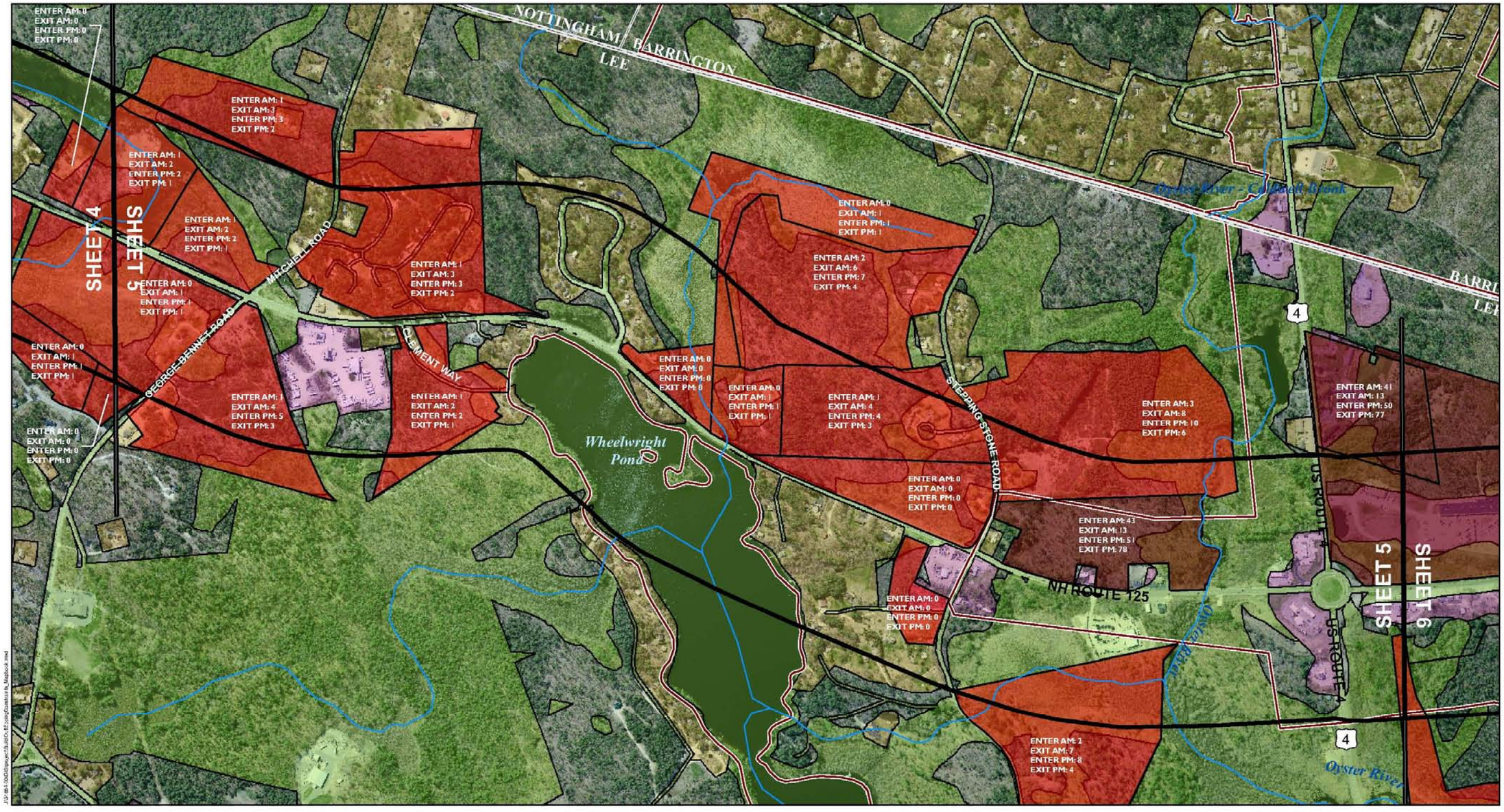
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 19

Build Out Analysis
Lee

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

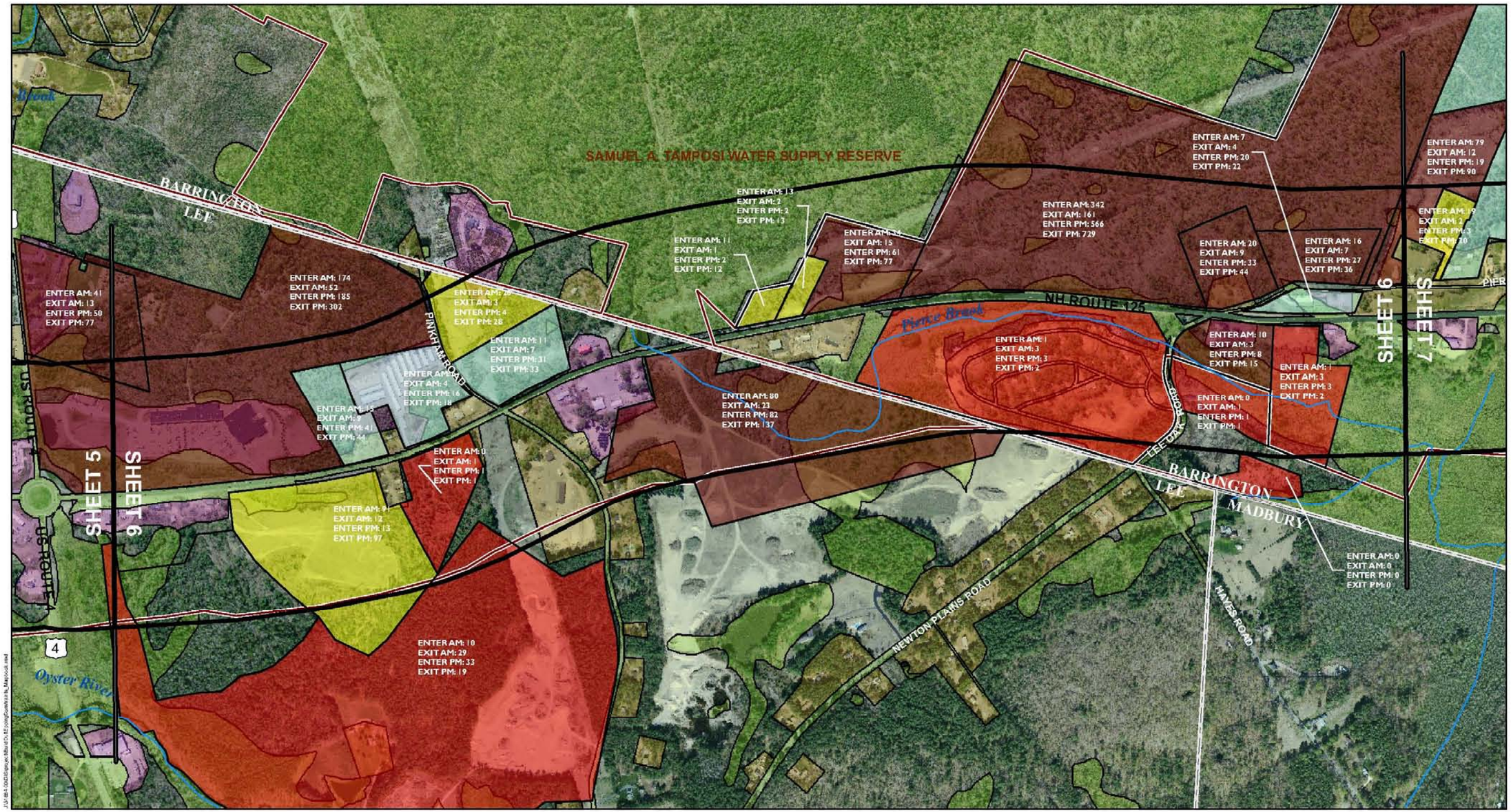
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 20

Build Out Analysis
Lee/Barrington

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

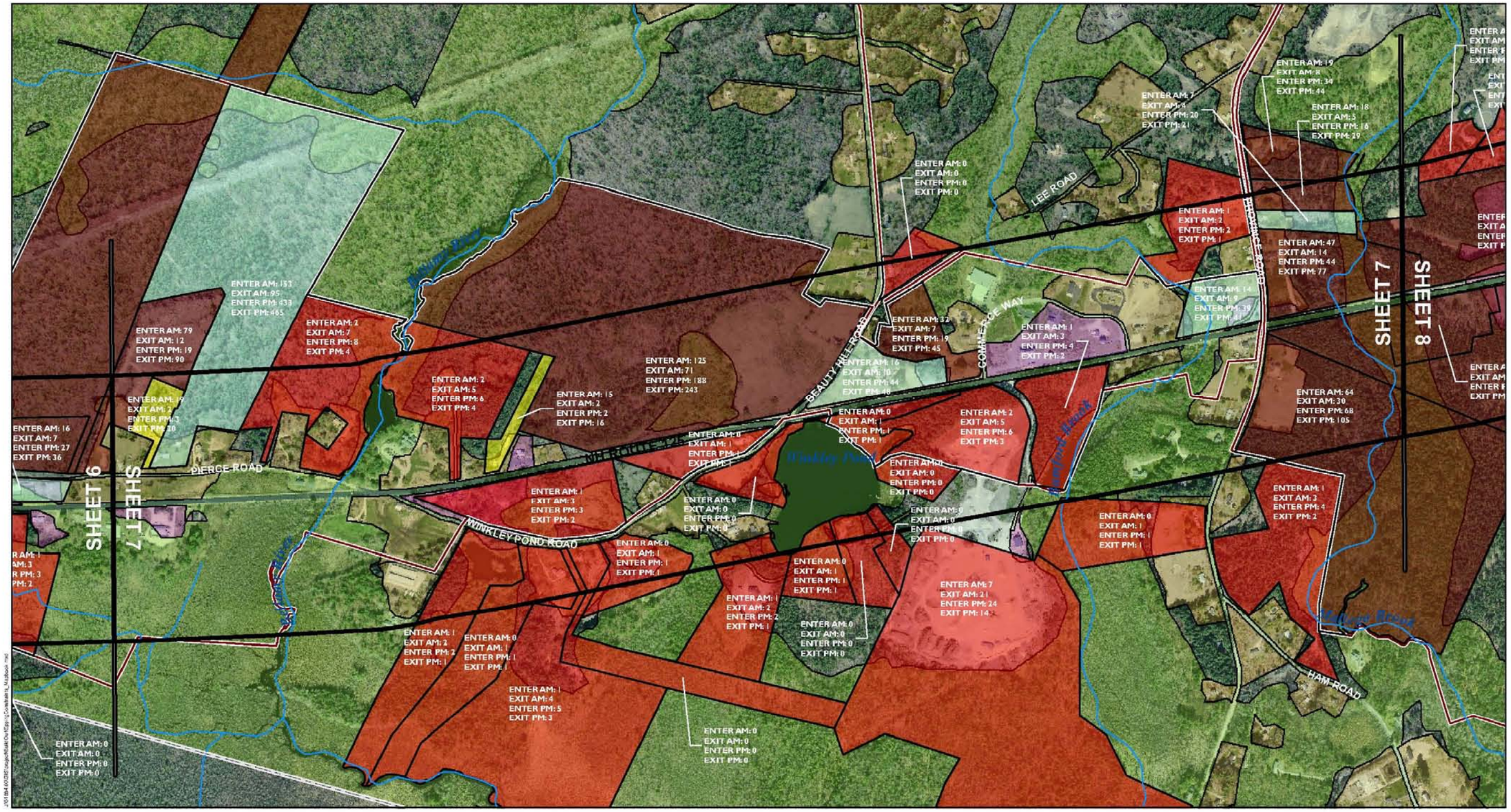
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 21

Build Out Analysis
Lee/Barrington

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 22

Build Out Analysis
Barrington

NH Route 125
Corridor Management Study


**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

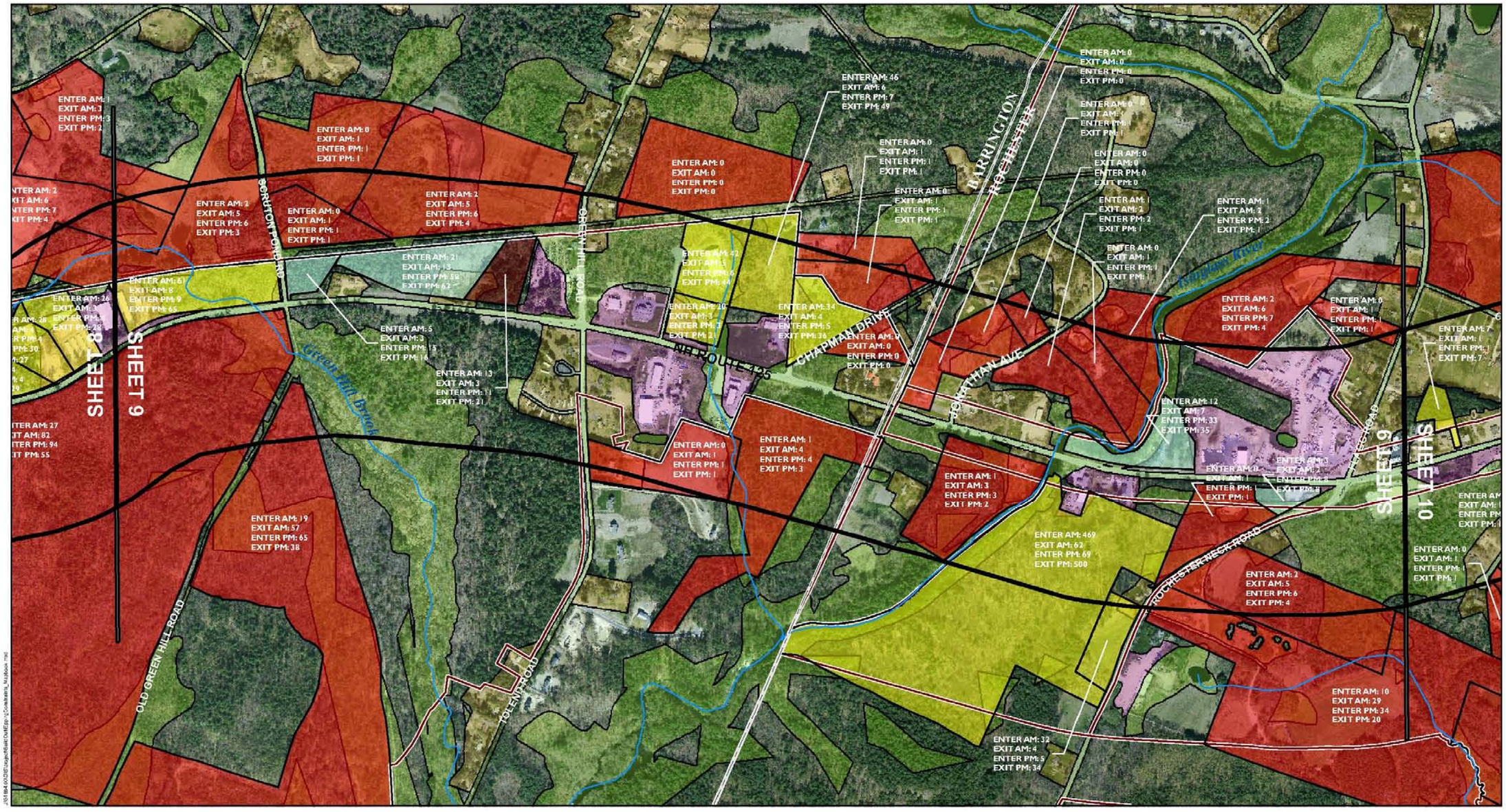
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 23

Build Out Analysis
Barrington

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

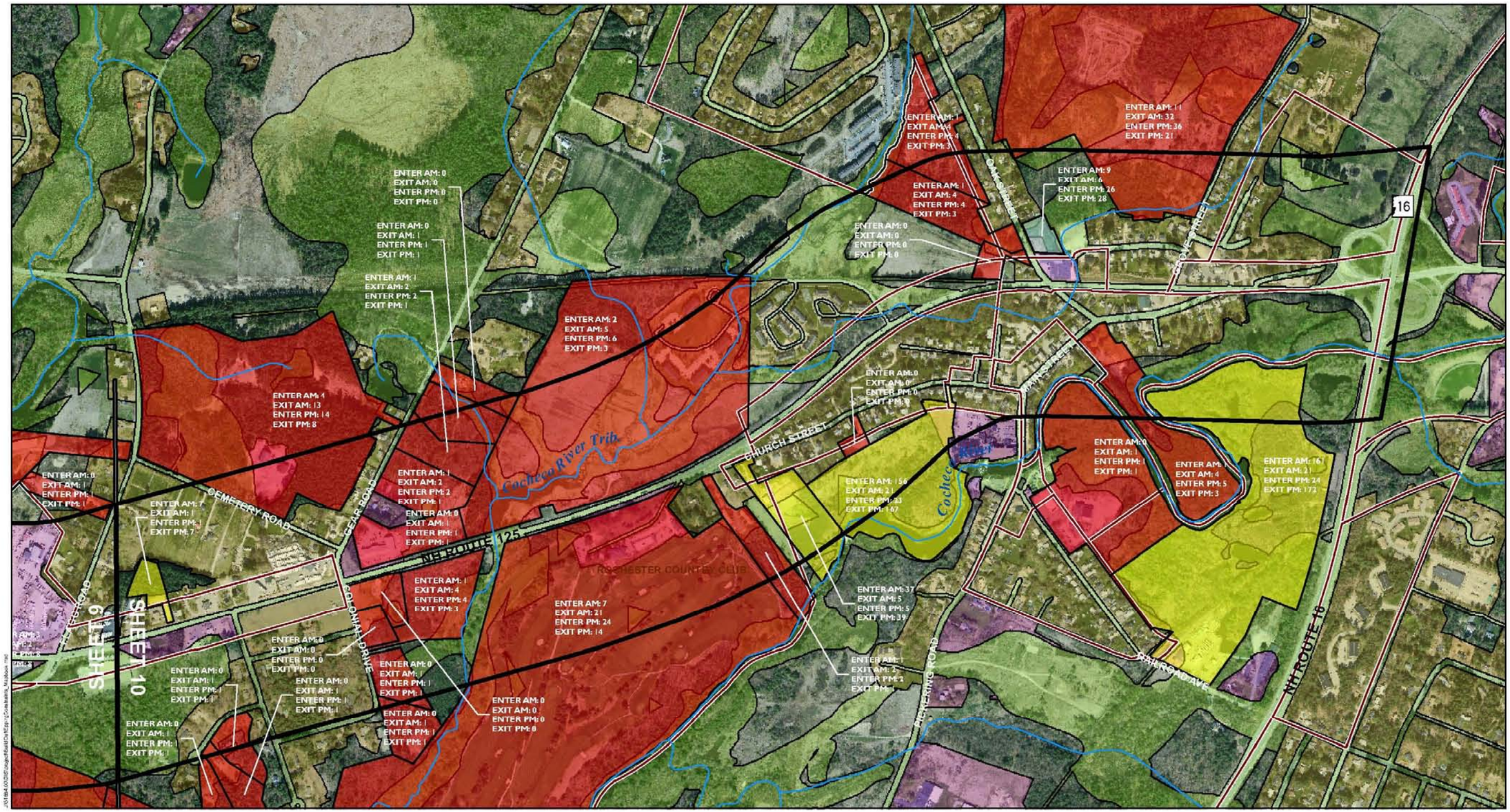
0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 24

Build Out Analysis
Barrington/Rochester

NH Route 125
Corridor Management Study




**Legend**

- Corridor Study Area
- Town Boundaries
- Stream/River
- Zoning Boundary

**Corridor Projected Use**

- Office/Industrial
- Retail
- Residential
- Mixed Use

**Land Use**

- Constrained
- Residential
- Commercial/Industrial

0 400 800 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 25

Build Out Analysis
Rochester

NH Route 125
Corridor Management Study

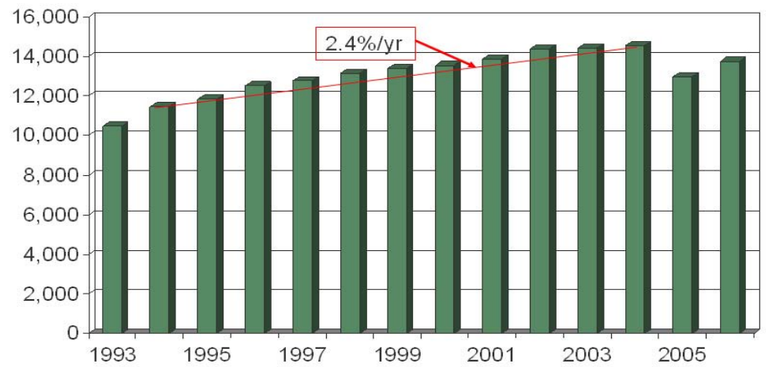
# Alternatives Evaluation

Having summarized the results of the full build-out analysis in the previous section, this section will discuss a preferred and frankly more likely build-out condition and the associated volume of traffic that would be generated by this condition. Alternatives including access management and multi-modal methods aimed at improving the efficiency of the corridor are also discussed.

## Preferred Build-out Analysis

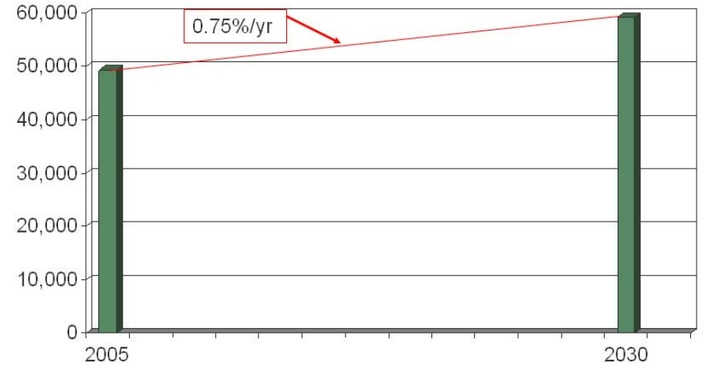
As described in the previous section, the maximum land use build-out under current zoning and its associated vehicle trip generation is not likely to occur - at least within any reasonable future design horizon such as 20 years. Therefore, the question is what is a more realistic 20-year traffic volume condition for the study corridor? To answer that question, both historical growth trends as well as population projections for the corridor communities were evaluated. As depicted in Figure 26, corridor traffic volumes (as recorded at the NHDOT's permanent count station located on NH 125 north of the Lee Traffic Circle) have been growing steadily since 1993. With the exception of the last two years, which may have been effected by construction projects on the corridor, traffic for the 20-year period between 1994 and 2004 has been growing at a rate of approximately 2.4 percent per year.

**Figure 26**
**Historical Traffic Growth**




In addition, to a review of historical traffic growth in the area, current population projections by the Office of Energy and Planning (OEP) for the communities of Epping, Lee, Barrington and Rochester were evaluated. As depicted in Figure 27, combining the population projections for the corridor communities, the population for these corridor communities is expected to grow at a relatively low rate of approximately 0.75 percent per year over a 30-year period (2005 to 2030). Note that this rate reflects residential population growth only and does not consider growth in non-residential uses.

**Figure 27**
**OEP Population Projections**



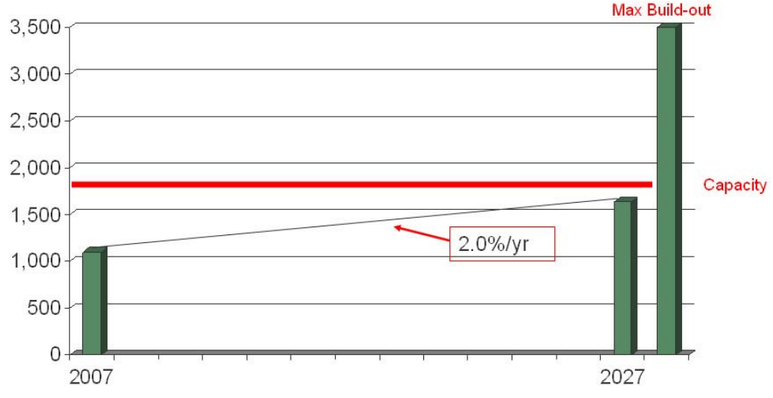

Based on the review of the historical traffic grow pattern as well as the OEP population projections, it is expected that the rate at which traffic would likely grow over the next 20-year period would be approximately 2.0 percent per year. With that, two questions arise: 1) how does that growth rate relate to the maximum land use build-out, and 2) how does either the 2 percent growth rate or the maximum build-out relate to the carrying capacity of the corridor.

Most of the study corridor is currently a 2-lane highway with one through lane in each direction. Assuming that there will be wider sections and adequate capacity at signalized intersections, the maximum carrying capacity of the 2-lane roadway section (long sections between major intersections) is estimated at approximately 1,700 vehicles in one lane in one direction. For purpose of comparison, although the volume of traffic varies throughout the corridor, the existing corridor currently processes approximately 1,100 vehicles in the peak direction during the peak hour. As depicted in Figure 28, at only a 2.0 percent annual growth rate, the capacity of the roadway would be reached in 20 years. In fact, if traffic grows at the historical 2.4 percent rate the corridor's capacity would be exceeded in less than 20 years.

Note that simply taking the volume of traffic that would be generated by the maximum land use build-out and adding that volume to the existing volume, with no other growth from other parts of the corridor communities or from other cities and towns, results in an

hourly volume in one direction of over 3,500 vehicles. This projection far exceeds the capacity of a 2-lane roadway section, as exists today along much of the corridor.

**Figure 28**
**Build-out vs. Corridor Capacity Summary**




## Traffic Volume Projections (on Preferred Build-out)

To establish a realistic 20-year future design year condition, the 2007 existing morning and evening peak hour traffic volumes were increased by a 2.0 percent compounded annual growth rate. The resulting 2027 future morning and evening peak hour traffic volume networks are presented in Figures 29 through 36.

Before simply developing a plan to widen the NH 125, other alternatives aimed at improving the efficient movement of traffic along the corridor were considered. Two actions aimed at improving the efficiency of the corridor are **access management** and **multi-modal considerations**. A more detailed discussion on the access management and multi-modal considerations is provided in later sections (refer to pages 35-39).

## Preferred Build-out Operational Analysis

A level of service analysis, similar to that which was conducted for the existing conditions, was conducted for the future 2027 preferred build-out condition. Again, unlike the full maximum build-out, the 20 year preferred build-out presumes an annual compounded growth rate of 2.0 percent. The results of the operational analyses for the future 20 year condition using the existing corridor geometric condition (no improvements in place) show all study corridor intersections in a failure condition. Unlike the analyses that were conducted for the maximum corridor build-out, the calculated delay is within a range that would suggest that the future volume could be accommodated with implementation of a well conceived improvement plan to mitigate for increased traffic volume and demand.

One of the features of the long-term corridor improvement plan, which is discussed in the Recommended Corridor Plan section (refer to pages 42-52), is the placement of well-spaced major intersections. These intersections would be placed under traffic signal control, and provide two through lanes and an exclusive left-turn lane in each direction along NH 125. In combination with frontage and connector roadways and internal connections between adjacent properties, these signalized intersections would safely and efficiently accommodate many of the corridor's left-turn movements and through traffic.

Similar to the analyses that were conducted for the existing and future (without improvements) conditions, a level of service analysis was conducted for the future 20-year condition with the improvements in place. The results of the analyses show substantial improvement at nearly all of the study corridor intersections (summarized in Tables 37 and 38).

The results of the 2027 future condition operational analyses, which were conducted for the key signalized and unsignalized intersections within the study corridor, are summarized in Tables 37 and 38. The results of the 2027 signalized intersection analysis for the with improvements condition is summarized in Table 39.

Table 37
2027 Future Signalized Intersection Capacity Analysis Summary
(Without Improvements)

| Location | Period | v/c* | Delay+ | LOS^ |
|---|---|---|---|---|
| NH 125 & NH 27 | AM Peak | 1.30 | 156 | F |
| | PM Peak | 1.71 | 255 | F |
| NH 125 & NH 152 | AM Peak | 1.21 | 98 | F |
| | PM Peak | 1.16 | 74 | E |
| NH 125 & NH 9 | AM Peak | 1.37 | 154 | F |
| | PM Peak | 1.27 | 127 | F |
| NH 125 & Flagg Rd/ Rochester Neck Rd | AM Peak | 1.00 | 40 | D |
| | PM Peak | 1.06 | 64 | E |
| NH 125 & Oak St | AM Peak | 1.10 | 88 | F |
| | PM Peak | 1.18 | 100 | F |

* Volume to capacity ratio

\+ Average delay per vehicle (sec)

^ Intersection Level of Service

Table 38
2027 Future Unsignalized Capacity Analysis Summary
(Without Improvements)

| | Weekday AM | | | Weekday PM | | |
|---|---|---|---|---|---|---|
| Location / Movement | Demand* | Delay** | LOS*** | Demand | Delay | LOS |
| NH 125 & NH 87 | | | | | | |
| EB from Old Nottingham Road | 10 | >1000 | F | 30 | >1000 | F |
| WB from NH 87 | 55 | >1000 | F | 90 | >1000 | F |
| NH 125 & Kelsey Road | | | | | | |
| EB from Kelsey Road | 140 | 609 | F | 55 | 416 | F |
| NH 125 & Lee Hill Road | | | | | | |
| WB from Lee Hill Road | 200 | >1000 | F | 520 | >1000 | F |
| NH 125 & Lee Oak Road/ Pierce Road | | | | | | |
| EB from Pierce Road | 6 | 116 | F | 6 | >1000 | F |
| WB from Lee Oak Road | 70 | 697 | F | 275 | 854 | F |
| NH 125 & Beauty Hill Rd/ Winkley Pond Rd | | | | | | |
| EB left/through from Beauty Hill Rd | 200 | >1000 | F | 90 | >1000 | F |
| EB right from Beauty Hill Road | 120 | 77 | F | 45 | 19 | C |
| WB from Winkley Pond Road | 1 | 827 | F | 10 | 858 | F |
| NH 125 & Province Road | | | | | | |
| EB from Province Road | 215 | >1000 | F | 60 | >1000 | F |
| WB from Province Road | 50 | >1000 | F | 45 | >1000 | F |
| NH 125 & Green Hill Rodd/ Tolend Rd | | | | | | |
| EB from Green Hill Road | 220 | >1000 | F | 105 | >1000 | F |
| WB from Tolend Road | 45 | >1000 | F | 115 | >1000 | F |
| NH 125 & Gear Road/ Colonial Drive | | | | | | |
| EB from Gear Road | 150 | 383 | F | 80 | >1000 | F |
| WB from Colonial Drive | 16 | 103 | C | 10 | >1000 | F |

* Demand expressed in vehicles per hour.

** Delay expressed in seconds per vehicle.

*** Level of service.

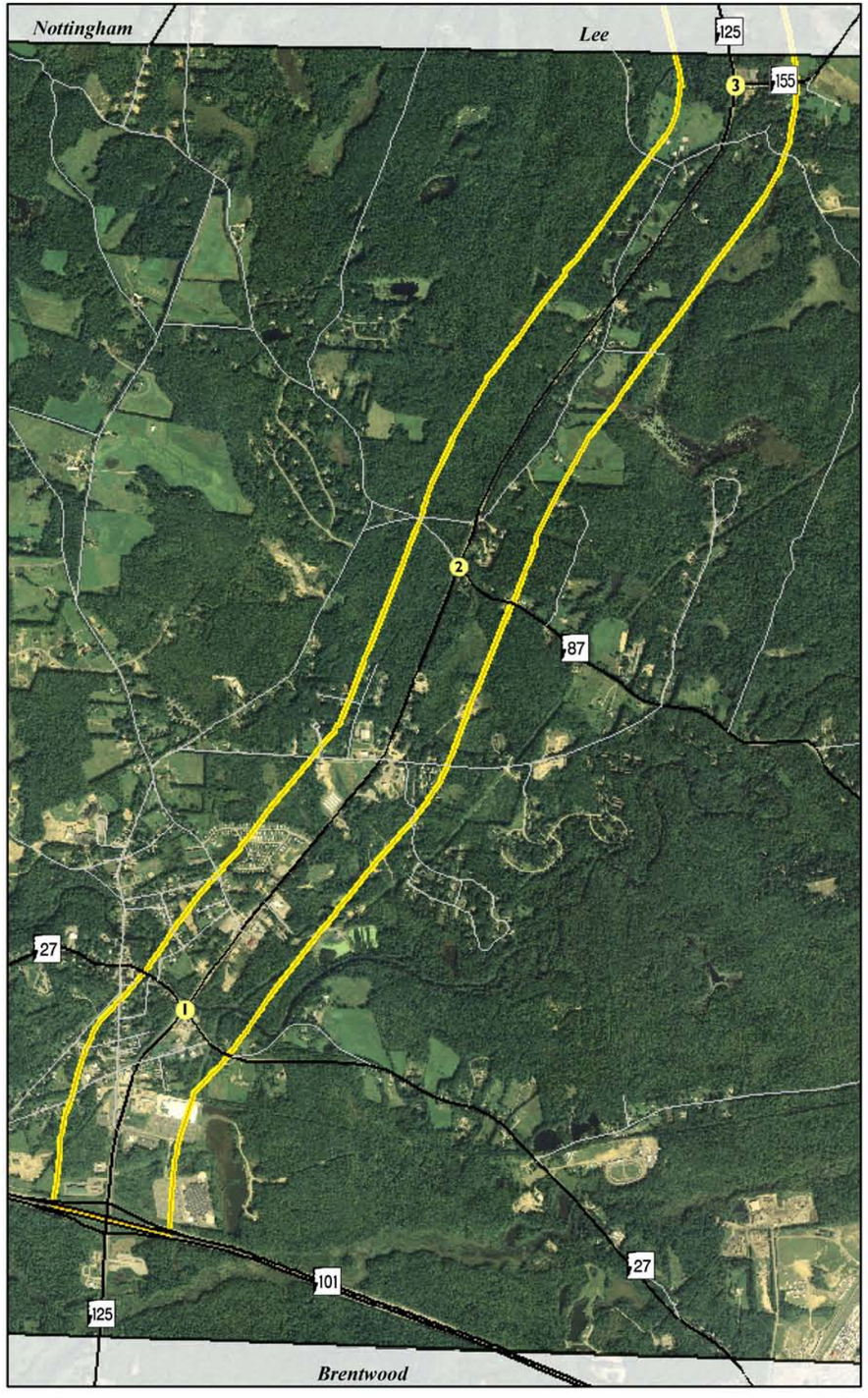
Table 39
2027 Future Signalized Intersection Capacity Analysis Summary
(Under Recommended Plan)

| Location | Period | v/c* | Delay+ | LOS^ |
|---|---|---|---|---|
| NH 125 & NH 27 | AM Peak | 0.86 | 44 | D |
| | PM Peak | 1.18 | 95 | F |
| NH 125 & NH 87 | AM Peak | 0.73 | 11 | B |
| | PM Peak | 0.68 | 10 | B |
| NH 125 & Lee Hill Road | AM Peak | 0.61 | 8 | A |
| | PM Peak | 0.93 | 26 | C |
| NH 125 & NH 152 | AM Peak | 0.63 | 10 | A |
| | PM Peak | 0.51 | 7 | A |
| NH 125 & Kelsey Road | AM Peak | 0.76 | 23 | C |
| | PM Peak | 0.77 | 23 | C |
| NH 125 & Pierce Road/ Lee Oak Road | AM Peak | 0.54 | 14 | B |
| | PM Peak | 0.70 | 13 | B |
| NH 125 & Beauty Hill Rd/ Winkley Pond Road | AM Peak | 0.76 | 14 | B |
| | PM Peak | 0.65 | 13 | B |
| NH 125 & Providence Rd | AM Peak | 0.70 | 13 | B |
| | PM Peak | 0.59 | 10 | B |
| NH 125 & NH 9 | AM Peak | 1.10 | 81 | F |
| | PM Peak | 0.99 | 59 | E |
| NH 125 & Green Hill Rd / Tolend Rd | AM Peak | 0.64 | 13 | B |
| | PM Peak | 0.62 | 15 | B |
| NH 125 & Flagg Rd/ Rochester Neck Rd | AM Peak | 0.66 | 17 | B |
| | PM Peak | 0.71 | 17 | B |
| NH 125 & Gear Rd/ Colonial Drive | AM Peak | 0.50 | 9 | A |
| | PM Peak | 0.64 | 11 | B |
| NH 125 & Oak St | AM Peak | 0.79 | 28 | C |
| | PM Peak | 0.76 | 26 | C |

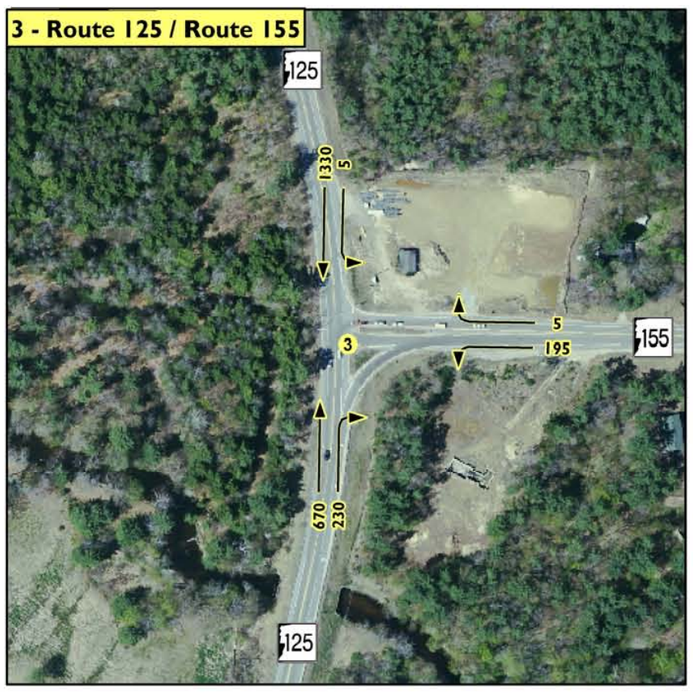
* Volume to capacity ratio

\+ Average delay per vehicle (sec)

^ Intersection Level of Service






**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

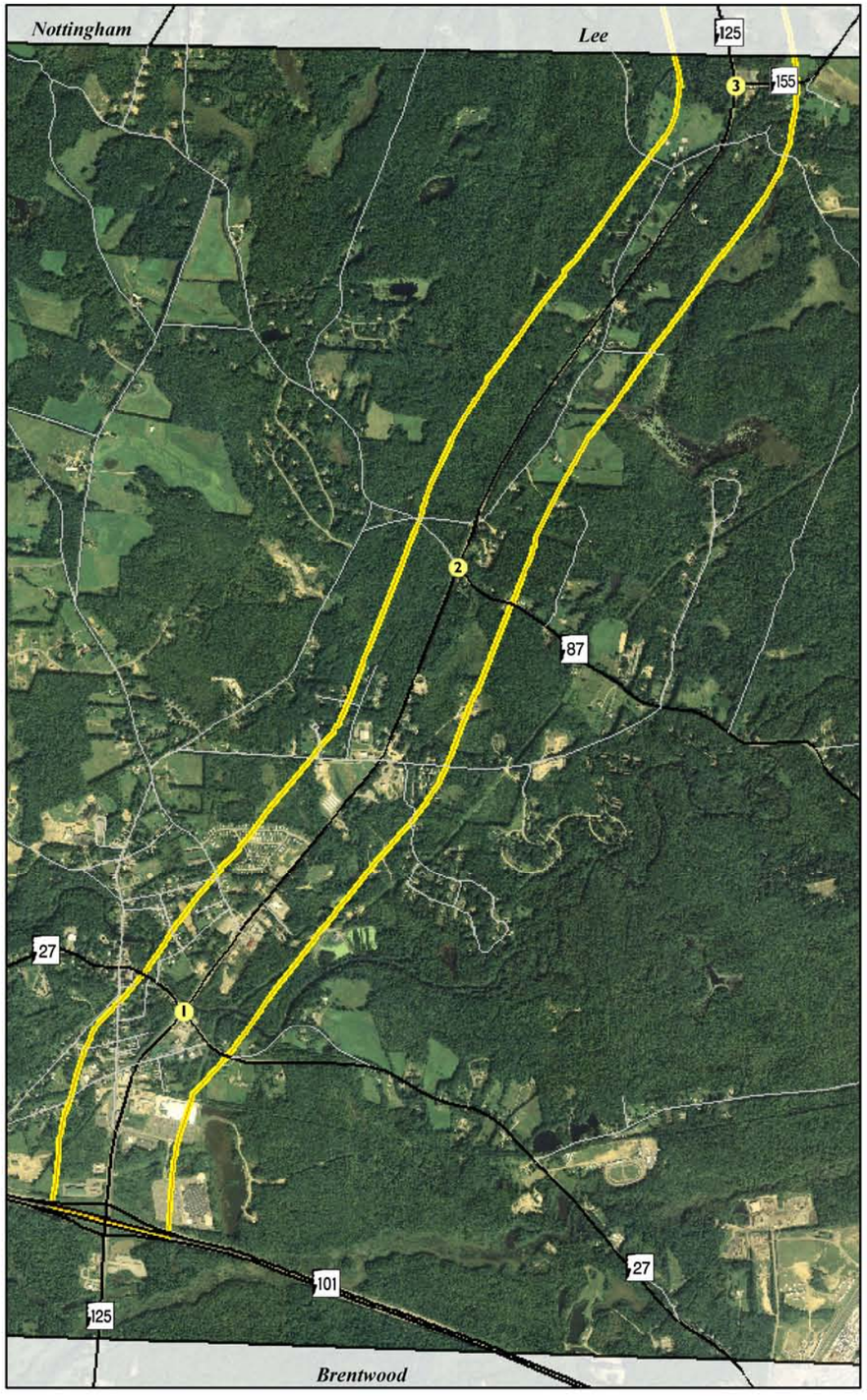
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

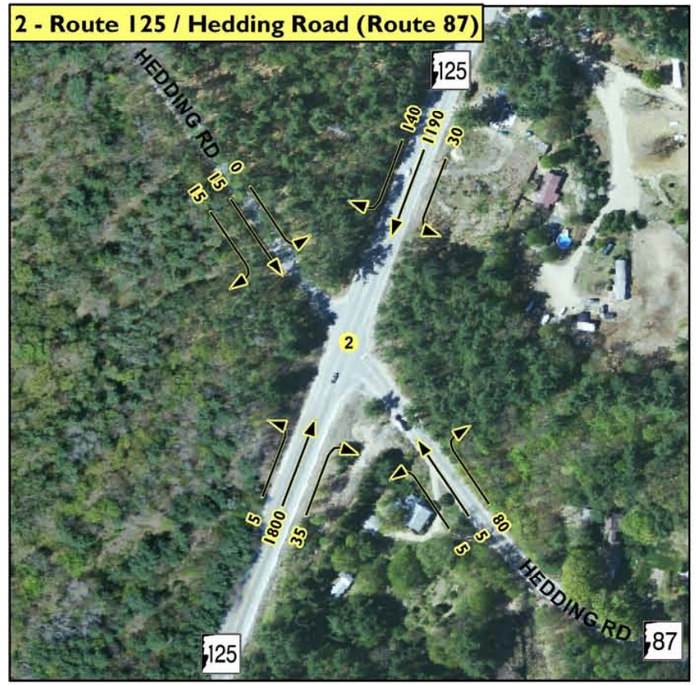
Figure 29

2027 Future Weekday Morning
Peak Hour Traffic Volumes
Epping

NH Route 125
Corridor Management Study











**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

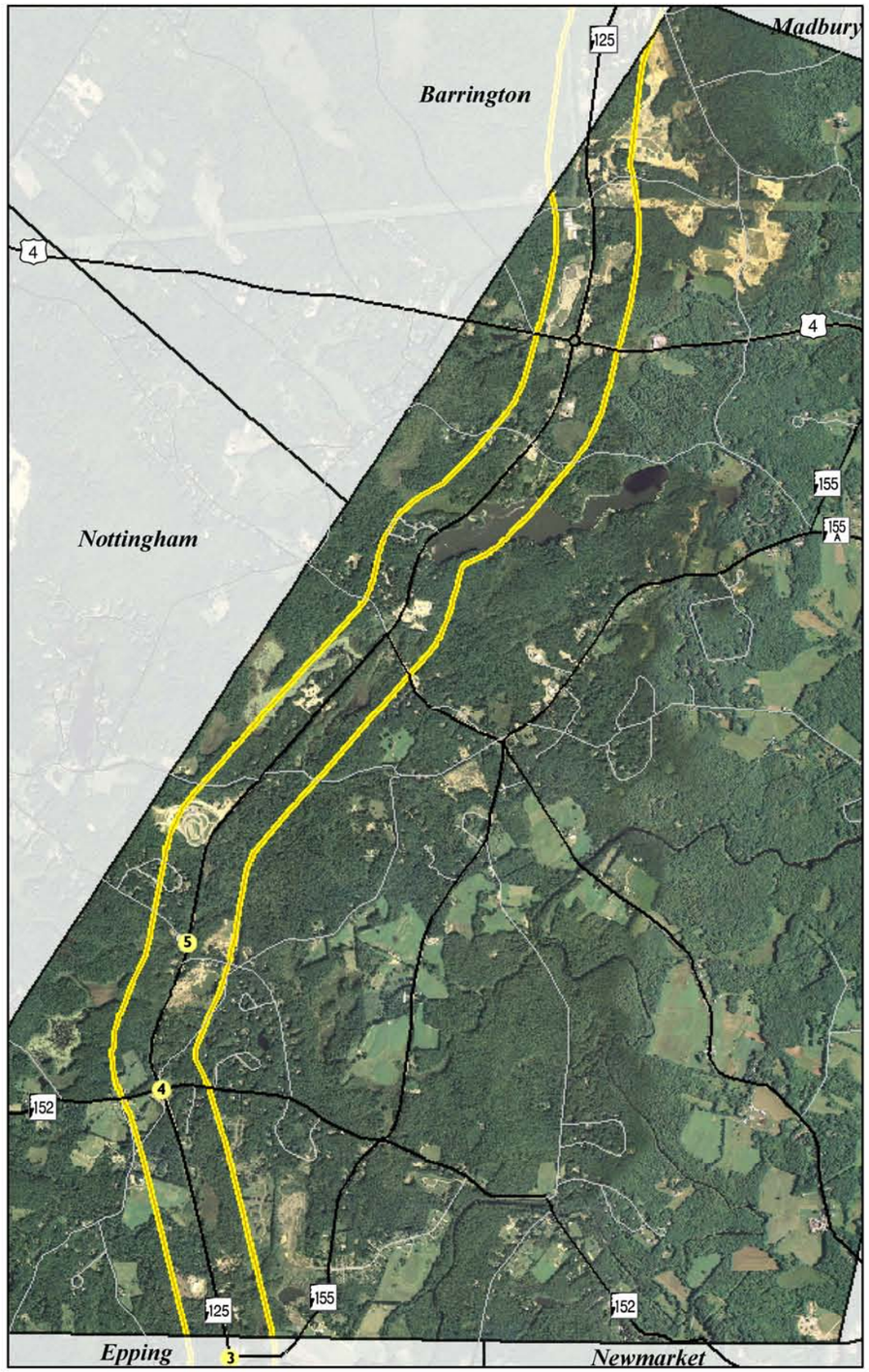
0 250 500 Feet

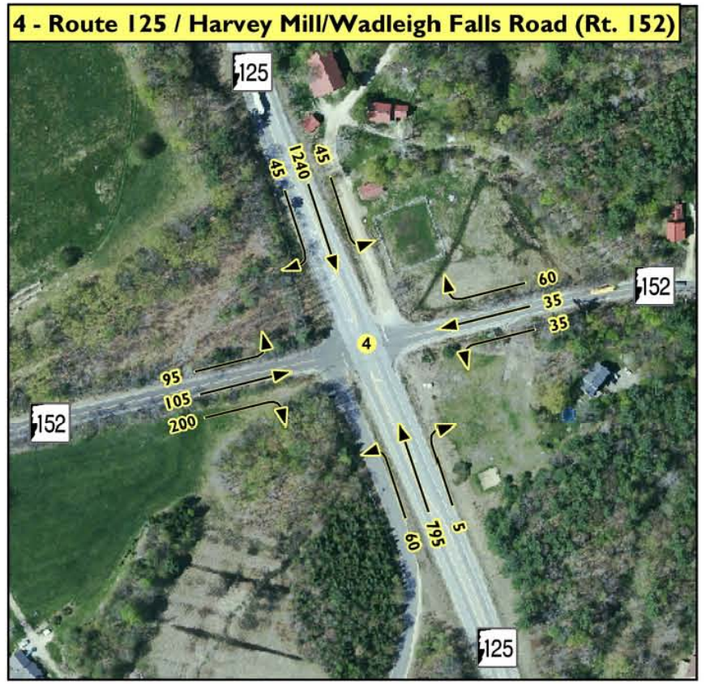
***Vanasse Hangen Brustlin, Inc.***

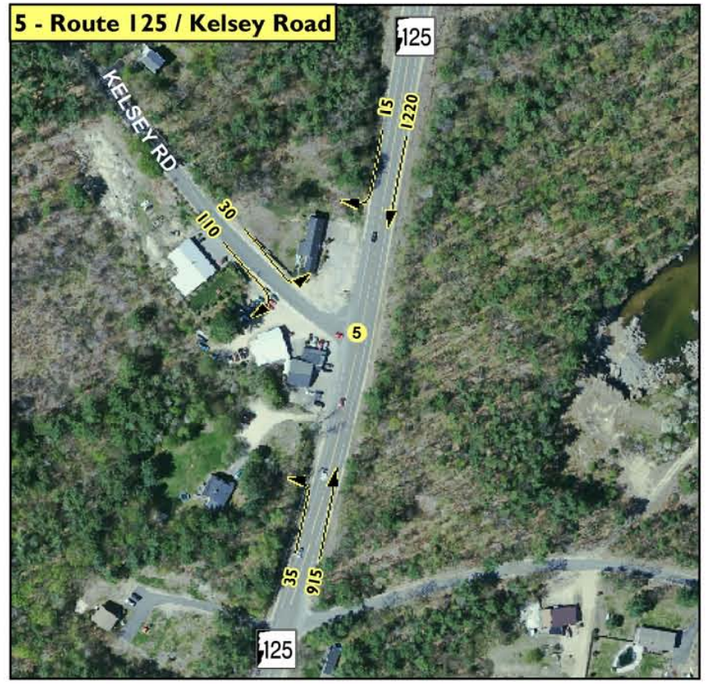
Figure 30

2027 Future Weekday Evening
Peak Hour Traffic Volumes
Epping

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT,VHB, ESRI

0 1,750 3,500 Feet

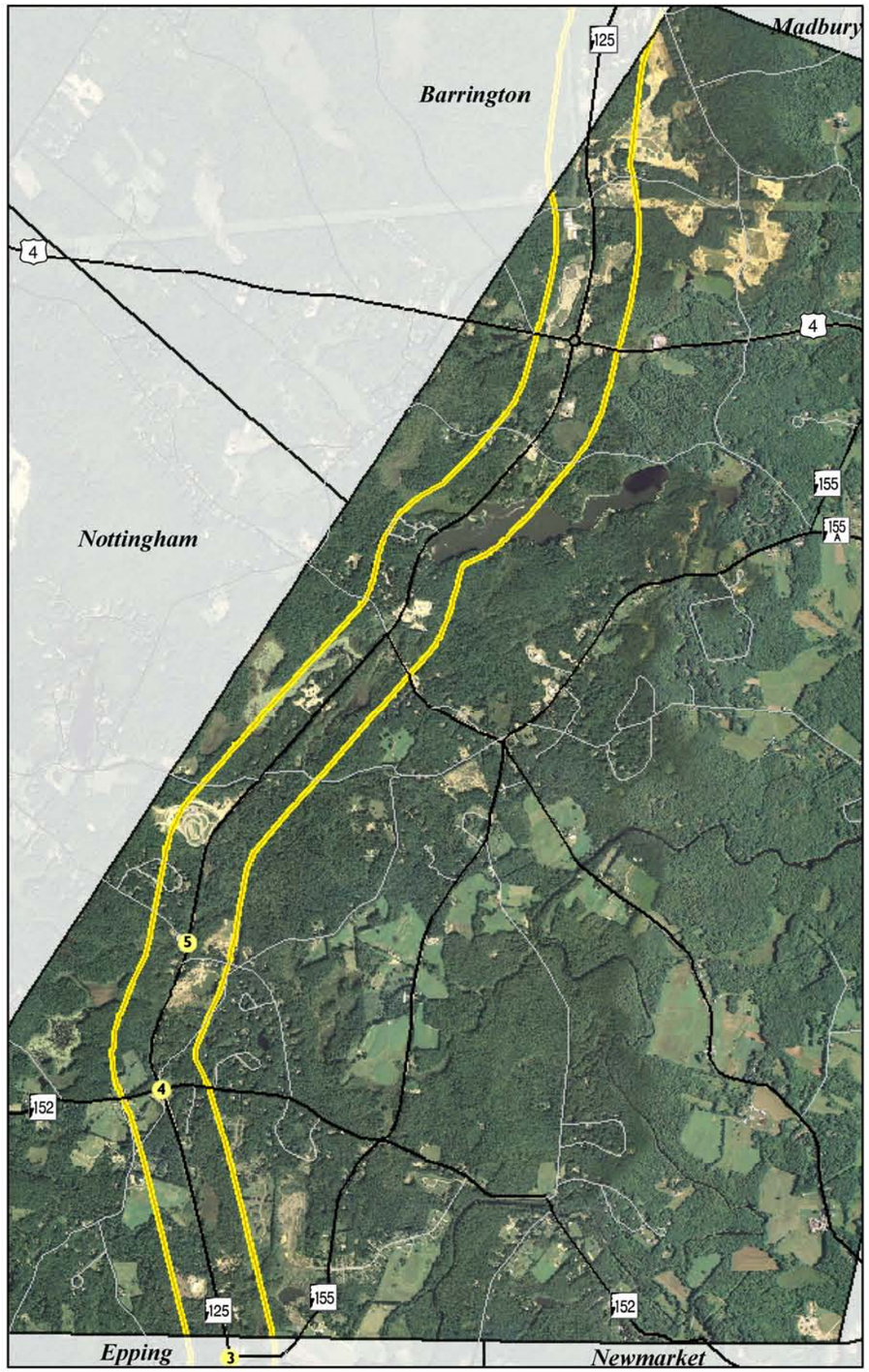
0 250 500 Feet

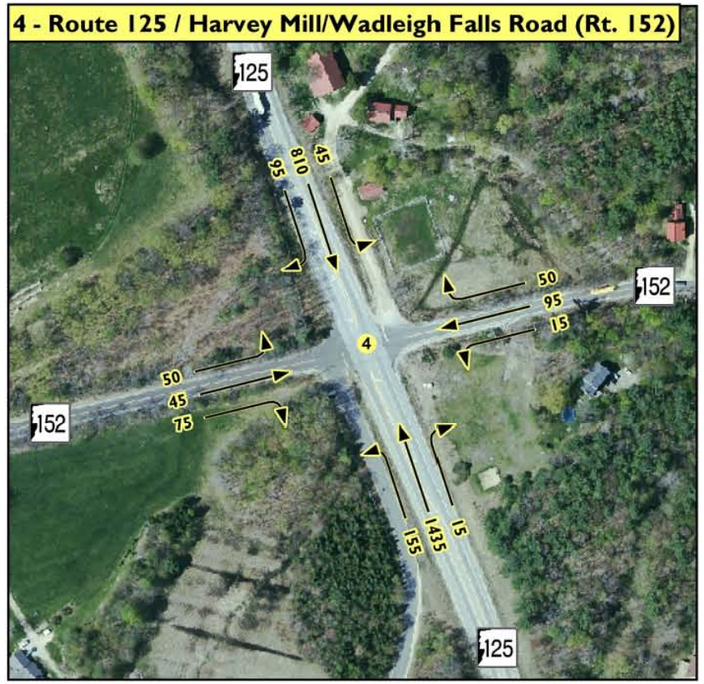
***Vanasse Hangen Brustlin, Inc.***

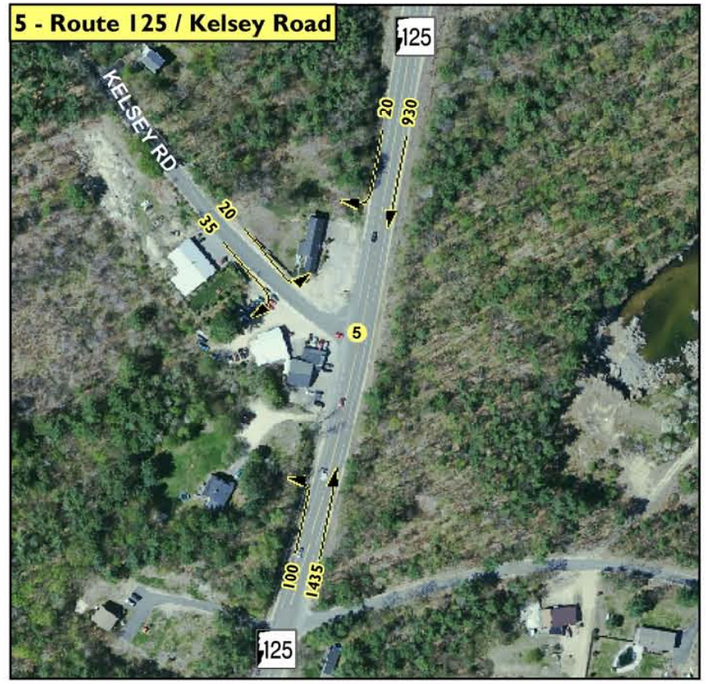
Figure 31

2027 Future Weekday Morning
Peak Hour Traffic Volumes
Lee

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT,VHB, ESRI

0 1,750 3,500 Feet

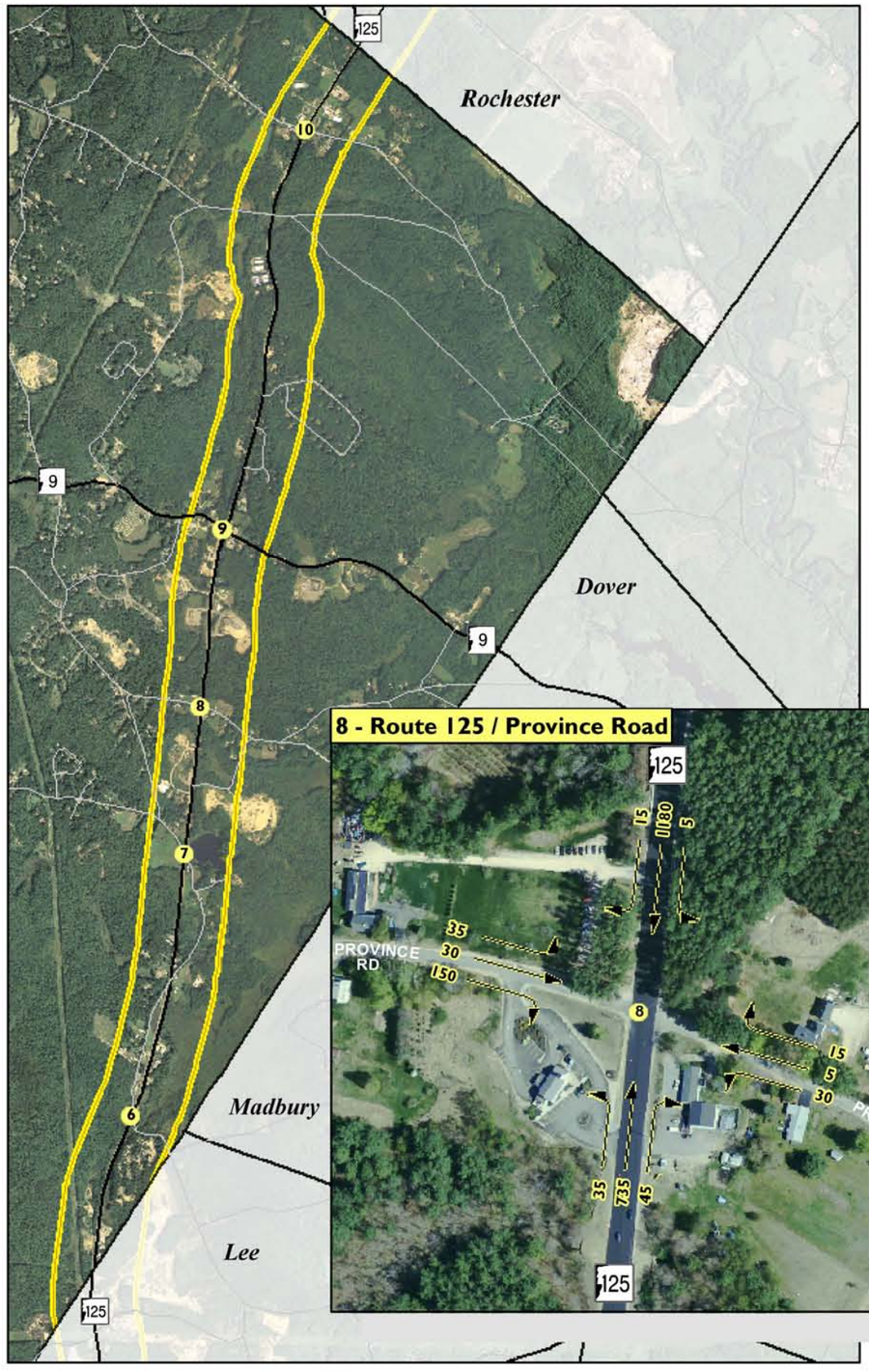
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 32

2027 Future Weekday Evening
Peak Hour Traffic Volumes
Lee

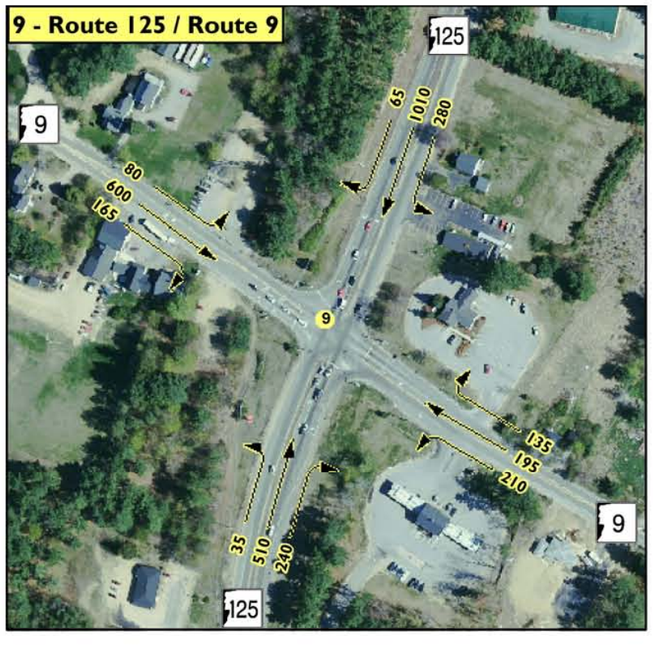
NH Route 125
Corridor Management Study













**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

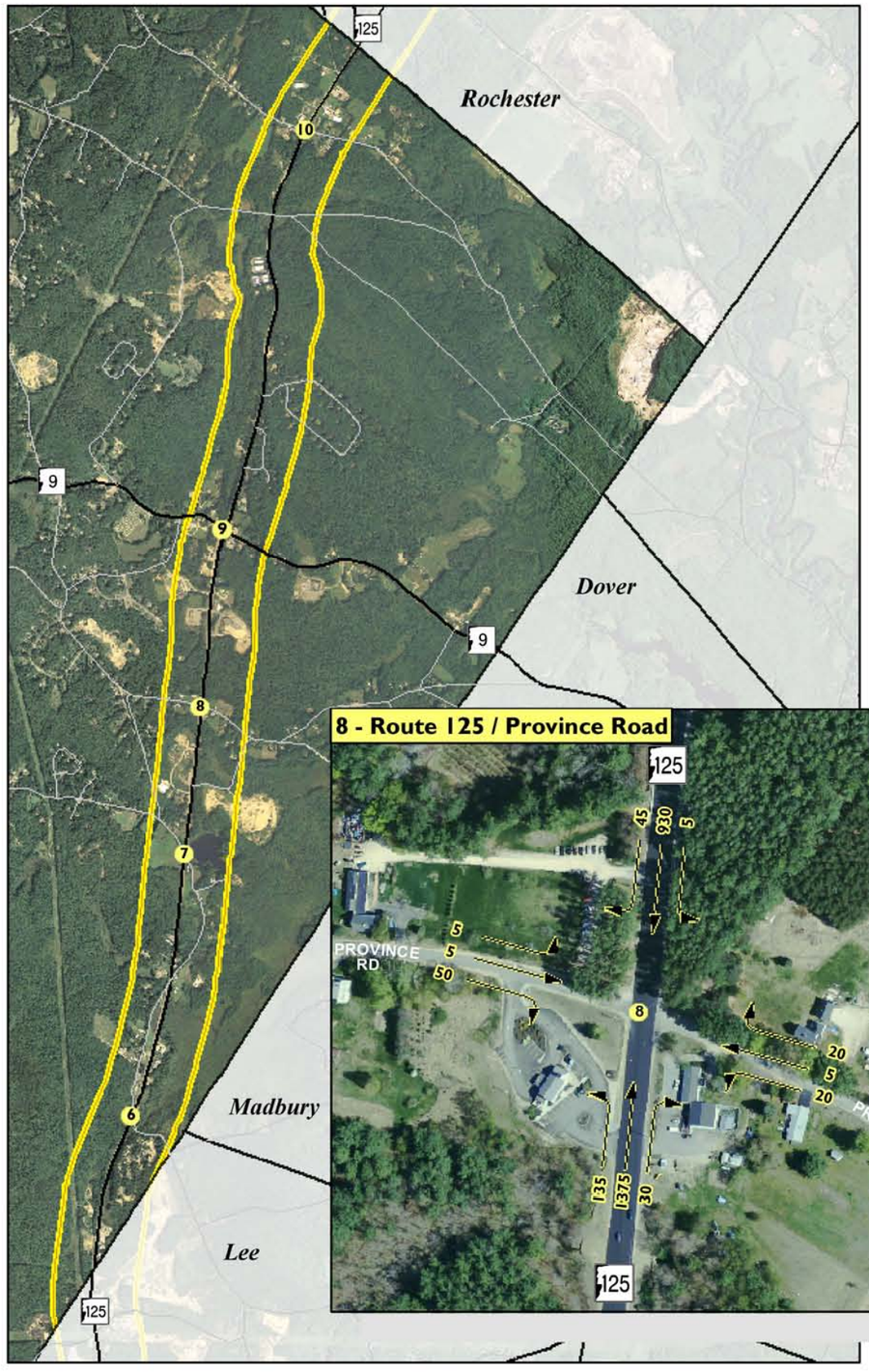
0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 33

2027 Future Weekday Morning Peak Hour Traffic Volumes
Barrington

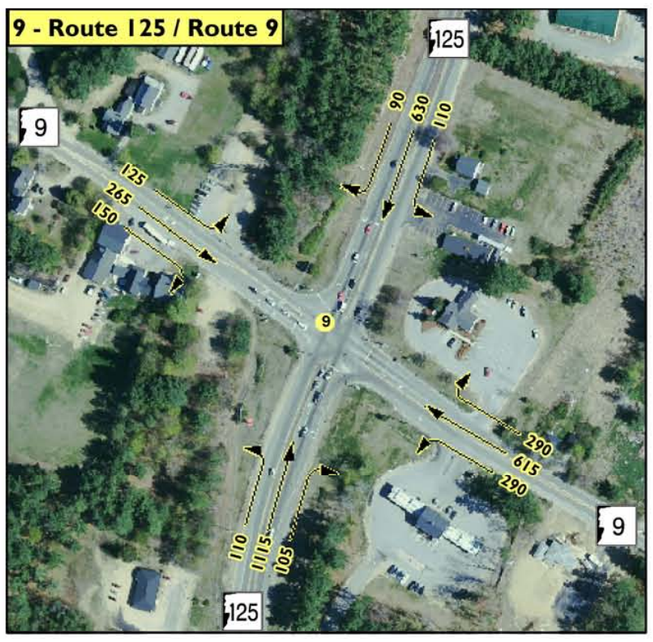
NH Route 125
Corridor Management Study













**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,750 3,500 Feet

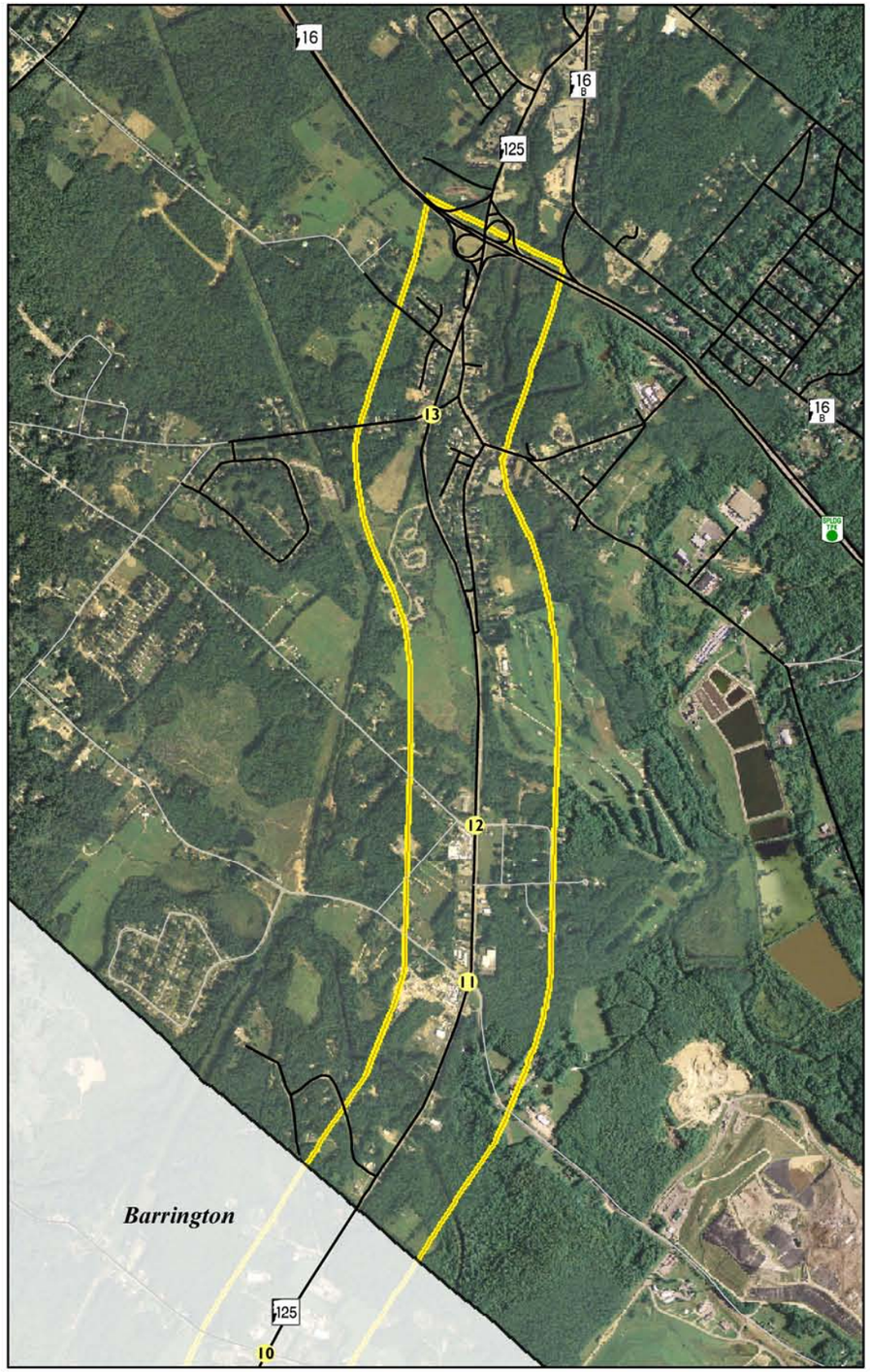
0 250 500 Feet

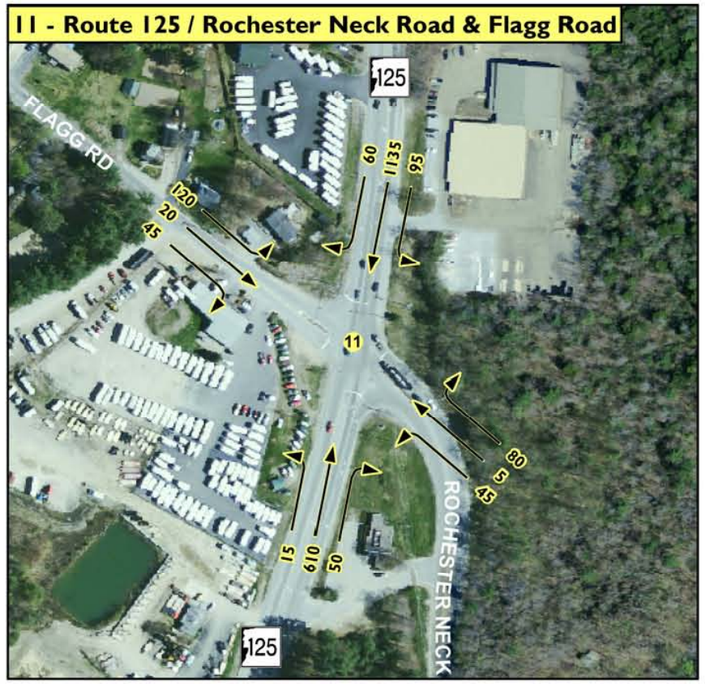
***Vanasse Hangen Brustlin, Inc.***

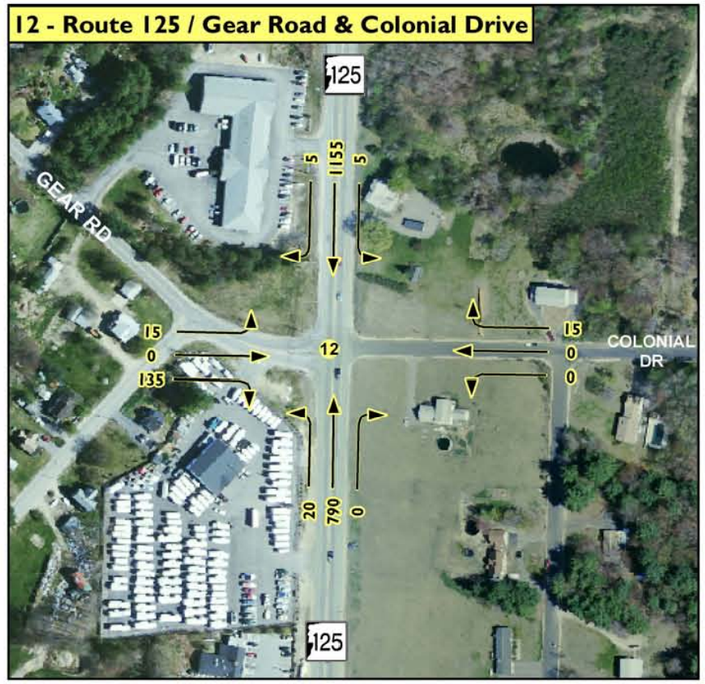
Figure 34

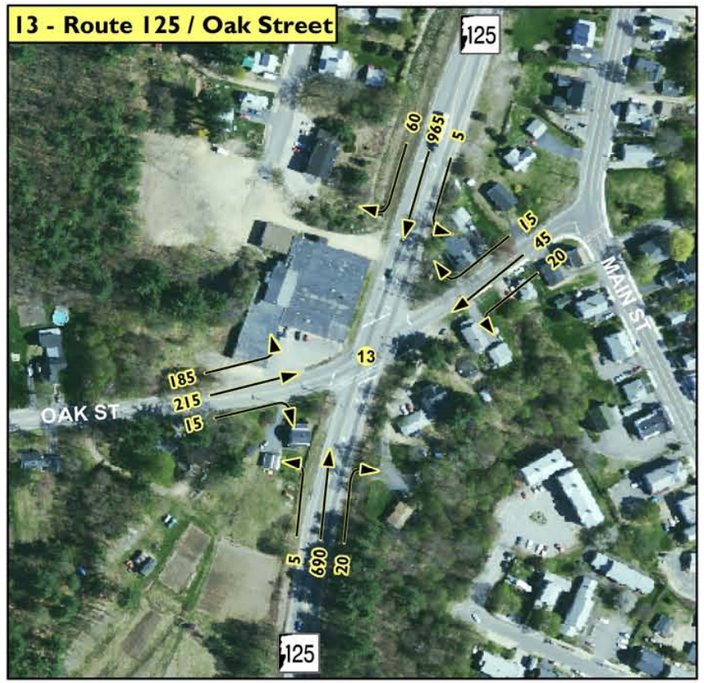
2027 Future Weekday Evening Peak Hour Traffic Volumes
Barrington

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

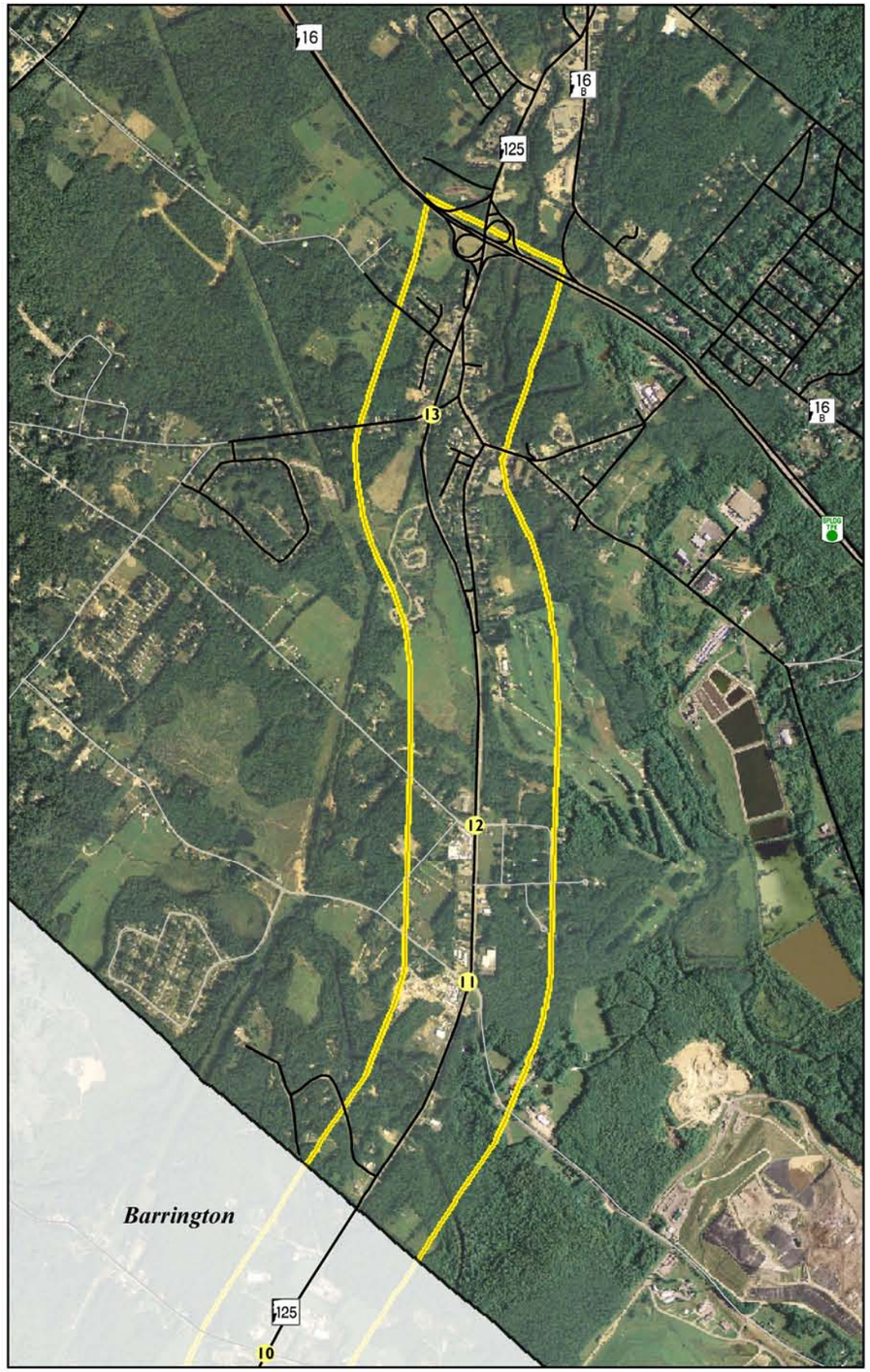
0 250 500 Feet

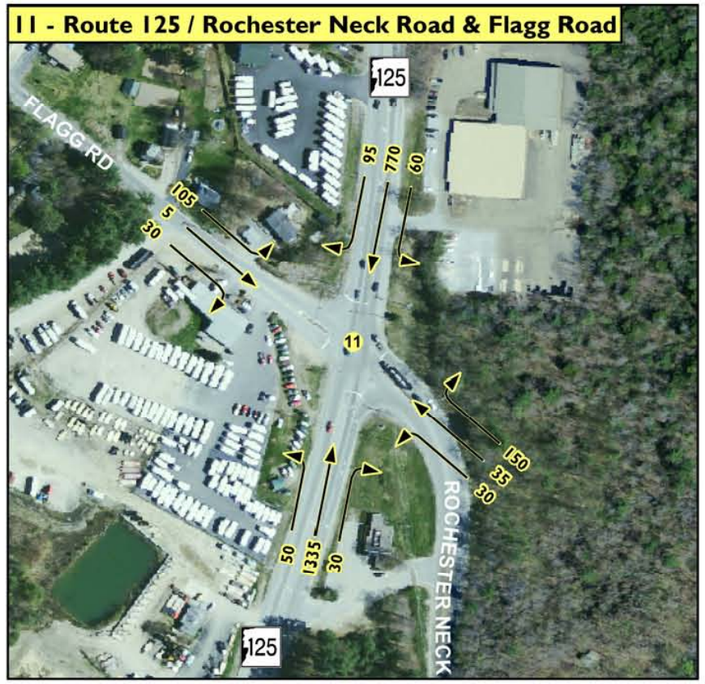
***Vanasse Hangen Brustlin, Inc.***

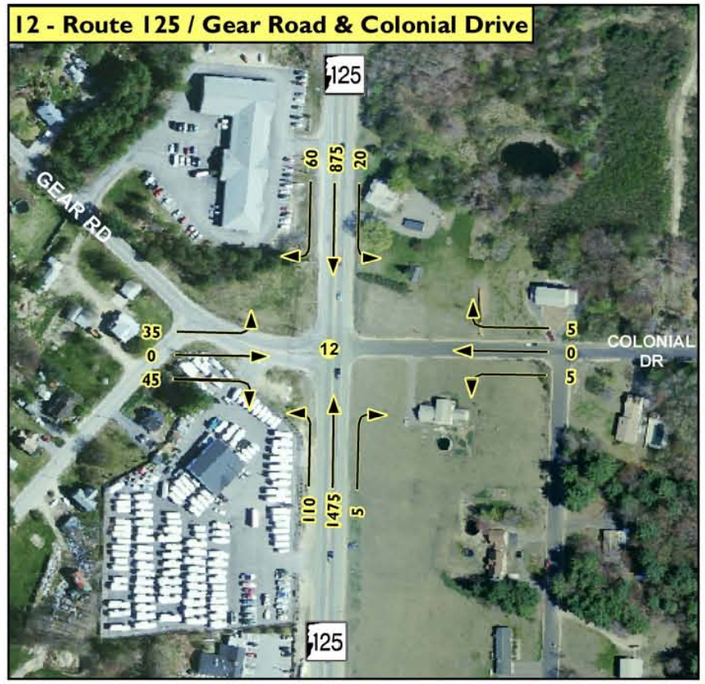
Figure 35

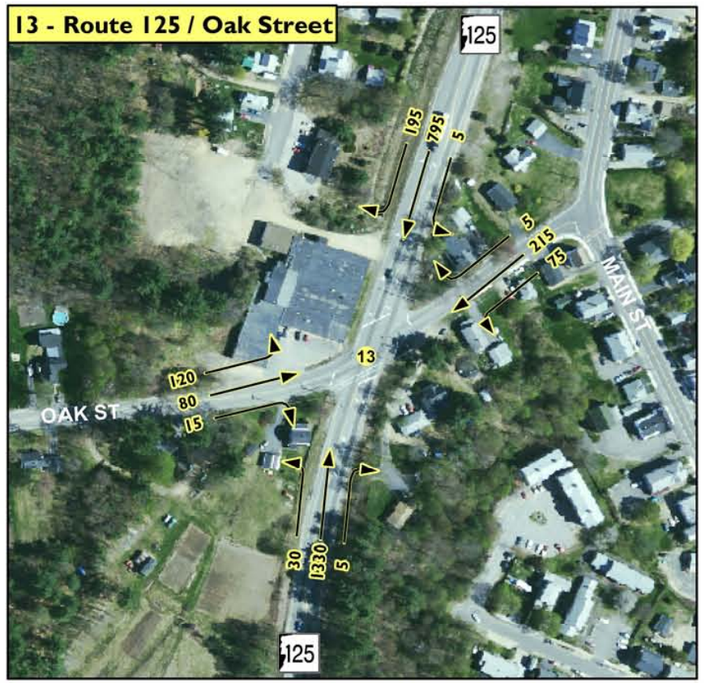
2027 Future Weekday Morning
Peak Hour Traffic Volumes
Rochester

NH Route 125
Corridor Management Study




**Legend**

- Intersection of Interest
- Municipal Boundary
- Route 125 Study Area

Source: NHGRANIT, VHB, ESRI

0 1,250 2,500 Feet

0 250 500 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 36

2027 Future Weekday Evening
Peak Hour Traffic Volumes
Rochester

NH Route 125
Corridor Management Study

## ACCESS MANAGEMENT

There was a time when state agencies and municipalities could design safe and efficient roadway systems with little or no coordination with the local planning agencies and boards who were responsible for land use and development decisions. In recent years both state agencies and municipalities have come to recognize that there is a much better way - through the implementation of access management. Access management balances mobility and access to improve the efficient movement of traffic while enhancing safe and efficient access to and from properties. In order for access management to be effective, it requires that land use planners, developers, property owners, officials, land use boards and roadway designers work together.

"Access management is the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway."[4] Some specific benefits of access management include:

- Safer and more efficient access to properties
- Fewer and less severe automobile crashes
- Fewer auto/pedestrian conflicts
- Less congestion
- Reduced travel delays
- Reduced fuel consumption
- Increased and preserved traffic capacity
- Enhanced corridor aesthetics
- Enhanced community character
- Reduced diversion of traffic onto local streets

Along a growing and regionally important transportation corridor such as NH 125, a well conceived access management plan is a necessity. Based on input received at the public meetings and from the Community Advisory Committee, it is clear that the communities of Epping, Lee, Barrington, and Rochester recognize the value of access management and are eager to partner with the New Hampshire Department of Transportation (NHDOT) in the planning and implementation of a consistent access management plan for the NH 125 corridor. Therefore development of the corridor improvement plan will incorporate a well conceived access management plan. The corridor improvement plan is accompanied by a Memorandum of Understanding (MOU) between the NHDOT and each local municipality. The MOU describes the processes for the development of an access management plan by the municipality in collaboration with the NHDOT and SPRC. The Town of Barrington executed this MOU with the NHDOT in 2007, the first community in the state to do so. The MOU will provide the local land use boards with an effective tool to enhance the safe and efficient operation of the corridor. When development projects are presented to the local Planning Boards, the Boards will be able to require applicants to incorporate access management techniques such as shared driveways and internal connection roadways into site plans, consistent with the approved access management plan.

♦

4 Access Management Manual; Transportation Research Board, Washington, D.C. 2003

Beyond the specific access management elements that will be included in the corridor improvement plan, this section of the report describes general access management guidelines and standards that can be used to guide future development along the corridor. The guidelines presented in this report are consistent with those developed as part of a similar study and adopted by the communities of Plaistow and Kingston located further south along NH 125.

The following sections describe the primary access management elements that will be incorporated into the corridor improvement plan as well as the suggested access management guidelines.

### Access Management Elements

There are many access management techniques that can be used to improve the efficient movement of traffic while enhancing safe and efficient access to properties. In the case of NH 125, the most important short-term need is to establish designated locations along the corridor where motorists turning left onto or off the corridor can enter and leave the corridor safely. This can be accomplished by establishing well-spaced signalized intersections with connector roadways or internal connections between parcels that would allow as many left-turn movements to occur at the signalized intersection as possible. With the establishment of the signalized intersections and connector roadways, a raised center median could be placed along the corridor to restrict left-turn movements beyond the signalized intersections. Note that preliminary discussions of these various alternatives at the public meetings suggest little support for a raised median – at least at this time. The advantages and disadvantages of each of these access management elements are described briefly.

#### Traffic Signal Spacing and Coordination

Traffic signal control and roundabouts provide a safe and efficiently means of accessing the corridor, particularly for motorists turning left onto the corridor. Given the number of existing signalized intersections along the corridor and that community input did not reveal a desire for roundabouts, the principal access to the corridor at signalized intersections is recommended. The corridor plan identifies the major access points along the corridor that should have signal control, where many of the corridor's left-turn movements would be accommodated safely.

The spacing of signalized intersections can have a dramatic influence on the safe and efficient movement of traffic along the corridor. Management of signal spacing includes planning for the frequency of signals, as well as the uniformity of their spacing. Some groups of traffic signals, if spaced properly can operate as a coordinated signal system.

To attain the maximum efficiency from a **coordinated traffic signal system**, traffic signals should be spaced approximately one-quarter mile and no more than one-half a mile apart. Given the extended length of the corridor, it is likely that only signalized intersections in the southern end of the corridor in Epping and in the northern end of the corridor in Rochester would be suitable for signal coordination. There are currently eight traffic signals within the study corridor (which does not include the signals at the NH 101 interchange in Epping or the

Spaulding Turnpike interchange in Rochester. The corridor plan, which is presented in the Recommended Corridor Plan section of the report (refer to pages 42-52), will include up to 13 additional traffic signalized intersections.

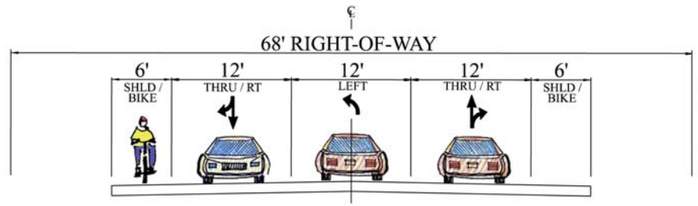
**Signalized Intersection Alternatives**

There are alternatives to consider with the installation of traffic signal control. Ultimately, the long-term plan would require that the lane use on NH 125 at signalized intersections consist of an exclusive left-turn lane, a through lane, and a shared through/right-turn lane in each direction. This ultimate cross section would also include a raised center median as well as a bike lane and sidewalk along each side of the roadway. The sidewalk alternative would be provided in areas of high pedestrian activity. Depending on a number of factors such as available right-of-way, costs, compatibility with other upgrades in the area, and opportunities for private funding through private development off-site mitigation of impact, construction of the ultimate cross section may not be the best initial alternative.

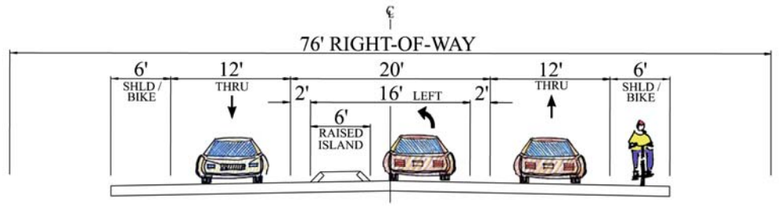
The following diagram presents four alternative cross sections for the phased construction of the signalized intersections proposed for the corridor. All four alternatives would provide an exclusive left-turn lane along NH 125. However, Alternatives 1 and 2 would be limited to providing only a single through lane in each direction, while Alternatives 3 and 4 would provide two through lanes in each direction. Alternative 1 would be the minimal cross section with a 12-foot wide left-turn lane (without a raised median). Alternative 2 would provide a slightly wider cross section with a 20-foot center area to accommodate the left-turn lane and a raised median.

Alternatives 3 and 4 would each provide two through lanes per direction with the exclusive left-turn lane and the raised center median. Alternative 4 would provide the full cross section with the side walk. Alternatives 3 and 4 would require a 100-foot right-of-way while Alternatives 1 and 2 would only require rights-of-way of 68 feet and 76 feet respectively (assuming a 10-foot wide buffer on each side). Consideration should be given to the most appropriate intersection cross section at the time a specific project is being considered. The specific project could be a planned NHDOT project or possibly a private sector development project being constructed in an effort to mitigate the development's traffic impact.

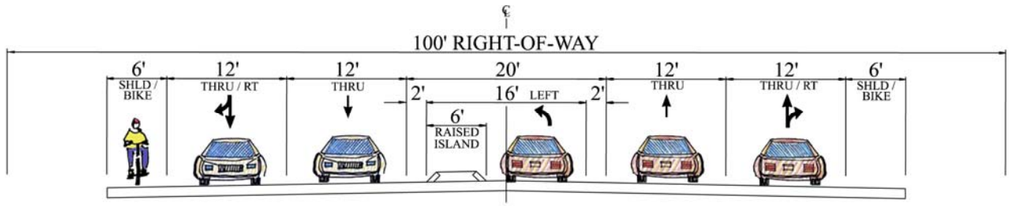
**Signalized Intersection Geometric Alternatives**



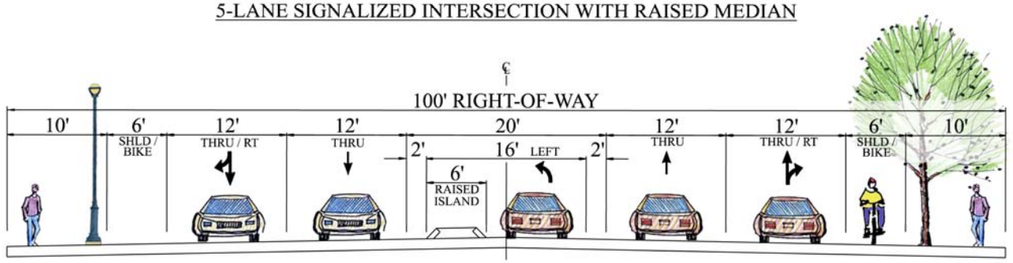

3-LANE SIGNALIZED INTERSECTION




3-LANE SIGNALIZED INTERSECTION WITH RAISED MEDIAN




5-LANE SIGNALIZED INTERSECTION WITH RAISED MEDIAN




5-LANE SIGNALIZED INTERSECTION
WITH RAISED MEDIAN SIDEWALK AND STREETSCAPE TREATMENTS

## Connector Roadways

Having established the locations of the signalized intersections, **connector roadways** can be used to provide numerous properties access to the signalized intersections. The next important step is to identify locations where the number of parcels having access to these signalized intersections could be maximized. This can be done by the construction of connector roadways or sometimes by simply providing internal connections between adjacent properties. As development proposals come before the local Planning Boards, each of the communities should require developers, when possible, to build connector roadways and internal connections or provide easements for them. These connections should be designed to allow motorists access to and from adjacent properties and access to the corridor at the signalized intersections.

## Raised Center Median

Having established the locations of the major signalized intersections along the corridor and having provided the means to access these signalized intersections through connector roadways or internal connections, it now becomes possible to restrict uncontrolled left-turn movements beyond signalized intersections with a raised center median. A raised center median can be a very effective access management tool because it not only separates directional traffic flow, but more importantly it eliminates uncontrolled left-turn movements. Left-turn movements adversely impact traffic flow and are far more likely to be involved in vehicular crashes than right-turn movements. The placement of a raised center median has the effect of restricting driveway and side street turning movements to right-turn in and right-turn out.

## Other Access Management Guidelines

MINIMUM DISTANCE BETWEEN DRIVEWAYS. The minimum distance between driveways on the same or opposing side of NH 125, including all road intersections, shall be measured from the centerline of the driveways at the right-of-way line and shall be a function of the posted speed in accordance with the following table:

**MINIMUM DISTANCE BETWEEN DRIVEWAYS**

| Highway Speed | Minimum Spacing |
|---|---|
| 35 | 150’ |
| 40 | 185’ |
| 45 | 230’ |
| 50 | 275’ |

SOURCE: "*Access Management for Streets and Highways*," Federal Highway Administration, 1982

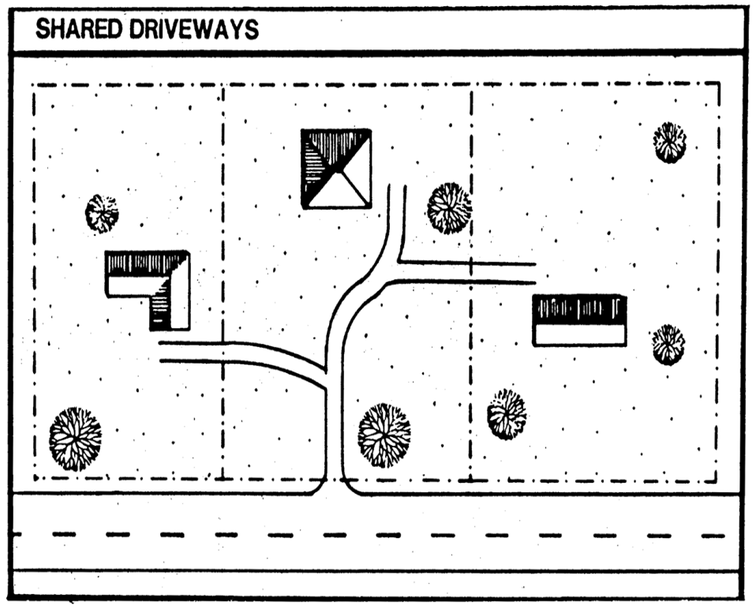
The centerlines of all new driveways should be aligned with driveways, and road intersections on the opposing side of NH 125, if they exist. If such an alignment is not feasible, the driveways shall be offset in accordance with the above minimum spacing criterion.

DRIVEWAY WIDTH. Commercial driveways shall not exceed 36 feet in width, measured perpendicular to the driveway at its narrowest point. The driveway shall be flared at the property line with minimum radii of 25 feet. All driveway entrances (regardless of the presence of curbing on NH 125) shall be curbed from NH 125 to at least the end of the radii at the driveway throat.

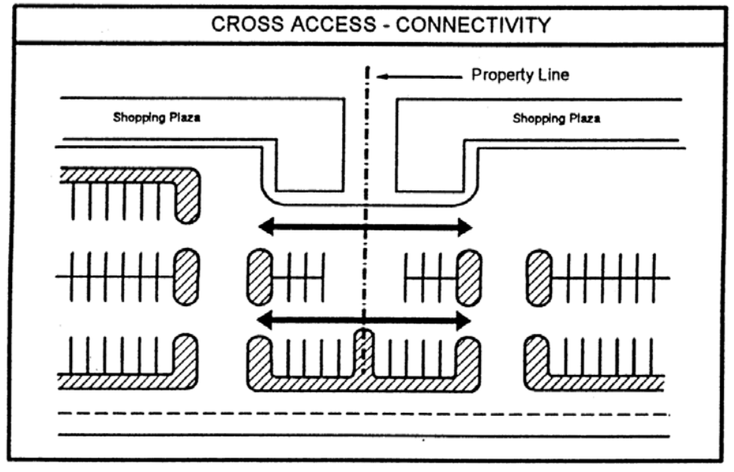
MAXIMUM NUMBER OF DRIVEWAYS PER LOT. Lots which have frontage only on NH 125 shall be allowed a single driveway, except that two, one-way driveways may be substituted for a singular full access driveway, provided that the minimum required distance between driveways can be met.

SHARED DRIVEWAYS. In order to minimize the number of driveways along NH 125, shared driveways shall be encouraged for adjacent properties. The following ***(OPTIONAL)*** dimensional requirements may be reduced if shared driveways are provided as follows:

- The minimum lot size and the minimum road frontage shall be reduced by a total of 10% if the entire site is accessed by a single shared driveway with an adjacent site.
- The minimum lot size and the minimum road frontage shall be reduced by a total of 20% if the entire site is accessed by a single shared driveway with an adjacent site on a highway other than NH 125, and which is appropriately zoned for the use.



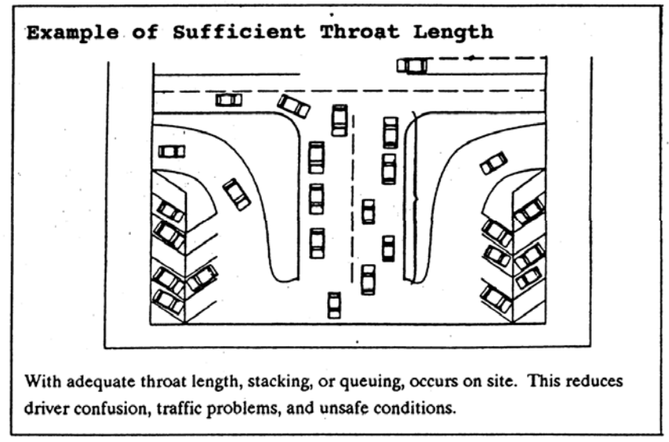

INTERCONNECTING DRIVEWAYS. It is recommended that projects subject to Site Plan Review should provide interconnecting driveways or easements for future construction of interconnecting driveways. This would provide for and promote vehicular and pedestrian access between adjacent properties without accessing NH 125. New development should be designed to provide safe and controlled access to adjacent developments and easements to adjacent properties. Every effort should be made by the Planning Board to require construction of these driveways in anticipation of future developments.




ACCESS TO LOTS WITH MULTIPLE FRONTAGES. It is recommended that lots with frontage on both NH 125 and an adjacent or intersecting road shall not be permitted to access NH 125, except where it can be demonstrated that other potential access points on the adjacent or intersecting road would cause greater environmental or traffic impacts.

ADEQUATE ON-SITE CIRCULATION AND STORAGE. Adequate number of parking spaces, aisle widths, raised medians, and tractor-trailer access, promotes safe and efficient movement into and out of the site.

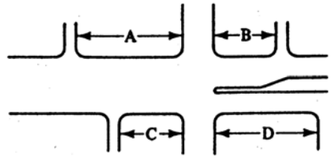
DRIVEWAY (THROAT) LENGTH. The minimum length of a driveway shall be of adequate length to accommodate the queuing of the maximum number of vehicles, as defined by the peak period of operation identified in a traffic study. The driveway shall be designed to accommodate the free flow of traffic onto the site so as to minimize the chance of vehicles backing onto NH 125.




LANDSCAPING, BUFFERING. Landscaping and buffering are especially important along road frontages, and within parking lots. Adequate buffers and properly designed landscaping assists in: the identification of driveway entrances and necessary signage, controlling light diffusion onto abutting properties, and mitigating noise and air pollution. Landscaping located within medians separating aisles of parking spaces controls internal lot circulation and helps to establish safe and efficient traffic patterns.

CORNER CLEARANCES. Lots with frontage on NH 125 and an adjacent or intersecting road, which, due to environmental or traffic impacts, cannot access the adjacent or intersecting streets shall comply with the following standards:

**Minimum Standards for Corner Clearance**




| Distance | Signalized Intersection - feet | Stop Sign Controlled Intersection - Feet |
|---|---|---|
| A | 230 | 115 |
| B | 115 | 115 |
| C | 230 | 85 |
| D | 230 | 115 |

The above dimensions assume a 30 mph operating speed. For rural and other high speed roads, clearances shall be two times as great as the numbers shown.

Source: "Transportation and Land Development," Institute of Transportation Engineers, 1988.

## Multi-Modal

As growth continues along the corridor, it will be important that travelers along and within the corridor have timely and convenient choices in their mode of travel. Just as the access management actions described in the previous section would enhance the efficient movement of vehicular travel, a well conceived multi-modal approach would enhance and coordinate the safe and efficient movement of all travelers (pedestrians, bicyclists, and drivers). Therefore, the corridor plan should both accommodate the movement of all users, and encourage the use of public transportation.

## Pedestrians

Given the diversity of existing and expected future land use along the corridor, the safe and efficient movement of pedestrians within the corridor not only serves to enhance the overall transportation system, but also serves to enhance the quality of life for those who live, work and travel within the corridor. There are numerous ways of accommodating pedestrian movement including the provision of sidewalks, crosswalks, pedestrian activated traffic signals, pedestrian bridges, and multi-use paths. The key to providing a well- connected pedestrian network is to ensure that the particular means of pedestrian access fit within the context and character of the different segments of the corridor.

Sidewalks are paved areas located near the edge of a roadway that are designed to accommodate pedestrian movement along and adjacent to the roadway. Sidewalks in urban settings are typically located directly adjacent to the roadway and separated by raised curbing, are generally wider, and are often separated from the roadway by street tress or planters. In more suburban areas, sidewalks are often separated from the travel way with raised curbing and a landscaped buffer area to provide better separation for the pedestrian from vehicular traffic.


The minimum width for sidewalks is 5 feet, although wider sidewalks are desirable in areas of high pedestrian volumes. Landscaped buffers generally range in width from 2 to 6 feet. If sufficient right-of-way is available, wider buffer areas can be used to increase the separation of pedestrians and motor vehicles, and to provide aesthetic enhancements to the corridor. Wider buffer areas can accommodate a range of street features including trees, benches, and bicycle parking facilities.

Sidewalks may not be desirable along the full length of the NH 125 corridor. However, sidewalks should be provided in the more developed areas of the corridor where it is desirable to link residential, employment, shopping, and recreational uses and activities. These areas include the southern portion of the corridor along the commercial area of Epping, the segment just north of the Traffic Circle in Lee, the Town Center zone in Barrington and along segments in the Village of Gonic in Rochester to provide connectivity between residential neighborhoods. Where sidewalks are intersected by major driveways or side streets, crosswalks and pedestrian ramps should be provided.

## Crosswalks and Pedestrian Activated Traffic Signals

Crosswalks are areas of a roadway that are designated for the use of pedestrians and bicyclists to cross the roadway or travelway. These areas are usually delineated by pavement markings and/or signage. Crosswalks can be located at intersections or at mid-block (between intersections) and can be placed under traffic signal control or not.

Along heavily traveled roadways such as NH 125, crosswalks would likely be placed at intersections rather than between intersections for safety reasons. Crosswalks would be provided at major driveways and side streets where pedestrians walk parallel to the corridor on sidewalks. Although pedestrian crosswalks on heavily traveled roadways such as NH 125 would generally be placed under traffic signal control, many of the existing traffic signals along the corridor currently do not provide crosswalks or pedestrian activated traffic signals. The Manual on Uniform Traffic Control Devices (MUTCD) provides eight (8) separate warrants for the installation of traffic signals, two of which relate directly to pedestrians.

The recommendations section identifies specific corridor intersections in each community where crosswalks and pedestrian activated traffic signal control should be considered.

## Pedestrian Bridges

There are times when accommodating pedestrian crossings on a high volume roadway at traffic signals would not provide the connectivity or measure of safety desired by some communities. In those cases, a pedestrian bridge may be the right solution. Other reasons to consider a pedestrian bridge would be at locations where a high number of children or senior citizens may cross at traffic signalized intersections. Additionally, pedestrian bridges should be considered in areas where the roadway is wide resulting in long crosswalks or where traffic volumes and travel speeds are high. Note that pedestrian bridges need to be designed to accommodate pedestrians with disabilities.

One area along the NH 125 corridor where a pedestrian bridge should be considered is in Barrington in the vicinity of Route 9 where the Town has approved a Town Center zone. Although pedestrians can be accommodated at the existing traffic signal at Route 9 or at future traffic signalized intersections, the provision of a pedestrian bridge at this location would provide much better connectivity throughout the entire Town Center, as the Town Center is planned to encompass both sides of NH 125.

Consideration could also be given to providing a pedestrian tunnel under NH 125. However, there are some negative factors that would need to be considered with a pedestrian tunnel, which may include lighting, security, and drainage requirements.

## Multi-Use Paths

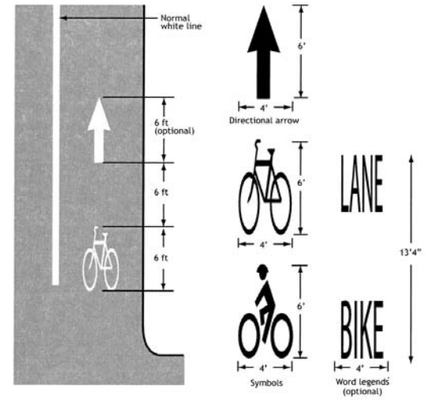
Multi-use paths can provide pedestrians and bicyclists the type of connectivity that encourages people to get out of their cars and walk or ride. These multi-use paths serve many uses including recreational, commuting, as well as for getting around town. Multi-use paths can be paved or non-paved, short in length to simply provide a connection between a residential area and a corner grocery store, or fairly lengthy, such as the Rockingham Recreational Trail, extending 27 miles from Manchester to Route 108 in Newfields. The Recommendations section describes how the corridor improvement plan can better integrate the Rockingham Recreational Trail and the NH 125 corridor in Epping, and provide connections between Gonic Village and the approved Village Center zone in Barrington.

**Example of a Multi-Use Path**

## Bicycles

Similar to the accommodations for pedestrians, bicycle accommodation must fit into the context and character of the corridor. One way to do this is to provide a designated bicycle lane along the corridor. A bicycle lane is a portion of the roadway's travelway that is designated for bicycle use. The minimum width for a bicycle lane is 4 feet along roadways without curbing. A 5-foot width is generally preferred in areas where curbing is provided. Along roadways where higher travel speeds (50 mph or greater) are expected, a 5-foot width would generally be considered minimum, and a 6-foot width preferred.

To encourage the use of the roadside bicycle lane, bicycle lane markings and signing should be provided to alert motorists to expect bicycle travel along the corridor (see figure at right). At the time of design, consideration must be given to providing a smooth and consistent bicycle lane surface. For example, drainage inlet grates or utility covers must be designed flush with the pavement surface. Rumble strips, raised pavement markings and embedded reflectors should not be placed within the bicycle lane. The roadway must be designed with sufficient drainage to eliminate the ponding of water in the bicycle lane. Lastly, traffic signals should be designed to detect and respond to bicycles.




Source: Guide for the Development of Bicycle Facilities, AASHTO, 1999. Chapter 2 Design
Manual on Uniform Traffic Control Devices, FHWA, 2003. Chapter 3 Pavement Markings

## Public Transit

As growth continues along NH 125, public transit service will need to play a greater role in reducing travel demand along the corridor. There is currently no regular bus service that covers the NH 125 study corridor. As traffic demand continues to grow along the corridor demand for bus service would be expected to increase. Based on input from COAST (Cooperative Alliance for Seacoast Transportation), there are no plans at this time to establish a bus route through the corridor.

Wildcat Transit currently provides local bus service from the UNH campus in Durham to Portsmouth. One of the University's highest priorities for new service routes is from UNH Durham to the northern Spaulding Turnpike corridor. This route would include stops at park and rides at Exits 9 and 13 on the Spaulding Turnpike, and at the park and rides in Barrington at Routes 9 and 125. Construction of a park and ride on Route 4 east of the Lee Traffic Circle would add to the viability of this weekday, commuter based service.

**Park-and-Ride lots** are critical elements of a well-planned multi-modal system as they provide travelers with convenient locations to transfer between automobiles and public transit or between single occupant vehicles and higher occupant vehicles (car pooling). The NHDOT currently has two Park-and-Ride lots within the NH 125 corridor communities, although neither one of them are supported by public transit. The lots include: 246 spaces on NH 125 in Epping south of NH 101 and 20 spaces on NH 9 in Barrington west of NH 125. A 25-space lot at the Sugar Shack on Route 4 in Lee was recently eliminated when the property was sold.

**Epping Park and Ride**

**Barrington Park and Ride**

The NHDOT is proposing to construct a new 200-space park-and-ride facility in Rochester in the vicinity of Exit 13 at the Spaulding Turnpike. Additionally, the NHDOT is investigating replacement of the lost facility at the former Sugar Shack in Lee with a 30 to 50-space facility in the vicinity of the US 4/NH 125 intersection in Lee.

Any future bus routes along NH 125 should maintain bus stops along the corridor. Placing bus stops off the corridor reduces the efficiency of the system as off corridor stops can substantially increase the time required for a bus to travel a single route. The locations of bus stops along the corridor should include sufficient pull-off area out of the traffic stream, bus shelters and well planned pedestrian connections (sidewalks, crosswalks, pedestrian signals, etc.). Bus stops should include maintenance for snow removal.

**Sample Bus Shelter**

# Recommended Corridor Improvement Plan

The Recommended Corridor Improvement Plan for NH 125 attempts to better integrate transportation and land use using smart growth strategies and access management techniques to enhance safety, preserve corridor capacity and most importantly to provide the corridor communities with the guidance and tools to ensure that as development occurs along the corridor, it will occur in a manner that is consistent with the vision and projected growth of each community.

The Plan provides the corridor communities with a great opportunity to better manage growth along the corridor. NH 125 is a state highway but it is also an important local connector through and across each corridor community. For this reason, the corridor communities recognize that each has great influence on how development will occur along the corridor. As development projects are presented along the corridor, it will be important that the strategies, techniques and vision presented in this report be considered by the local land use boards and developers in each community. The Plan is comprehensive and its implementation will take time. However, working together and with the assistance of the Strafford Regional Planning Commission and the New Hampshire Department of Transportation, the corridor communities can transform the corridor into a roadway that has a sense of place within the communities as opposed to simply bisecting the communities.

The needs, desires, and priorities for the corridor will differ by community. However, it is important that each community recognizes the vital link between transportation and land use and how development patterns in one community can impact neighboring communities. It is through the consistent and long-term implementation of the smart growth strategies and access management techniques that are incorporated into the corridor improvement plan that will transform the NH 125 corridor.

The following Smart Growth Guiding Principles[5] were considered in the development of the recommended corridor improvement plan:

- Create a Range of Housing Opportunities and Choices – Providing quality housing for people of all income levels is an integral component in any smart growth strategy.
- Create Walkable Neighborhoods – Walkable communities are desirable places to live, work, learn, visit and play.
- Encourage Community and Stakeholder Collaboration – Growth can create great places to live, work, and play if it responds to a community's own sense of how and where it wants to grow.
- Foster Distinctive, Attractive Communities with a Strong Sense of Place – Smart growth encourages communities to craft a vision and a set of standards for development and construction which respond to community values of architectural beauty and distinctiveness, as well as expanded choices in housing and transportation.
- Make Development Decisions Predictable, Fair and Cost Effective - For a community to be successful in implementing smart growth, the concept must be embraced by the private sector.
- Mix Land Uses – Smart Growth supports the integration of mixed land uses into communities as a critical component of achieving better places to live.
- Preserve Open Space, Farmland, Natural Beauty and Critical Environmental Areas – Open space preservation supports smart growth goals by bolstering local economies, preserving critical environmental areas, improving quality of life, and guiding new growth into existing communities.
- Provide a Variety of Transportation Choices – Providing people with more choices in housing, shopping, communities, and transportation is a key aim of smart growth.
- Strengthen and Direct Development Towards Existing Communities – Smart growth directs development towards existing communities already served by infrastructure, seeking to utilize the resources that existing neighborhoods offer, and conserve open space irreplaceable natural resources on the urban fringe.
- Take Advantage of Compact Building Design – Smart growth provides a means for communities to incorporate more compact building design as an alternative to conventional land consumption.

In addition to the Smart Growth principles, a second principle considered in the development of the recommended plan is that solutions should be planned in a context sensitive manner. As defined by the Federal Highway Administration (FHWA), "context sensitive solutions (CCS) is a collaborative, interdisciplinary approach that involves all stakeholders to develop a transportation facility that fits its physical setting (i.e. land use, developed landscape and development pattern) and preserves scenic, aesthetic, historic and environmental resources, while maintaining safety and mobility for all users." This context sensitive approach was applied to the formulation of the recommended plan.

## Corridor Improvement Plan

The results of the full build-out analysis and environmental constraints analysis, which considered the maximum land use build-out of the corridor under current zoning, revealed that the corridor has the potential for substantial growth – much more than would reasonably be expected to occur in a 20-year future planning horizon. Applying a substantially less but more likely traffic growth rate of 2.0 percent per year over a 20 year period, would result in the existing traffic volume levels increasing by nearly 50 percent during that timeframe. A 50 percent increase in traffic volume would significantly impact the efficiency and safety of the corridor.

**Discussion of Corridor Widening**

Based on initial input received at public meetings, it was clear that although residents of the corridor communities recognize the need to process traffic along the corridor, it was the hope

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5 Smart Growth.org

that major widening (two through lanes in each direction plus turn lanes) for the entire length of the corridor would not be needed. However, the lower range traffic volume projections suggest that most, if not all, of the corridor would eventually require major widening. It is important for each of the communities to understand that given the State's current funding short-fall, it is the NHDOT's stated policy that they will focus their limited available funding for projects on NH 125 that enhance the efficiency of the system rather than projects that simply expand the roadway by adding lanes.

**Access Management and Multi-Modal**
To reduce the need to continue to widen the corridor, or at least delay the need, it will be necessary to more effectively manage the flow of traffic along the corridor as well as to begin to reduce or mitigate for the demand. One of the best ways to better manage the flow of traffic along the corridor is through the establishment and implementation of a well conceived access management plan. The best way to reduce the travel demand along the corridor is to introduce a multi-modal mindset to the users of the corridor. It is for this reason the corridor improvement plan incorporates both access management and multi-modal actions and techniques.

## General

The following is a general discussion of the recommended plan from an overall corridor perspective. The General section is followed by separate sections describing the specific recommendations within each of the four corridor communities. The specific corridor recommendations are presented graphically at the end of the report in Figures 38 through 55.

**Corridor Improvement Elements**
In general, the long-term plan calls for the placement of well-spaced major intersections, which when placed under traffic signal control, would serve to safely and efficiently accommodate left-turn movements. These **major signalized intersections** would ultimately provide two through lanes and an exclusive left-turn lane in each direction on NH 125. As described (see page 36) there are a number of alternative cross sections ranging from a 3-lane section with an exclusive left-turn lane, no raised median, and a single through lane in each direction to an ultimate 5-lane section with an exclusive left-turn lane, raised median, two through lanes per direction, and sidewalks. The decisions on the phased implementation of these various cross sections would consider such factors as available right-of-way, costs, compatibility with other upgrades in the area, and opportunities for private funding through private development off-site mitigation of impact.

**Connector roadways or internal connections** between adjacent properties would provide access to the signalized intersections where left-turn movements can be better accommodated.

The plan also provides specific guidelines for the **placement of driveways** along the corridor. The guidelines cover the spacing and width of driveways as well as the number of driveways that would be permitted on each parcel.

The plan recommends **improved pedestrian and bicycle connectivity** throughout the corridor, including **sidewalks, crosswalks, pedestrian activated traffic signals, the consideration of a pedestrian bridge, designated bicycle lanes** as well as **multi-use paths and trails**. In addition, the plan anticipates a need for future **bus service** and for additional **park-and-ride facilities.**

The recommended roadway cross section provides the flexibility for use of raised **center medians** along particular segments of the corridor or for accommodating left-turn movements with a **center left-turn lane**. Raised concrete center medians could be used along some segments of the corridor while **landscaped medians** could be used in other areas where the purpose would be to complement the aesthetic character of the surrounding land use. Landscaped medians would also serve as **"gateway treatments"** to delineate high activity areas and at **crosswalks** to better alert motorists to pedestrian crossing locations.

**Land Use Recommendations**
In addition to the physical modifications to the corridor, **land use policy recommendations** are provided to ensure that the land use policies for each of the four corridor communities are consistent with the long-term vision for the NH 125 corridor.

There are several sections of the corridor that have higher concentrations of development such as in Epping on the southern end of the study corridor and in Rochester toward the northern end. Numerous curb cuts often result from this pattern of development. The Epping segment of the corridor near the NH 101 interchange is extensively developed, including big box retail, small retail, restaurants, and gas stations. In Rochester, there are some areas of mixed-use along the corridor that are part of the established fabric of the City. This includes a variety of retail, institutional, and residential uses as well as Gonic Village. Expansion of mixed-use development may be appropriate in Rochester. A mixed-use village center is the major element of the proposed zoning revision in the Town of Barrington. In Lee, there are no similarly developed areas along the corridor other than the Lee Circle.

**Mixed-Use Development**
The zoning ordinances for the four communities in the study corridor say little about mixed-use development. This growing trend in the 'smart growth toolkit' should be directly reflected throughout the corridor. Mixed-use can be defined as a single building or group of buildings in a development designed to encourage a diversity of compatible land uses, which include a mixture of two or more of the following uses: residential, office, retail, recreational, light industrial, and other miscellaneous uses. Among the advantages of this technique are the following:

- Reduction in vehicle-trips,
- Less paved surfaces requiring storm water management,
- Fewer curb cuts,
- Fewer required parking spaces, which would typically be located to the rear,
- Increased pedestrian activity, and
- Better connectivity of land uses, and improved design and landscaping.

The typical mixed-use development consists of retail on the first floor and residential or office use above. In a NH 125 setting, the maximum height for such a building would be no more

than three stories. Since it tends to result in a more compact design pattern and possibly greater density, its implementation should be limited to areas where roadway and water/sewer infrastructure exist or can be provided (either by the community or perhaps by private development projects) to support the increased density. Currently, municipal water and sewer is available in the City of Rochester, north of Rochester Neck Road, and in the Town of Epping, south of Lagoon Road. Municipal water and sewer are not provided currently in Lee or Barrington.

**Natural Resource and Open Space Protection**

Given the existence of significant public and sensitive environmental resources along the NH 125 corridor, natural resource and open space protection should be addressed as well. **Conservation Subdivision** development, where smaller residential lots are developed in such a manner as to create larger areas of contiguous open space, is allowed in some of the communities. An additional tool to consider is **Transfer of Development Rights (TDR)**. TDR is a system that assigns development rights to parcels of land and gives landowners the option of using those rights to develop in designated growth areas or receive compensation for development rights. TDRs can be used to promote a couple of different important land use management goals. First, it can be used as a means to ensure that development is concentrated where it is appropriate to do so (i.e. where the capacity of the land or infrastructure can sufficiently accommodate increased development density). Second, it can provide for conservation and protection of land by allowing landowners to transfer the development rights of one parcel to another parcel. As a result, environmentally sensitive land within the corridor can be protected.

By selling development rights, a landowner gives up the right to develop his/her property, but the buyer could use the rights to develop another piece of land at a greater intensity than would otherwise be permitted[6]. For example, one could transfer the development rights from an environmentally sensitive parcel to one where development should be encouraged, such as the approved Town Center in Barrington, thereby preserving important resource areas. Similarly, development can be relocated from an area with no infrastructure to support it while directing it to one that can.

**Low Impact Development**

New methods of preserving existing site hydrology, collectively known as Low Impact Development (LID), have become one way for communities to deal with water quality issues resulting from development. Implementation of LID methods can help communities address recent changes in federal requirements for development as part of the National Pollution Discharge Elimination System (NPDES) Phase II regulations. The Phase II regulations require communities to consider stormwater quality and erosion control when approving plans for new developments. Typically, these regulations apply to all developments that disturb more than 50,000 square feet. The NPDES regulations are geared toward development of comprehensive systems of pollution elimination at the community level. If included under NPDES Phase II regulations, communities are required to enact specific local ordinances for control of stormwater discharges. These require that development projects prepare specific Stormwater Pollution Prevention Plans (SWPPP). If desired, local regulations can also extend jurisdiction to projects smaller than typically covered by state or federal regulations and can be adopted by communities not required to meet the Phase II regulations. Corridor communities should at a minimum require that development projects conform to state and federal law, and can also encourage the use of LID practices and infiltration as the primary means of stormwater treatment and disposal.

Generally, LID is a series of techniques for mimicking predevelopment hydrology in developed sites. The goal of LID is to enhance infiltration into the ground, reduce runoff volumes, and filter runoff water to remove pollutants typically present in stormwater. LID methods also seek to distribute stormwater management throughout a development site rather than to centralize treatment areas. Advantages of LID include the potential for reducing site infrastructure costs, distribution of impacts, attenuation of runoff *volumes* as well as rates, and water quality protection. LID includes methods to more closely resemble and maintain natural hydrologic conditions for maintaining stream base flow, aquifer recharge, and wetland systems. Measures that can be implemented include rain gardens, permeable paving, infiltration areas and structures, and bioretention (constructed wetland treatment areas).

The following is a more detailed discussion of the recommended actions by community.

## RECOMMENDATIONS FOR THE CORRIDOR COMMUNITIES

### Epping

**Connectivity**

The southernmost segment of the corridor in Epping from the NH 101 interchange to the Route 27 intersection is currently experiencing rapid growth of commercial development. Many of the developed properties already have good interconnections between parcels, which allow access to either the traffic signal at Main Street or the signal at Route 27. However, sidewalks should be incorporated within the Wal-Mart-Lowes development and connect to Main Street. Given the size and density of the commercial development in this section of the corridor, sidewalks should be provided along both sides of NH 125, between Main Street and Route 27. Pedestrian crosswalks and pedestrian activated signal control should be provided at each of the intersections.

The Rockingham Recreational Multi-Use Path, which extends approximately 27 miles from Manchester to Newfields, crosses NH 125 approximately 1,000 feet to the north of the Main Street signalized intersection (see Figure 38). There is currently no crosswalk at this busy mid-block location. Provision of the sidewalk and pedestrian signal control would allow users of the multi-use path to cross NH 125 at the Main Street intersection.

The following sketches illustrate how providing the crosswalk at the Main Street intersection under traffic signal control in combination with new sidewalks and enhanced streetscape treatments would enhance pedestrian safety and better integrate the Rockingham Recreational Multi-Use Path into the existing transportation system.

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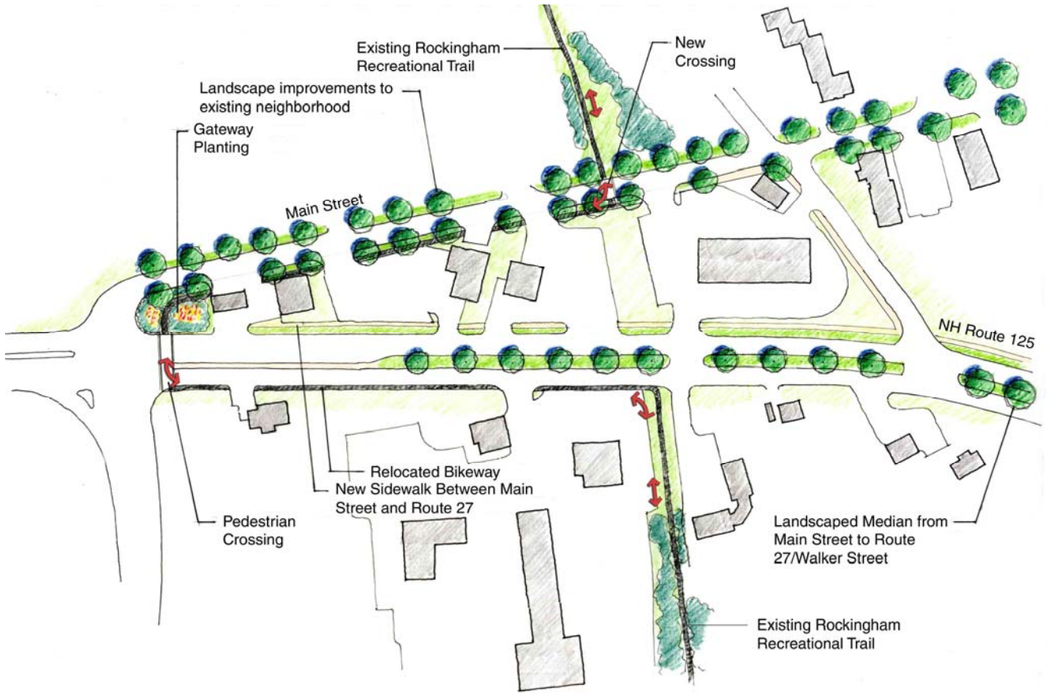
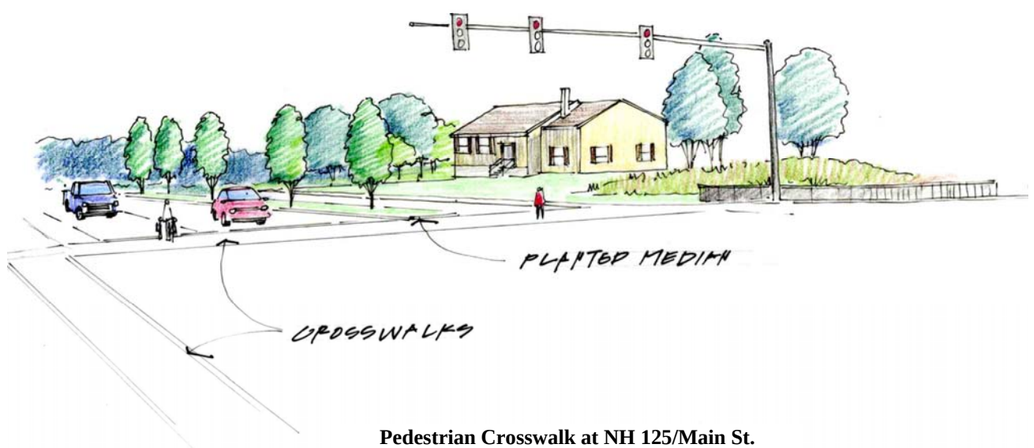
6 http://www.mass.gov/envir/smart_growth_toolkit/pages/glossary.html




**Gateway Treatment at NH 125/Main St.**




**Pedestrian Crosswalk at NH 125/Main St.**

**Signalized Intersections**

Lagoon Road has been identified as a potential location as one of the corridor's future major signalized intersections (see Figure 39). With the recommended future connector roadways, developable parcels to the north and south of this intersection would be provided good access to the corridor. Two existing properties (Tully's Restaurant and the Irving Gas Station), located on the east side of NH 125 south of Lagoon Road, already have a connection between them. Extending that internal connection to the north by way of the Epping Motor's property and onto Lagoon Road would allow these properties to be connected to this future signalized intersection.

Other potential major intersections within Epping would include Old Hedding Road, Route 87 (Hedding Road), North River Road and Lee Hill Road. Each of these intersections have been identified as candidates for future traffic signal control with North River Road requiring realignment to eliminate the existing skewed angle (see Figures 39 to 41).

**Land Use Regulations and Zoning**

No modifications to Epping's land use regulations are recommended at this time. The current zoning transitions (south to north) from Industrial/Commercial in the vicinity of the NH 101 interchange to Central Business, High Density Residential, Highway Commercial and Residential Commercial towards the Lee town line. This progression of zoning districts allows for the types of uses contemplated by the Town.

**Access Management**

The Town of Epping should adopt and consistently apply the access management guidelines for the spacing, dimensions, and the number of driveways for properties located along the corridor (see Page 35). In reviewing proposed development projects along the corridor, the Town should, whenever possible, require development projects to incorporate connector roadways or internal connection to adjacent properties into site plans. The Town should also adopt the Memorandum of Understanding, which outlines access management agreement with the NHDOT.

## Lee

The development and growth potential along the corridor in the Town of Lee is limited given the numerous environmentally constrained parcels along substantial segments of the corridor. There are some developable parcels, most of which are located in the vicinity of the Traffic Circle. However, even these parcels are to some degree constrained by wetlands.

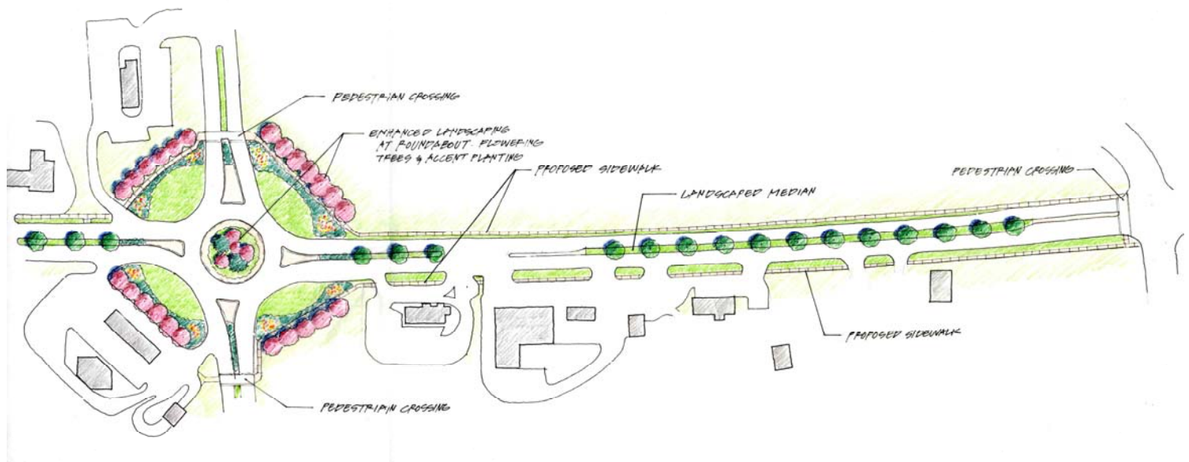
**Signalized Intersections**

In addition to the two existing signalized intersections of Route 152 (Wadleigh Falls Road) (see Figure 42) and the Lee Market Plaza (see Figure 46), Kelsey Road (see Figure 43) and George Bennett Road (see Figure 44) have been identified as candidates for future signalized intersections that would serve as primary access points to the corridor. The upgrade of Kelsey Road to one of the Town's primary signalized access points would also involve the realignment and relocation of Fox Garrison Road so that the roadway intersects directly opposite Kelsey Road.

**Lee Traffic Circle**
The Lee Traffic Circle, where Route 4 (a primary east-west regional connection) intersects NH 125, should be converted from the old style traffic circle to a modern 2-lane roundabout (see Figure 46). The 2-lane roundabout, with its tighter design, would provide greater capacity while actually being much smaller than the existing old-style expansive traffic circle. The tighter corner radii would also improve operations and safety by providing better separation between the roundabout and the nearby access driveways. The conversion of the traffic circle to a modern roundabout would also provide an opportunity to upgrade the area with enhanced landscaping, pedestrian crossings, and other streetscape elements so that the roundabout serves as a "gateway" to the NH 125 corridor.

Sidewalks should also be provided at the roundabout and extending northward to the Lee Market Plaza intersection (see Figure 46). Pedestrian crosswalks and pedestrian activated signals should be provided at the Lee Market Plaza intersection. In addition, as part of the design of the modern roundabout, consideration should be given to providing pedestrian crosswalks and a pedestrian activated traffic signal on the Route 4 legs of the roundabout. It is important to note that current proposed Americans with Disability Act (ADA) Guidelines recommend the placement of pedestrian activated traffic signal control at pedestrian crosswalks at all 2-lane roundabouts. The crosswalks would be placed back away from the roundabout at the channelized medians so that pedestrians would cross one direction of traffic at a time with the median serving a pedestrian refuge island.

The following sketch illustrates how the redesigned Traffic Circle and landscaped median treatment could begin to establish a more pedestrian friendly environment.




**Gateway Treatment at Traffic Circle**

**Land Use Regulations and Zoning**
Lee has two zoning districts – Residential and Commercial. Much of the land in the corridor is environmentally constrained, as shown on Figure 41-47. As a result of the large minimum lot sizes and the constrained land, the projected build-out along the Lee stretch of NH 125 is generally small with the exception of the area from the Lee Traffic Circle and areas to the north are commercially zoned. Given the environmental constraints, particularly along the commercially zoned sector of the corridor, there is little opportunity for commercial growth in Lee. There is some development potential in the immediate vicinity of the Lee Traffic Circle, but even these parcels are somewhat constrained by wetlands and poorly-drained soils.

The following zoning recommendations are made:

- The Commercial zoning district allows "[a]ny industrial or commercial use on a site approved by the Planning Board". To provide a greater level of predictability, it is recommended that the allowed uses be specifically delineated, whether by right or by special exception. This provides some parameters for the type and size of uses to be permitted, which can begin to regulate future build-out and trip generation. Additionally, uses that should not be allowed (for environmental or traffic reasons) could be listed as prohibited uses. This recommendation would be particularly applicable in the event that additional land is zoned for commercial uses.
- Recommend reducing the front setback in the Commercial Zone (currently 125 feet) to reduce the amount of parking areas and impervious surfaces in front of a commercial development. This would help to minimize stormwater management problems, enhance landscape/streetscape improvements along the corridor, and could also provides for better visibility to the businesses from the roadway.
- Open Space Residential Development (OSRD) is allowed on parcels in excess of 20 acres. The revised minimum lot sizes are reduced from 85,000 sq. ft. to 30,000 sq. ft. for single-family dwellings and 60,000 sq. ft. for two-family. Because developments that preserve contiguous open space can be achieved on smaller parcels, the Town may consider reducing the minimum parcel size for OSRD. The minimum lot sizes can be further reduced to provide greater expanses of contiguous open space. However, soil suitability and septic system capacity must be factored into any such reductions. This may allow for more of a greenbelt along the residentially zoned stretch of the corridor in Lee. Note that this recommendation is neutral on its impact on the build-out and trip generation because overall density is not changed.

**Access Management**
The Town of Lee should adopt and consistently apply the access management guidelines for the spacing, dimensions, and the number of driveways for properties located along the corridor (see Page 35). In reviewing proposed development projects along the corridor, the Town should, whenever possible, require development projects to incorporate connector roadways or internal connection to adjacent properties into site plans. The Town should also adopt the Memorandum of Understanding, which outlines access management agreement with the NHDOT.

The driving force behind the corridor recommendations in the Town of Barrington is the Town's implementation of a major revision to their zoning that would serve to encourage the development of a Town Center along NH 125 in the vicinity of the Route 9 intersection (see Figures 49-50). Approved at 2008 Town Meeting, the Town Center zone presents a spectacular opportunity to introduce all of the Context Sensitive Solutions, Smart Growth, connectivity, access management, and pedestrian enhancement actions that are envisioned for the corridor.

**Signalized Intersections**

As stated previously, one of the key elements of the recommended corridor plan is the placement of well-spaced signalized intersections. These signalized intersections, in combination with connector roadways or internal connections between adjacent properties, serve to safely and efficiently accommodate left-turn movements. The elimination, or at least the reduction, of uncontrolled left-turn movements along the corridor would be expected to increase the carrying capacity of the corridor as well as reduce the number of vehicular accidents.

The build-out of the Town Center, as currently envisioned, would require three major access points (signalized intersections). One would be the intersection of Route 9, the other would be at the southern end of the Town Center at Province Road (see Figure 49), and the third would be either the northernmost point of the Town Center at Forest Brook Drive (see Figure 50) or possibly a location closer to Route 9. The selection of a location to the north should be based on the best connectivity that can be provided to the future users of the Town Center. The best location for this access point will become evident as the concept develops. All three of the signalized intersections, like all of the future signalized intersections along the corridor, would consist of two through lanes and an exclusive left-turn lane in each direction on NH 125.

In addition to the three signalized intersection in the Town Center area, three other locations within Barrington have been identified as candidates to serve as primary access points to the corridor. Two of the locations would be Pierce Road at Lee Oak Road (see Figure 47) and Beauty Hill Road at Winkley Pond Road (see Figure 48). Both of these locations would require the realignment and relocation of the side streets to eliminate their skewed angles and to form a standard 4-way signalized intersection. A conservation easement was established in 2007 on the property at the southwest corner of the Beauty Hill Road intersection. Any proposed changes to this intersection would require discussion with the Town, property owners and the land trust holding the easement. The third location would be the Tolend Road and Green Hill Road intersection (see Figure 51).

**Raised Center Medians**

Given the level of activity that would be expected in the Town Center area, it will be important to put in place visual stimuli that would alert motorists that the character of the roadway has changed substantially. Therefore, it is recommended that not only a raised center median be constructed along NH 125 from Province Road to Foster Brook Drive (or wherever the northern signal is installed), but the median should be landscaped. In fact, if the Town decides to go with the extended landscaped median in the Town Center area, the median area should be at least 20 feet wide – wider than the typical concrete median that would be installed in other segments of the corridor.

Left-turn movements would be allowed only at the three primary access points. The connector roadway system envisioned in the Town Center plan as well as the additional future connections recommended in this corridor plan would provide all properties within the Town Center with access to NH 125 at one of the three primary access points proposed. Sidewalks, various streetscape amenities, and enhanced landscaping should also be provided along both sides of the corridor – again from Province Road to Foster Drive.

The following sketch depicts how the bike lane, sidewalk and landscaping treatments could be incorporated into the corridor plan for the Barrington Town Center.


**NH 125 at Barrington Town Center**

**Multi-Modal Connections**

The connector roadway system would provide good pedestrian connectivity along each side of the corridor within the Barrington Town Center area. However, because the Town Center is envisioned to encompass both sides of NH 125, providing convenient and safe pedestrian access across NH 125 will be essential. For this reason, each of the three signalized intersections should provide crosswalks and pedestrian activated traffic signals. Furthermore, to provide the type of pedestrian connectivity that would be needed to tie both sides of the Town Center together as one, the Town should consider the placement of an overhead pedestrian bridge.

Crossing over NH 125 with a pedestrian overpass would require a primary structure over the roadway as well as approach structures to bring pedestrians from the road level to the main bridge span. Requirements of the American with Disabilities Act (ADA) dictate that the grades be approximately 8 percent with a landing (flat areas) every 30 feet. For NH 125, the clearance requirement would be 16'-6" and the structural depth would be 2'-3" requiring 400 to 500 feet of approach structure on each side.

Consideration could also be given to providing a pedestrian tunnel under NH 125. However, there are a number of negative factors that would need to be considered with a pedestrian tunnel, which may include lighting, security, and drainage requirements.

With the development of the Barrington Town Center and its numerous trails and paths comes the wonderful opportunity to link the activity in the Town Center to points north in Rochester. To accomplish this, it is recommended that a multi-use path be constructed along the old abandoned rail line that runs along the west side of the corridor. The multi-use path would extend approximately 4 miles to the Village of Gonic area in the vicinity of Oak Street in Rochester (see Figures 50-55).

**Roundabouts**

Alternatives to the three signalized intersections may be possible as a means of providing access to the Town Center. Town officials asked that this report address the use of roundabouts on NH 125 as an alternative to traffic signals, in response to a development proposal presented to the Town of Barrington for a property located on NH 125, just north of the Route 9 signalized intersection. The applicant suggested the possibility of constructing a roundabout at the site's intersection with NH 125 as part of the proposed development project. Placement of a roundabout at this location would be problematic given its proximity to the existing signalized intersection at Route 9 where vehicles stopped at the traffic signal could queue back into the roundabout.

If desired by the Town of Barrington, roundabouts could potentially serve as the major access points to the Town Center (Province Road, Route 9, and Forest Brook Drive) rather than the three signalized intersections. However, to maintain a consistent expectation for the driver as well as to establish a consistent look and feel for this segment of the corridor, it is recommended that the three locations be either all roundabouts or all traffic signals.

A roundabout is a channelized intersection with one-way traffic flow circulating around a central island. Traffic entering the roundabout is placed under "Yield" control while the approaches are channelized to specific geometric curvature in an effort to slow vehicular traffic. Single-lane roundabouts can be very effective traffic calming devices as vehicles are forced to slow allowing motorists to be more cognizant of their surroundings, including pedestrians, as they pass through an intersection. This traffic calming effect, as well as the corridor aesthetics, is often enhanced by the placement of landscaped treatment within the central island as well as other streetscape amenities along the outside of the roundabout. In contrast, although still serving a traffic calming role, larger two-lane roundabouts often serve in more of a high capacity role. For example, the recommended plan calls for the conversion of the single-lane Lee Traffic Circle to a modern two-lane roundabout.

In recent years, the use of roundabouts as an alternative to the use of traffic signals has become popular in New Hampshire. There are currently 14 modern roundabouts in operation in New Hampshire, four of which have been constructed by the New Hampshire Department of Transportation (NHDOT). As more roundabouts are constructed and become operational in the State, more information will be gained as to their operation and as to their acceptance by motorists.

Could roundabouts be considered along NH 125 as an alternative to traffic signals? The answer is yes. However, given the traffic volume demand along this segment of the corridor, obtaining acceptable operation would likely require two-lane roundabouts. Again, two-lane roundabouts are larger, would likely require additional land acquisition, and may not be able to deliver the pedestrian friendly aspects of a single lane roundabout, which certainly would be the desire in the Barrington Town Center.

**Land Use Regulations and Zoning**

As stated previously, the Town adopted a major revision to the zoning to establish a new Town Center. Given that the Town is seeking to encourage commercial growth in the new Town Center, it may be appropriate to also consider revisions regarding commercial development in other zoning districts adjacent to the proposed Village Center and along the corridor. This creates a better transition from residential development to the commercial use in the Town Center rather than allowing commercial and industrial development through the corridor in Barrington. The following revisions are recommended.

- General Residential – eliminate commercial and industrial uses allowed by conditional use permit from the Planning Board, except for neighborhood services such as small retail stores or eating establishments.
- Neighborhood Residential – eliminate industrial uses allowed by conditional use permit from the Planning Board.
- Conservation Subdivisions – Open Space Residential Development (OSRD) is allowed on parcels in excess of 20 acres. The revised minimum lot sizes are reduced from 85,000 sq. ft. to 30,000 sq. ft. for single-family dwellings and 60,000 sq. ft. for two-family. Because developments that preserve contiguous open space can be achieved on smaller parcels, the Town may consider reducing the minimum parcel size for OSRD. The minimum lot sizes can be further reduced to provide greater expanses of contiguous open space. However, soil suitability and septic system capacity must be factored into any such reductions.

As discussed in the general recommendations section, Barrington should also consider enacting a Transfer of Development Rights (TDR) ordinance for the dual purpose of directing both residential and commercial development (including mixed-development proposals) to the new Town Center while discouraging development from areas outside the Town Center and/or within environmentally constrained lands.

**Access Management**
The Town of Barrington should adopt and consistently apply the access management guidelines for the spacing, dimensions, and the number of driveways for properties located along the corridor (see Page 35). In reviewing proposed development projects along the corridor, the Town should, whenever possible, require development projects to incorporate connector roadways or internal connection to adjacent properties into site plans. In October 2006, the Town adopted the Memorandum of Understanding, which outlines access management agreement with the NHDOT.

## Rochester

With the New Hampshire Department of Transportation's planned reconstruction of the Spaulding Turnpike/NH 125 interchange (Exit 12) the focus of the recommended actions along this segment of the corridor is to provide a smooth transition between vision and character of the corridor that is being established to the south (such as the Barrington Town Center) with the Spaulding Turnpike and the City's downtown, located to the north of the study area.

**Signalized Intersections**
The major corridor intersections, which would serve as the primary signalized access points to the corridor, would include Rochester Neck Road (see Figure 52), Gear Road and Colonial Drive (see Figure 53), and Oak Street and Grove Street (see Figure 54). Again, these intersections would provide two through lanes and an exclusive left-turn lane in each direction on NH 125. There is the potential for substantial redevelopment in this area, particularly once the Exit 12 interchange improvements are completed. It will be particularly important that the City of Rochester and the NHDOT work together in requiring that development projects in this area provide the needed internal connections that would allow all parcels access to one of the major signalized intersections.

Ideally, the Oak Road intersection should be realigned to eliminate the skewed angle. This realignment would involve substantial property takings as several existing buildings are currently located close to the intersection. Realigning the intersection may make sense in the future if it were part of a redevelopment proposal of some of these properties.

**Pedestrian Connections**
Crosswalks and pedestrian activated traffic signal control should be provided at each of these major intersections. Sidewalks should be provided along NH 125 between Oak Street and the Spaulding Turnpike interchange (see Figure 54). It will be important to provide good pedestrian connectivity between the neighborhoods located on the east and west sides of NH 125 in the vicinity of Oak Street and Grove Street to Gonic Village (refer to the graphic at right and the larger version in Figure 55). Landscaped medians should be provided at the pedestrian crosswalks located at these intersections. The landscaped medians and other streetscape amenities located at the crosswalks would serve to better delineate these important pedestrian crossing and alert motorists to expect pedestrian crossings in the area.

**Multi-Use Path**
The recommended multi-use path, which would extend approximately 4 miles along the abandoned rail line from the Barrington Town Center, would meet NH 125 approximately 1,000 feet south of Oak Street at Brook Farm Village. The multi-use path would extend along NH 125 to Oak Street where the crosswalk and pedestrian activated traffic signal at the intersection would provide connectivity to Gonic Village on the east side of the corridor.


**Gonic Village Connectivity Concept**

A sidewalk should be provided along one side of Rochester Neck Road from the intersection at NH 125 to the Gonic Trails at the Mount Isinglass Recreational Area (see Figure 52). This enhanced pedestrian connectivity could encourage residents of the area to visit and experience this wonderful natural trail system and recreational area. Consideration should also be given to developing a multi-use path that would connect Rochester Neck Road and the Gonic Trails to the residential areas to the north.

**Environmental Considerations**
It is important to note that the requirements of the State's River Management and Protection Program and Comprehensive Shoreland Protection Act apply to the Isinglass River (a State Protected River), which crosses NH 125 just south of Rochester Neck Road. This means that a state shoreland permit will be required for any construction, excavation or filling activities along the corridor within certain buffer areas of the Isinglass River. Note that Barrington and Rochester have additional development requirements that apply to the Isinglass River.

**Land Use Regulations and Zoning**
The City of Rochester has been undertaking a comprehensive rezoning project over the last couple of years. The proposed rezoning is reflected in these recommendations with some suggested revisions to make the new zoning more consistent with the corridor plan. Further coordination with the City as it finalizes its effort may be warranted to properly coordinate these two efforts.

There is an area that is zoned "Industry 3" that would become Light Industrial and probably does not represent a significant change. The area close to the Barrington border is proposed to become a Highway Commercial area that could support big box retail. This includes a large parcel currently zoned as Agricultural, and this change may represent a significant increase in potential development intensity.

Existing zoning along the study corridor includes a fair amount of land zoned as Agricultural, much of which is proposed to be Residential. Some of that area on both sides of NH 125 (north of Colonial Drive and Gear Road adjacent to the Cocheco River Tributary) may have environmental constraints, so low density residential and open space development or a greenway that protects the resource may be appropriate (see Figure 53).

Gonic Village currently consists of a mix of residential and commercial uses that could be integrated into a small village center. Allowing mixed-uses and providing streetscape enhancements and improved pedestrian connectivity could enhance such a village setting. However, it should be recognized that the existing residential development pattern limits the opportunities for significant redevelopment of the area but could perhaps accommodate change in use to mixed-use or small retail, business or office uses.

**Access Management**
The City of Rochester should adopt and consistently apply the access management guidelines for the spacing, dimensions, and the number of driveways for properties located along the corridor (see Page 35). In reviewing proposed development projects along the corridor, the Town should, whenever possible, require development projects to incorporate connector roadways or internal connection to adjacent properties into site plans. The City should also adopt the Memorandum of Understanding, which outlines access management agreement with the NHDOT.

## Construction Costs

An order of magnitude construction cost estimate has been prepared for the long-term full widening of the corridor. The order of magnitude estimate is based on current (2008) construction cost and do not include the cost land acquisition, additional environmental impact studies or design. The total cost for the 20-mile corridor is approximately $150 million.

## Project Prioritization

Given the magnitude and the cost associated with the overall corridor management plan, the implementation of the plan will span over many years. Given available funding it is unlikely that any substantial lengths of the corridor would be constructed under a single project. As it is much more likely that the corridor improvements would be constructed as a series of many small projects, each community should give serious consideration to the setting of project priorities.

In establishing these priorities, consideration should be given to such factors as safety and operational need, effectiveness of meeting the long-term vision, cost, and opportunity. Although each community will need to arrive at their own set of priorities that meet their individual goals and objectives, it is recommended that from a safety and operational perspective that a high priority be given to the provision of designated left-turn lanes at high volume intersections and/or extended sections of two-center turn lanes. Because the corridor has the high traffic volume demand, relatively high travel speeds, trucking activity, numerous side streets and driveways, and high turning movement activity, the absence of turn lanes – particularly left-turn lanes - is one of the more glaring corridor deficiencies.

Other high priority projects should include the establishment of the major signalized intersections as well as initiating the access management and multi-modal elements of the plan. Each community should embrace the smart growth principles outlined in the report including but not limited to supporting the integration of mixed land uses, preserving open space, and fostering distinctive and attractive development with a strong sense of place. In reviewing proposed development projects along the corridor, each community should, whenever possible, require development projects to incorporate connector roadways or internal connection to adjacent properties into site plans. These actions can be initiated immediately.

## Project Implementation Process

Having established the vision, the plan, and having identified some initial project priorities, the next step is to establish the impetus to begin to work towards implementing the recommended actions. As NH 125 is a state roadway, it will be important to begin the process of getting the recommended roadway improvements into the Strafford Metropolitan Plan and Transportation Improvement Plan (TIP) and on into the State's Ten-Year Program. Given the State's funding short-fall, and that numerous communities throughout the state are looking for the funding of similar projects, obtaining state funding for these projects will not be easy. The Strafford Regional Planning Commission will assist the communities with the project application process. However, there are actions that the can be taken at the community level to advance the implementation of the plan.

As discussed under the Project Prioritization section, the highest priorities are the need to provide left-turn lanes along the corridor so as to (at least in the near term) remove these left-turn movements from the through lanes, upgrade the major signalized intersections, and begin to implement the access management and multi-modal elements of the plan.

As development proposals come before the Planning Boards of each community, the communities will have the opportunity to ensure that not only that each development proposal is consistent with the plan's goals and objectives, but that each development proposal is constructing the off-site roadway improvements that will needed to mitigate the project's traffic impacts.

Each community should meet early-on in the development process with the applicant as well as with the NHDOT to discuss the applicant's proposal relative to the corridor plan. It is recommended that each community retain a project review consultant who can guide the applicant as to what aspects of the plan will need to be incorporated into the site plan. This phase of the development review process will be the opportunity to incorporate the various access management elements into the site plan. The types of elements might include the number and placement of driveways, connections to abutting properties, building set-backs, etc. Additionally, off-site mitigation might include the widening of NH 125, the installation of traffic signal control, the construction of sidewalks, or multi-use paths.

## Memorandum of Understanding

Having established this long-term plan for the NH 125 Corridor and given that NH 125 is a state controlled highway, it is important that the New Hampshire Department of Transportation (NHDOT) and each of the communities along the corridor coordinate and communicate with regard to the granting of corridor access permits. Local Planning Boards and the NHDOT should ensure that any proposed development projects are consistent with the access management goals and objectives presented in this plan. For this reason, a draft version of a Memorandum of Understanding (MOU), which outlines the agreement between the NHDOT and the communities, is included in this report

The purpose of the MOU is to improve communication and coordination between the NHDOT and the corridor communities and to define the joint and individual roles and responsibilities for corridor access management. It is worth noting that in October of 2006, the Town of Barrington became the first municipality in the state to enter into an MOU with the NHDOT.

The draft version of the NH 125 MOU is provided on pages 53 and 54. Once reviewed and approved, a final version of the MOU would be signed by the NHDOT and each of the corridor communities.

## Summary

The purpose of this study was to develop a plan for NH 125 that better integrates transportation and land use using smart growth strategies and access management techniques to enhance safety, preserve corridor capacity and most importantly to provide the corridor communities with the guidance and tools to ensure that as development occurs along the corridor, it will occur in a manner that is consistent with the vision and projected growth of each community.

The report presents both general and specific recommendations for the corridor. However, it is important to recognize that this is a planning document and that none of the recommendations are "set in stone". The communities will, with the assistance of the Strafford Regional Planning Commission (SRPC), have the opportunity to work with the New Hampshire Department of Transportation (NHDOT) in the implementation of the recommendations in the corridor improvement plan. It will be important for the corridor communities to work together on establishing and maintaining a consistent long-term vision for the corridor.

NH 125 is a state highway but it is also an important local connector through and across each corridor community. For this reason, the corridor communities recognize that each have great influence on how development will occur along the corridor. As development projects are presented along the corridor, it will be important that the strategies, techniques and vision presented in this report be considered by the local land use boards and developers in each community. Decisions relating to site access, traffic control, connectivity, land use, building setbacks, pedestrian needs, and multi-modal strategies will need to be considered within the context of the long-term vision for the corridor.

The following are some of the key study findings, which formed the basis for the development of the recommended corridor plan.

**Smart Growth –** The results of the full land use build-out analyses under current zoning revealed a traffic growth potential for the corridor that, if realized, would significantly reduce the carrying capacity of the existing corridor or require the type of major roadway widening that would adversely impact the quality of life for corridor communities. It is for this reason that each of the corridor communities should embrace the smart growth principles outlined in the report including but not limited to supporting the integration of mixed land uses, preserving open space, and fostering distinctive and attractive development with a strong sense of place.

**Access Management –** A well conceived access management plan would enhance the safe and efficient movement of vehicular traffic and reduce, or at least delay, the need to introduce major roadway widening along the corridor. Working closely with the NHDOT, through the implementation of public roadway improvement projects or in reviewing proposed private development projects, the corridor communities must encourage the construction of connector roadways or internal connections between properties that provide access to signalized intersections. Each community should adopt and consistently apply the provided guidelines for the spacing, dimensions, and the number of driveways for properties

located along the corridor. The Memorandum of Understanding, which outlines the agreement between the NHDOT and the communities, should be adopted by the corridor communities.

**Multi-Modal –** To reduce the travel demand along the corridor, travelers need to have timely and convenient choices in their mode of travel. The corridor communities must aggressively pursue the creation of multi-use paths such as those envisioned within the Barrington Town Center zone as well as use of the abandoned rail corridor to create an approximately 4-mile long multi-use path to link the Barrington Town Center northward to the Gonic Village. Corridor communities should work closely with public transit providers in the pursuit of opportunities to provide bus service along the corridor. Additionally, the NHDOT should continue to pursue efforts in locating and constructing a new park and ride facility in the US 4/NH 125 intersection.

**Safety –** One of the more glaring corridor deficiencies, as voiced by attendees at public input meetings, is the absence of turn lanes along the corridor. Given the high traffic volume, relatively high travel speeds, trucking activity and the numerous side streets and driveways, motorists are concerned with stopping in the through lane to turn left form the corridor. The communities should work closely with the NHDOT to develop a program for providing designated turn lanes at major intersections and perhaps extended lengths of a two-way-center turn lane in areas where numerous driveways exists.

**Pedestrian Access –** The NH 125 corridor is currently not pedestrian friendly. Sidewalks, crosswalks, and pedestrian activated traffic signals should be provided in the high pedestrian activity areas of the corridor such as in Epping from Main Street to Route 27, in Lee in the vicinity of the Traffic Circle, in Barrington near Route 9, and in Rochester near the Gonic Village.

**Community Character –** In developing the corridor plan, it was particularly important that the plan enhances rather than detracts from the distinct character of each of the communities. The plan encourages the use of gateway treatments, which through the use of landscaped medians and other streetscape serve to create a "look and feel" that fits with the character of the community and identifies areas where pedestrian activity is prevalent.

**Project Funding –** Although the corridor plan identifies a long-term plan that would involve substantial and expensive widening of the corridor, it is important to recognize that with the State's current funding short-fall, it is the NHDOT's stated policy that they will focus their limited available funding for NH 125 on projects that enhance the efficiency of the corridor rather than on projects that simply expand or add new lanes. Therefore, it will be important to focus on the smart growth, access management, multi-modal, safety, pedestrian access, and community character elements of the plan first. Additionally, as development proposals come before the Planning Boards of each community, the communities and the NHDOT will have the opportunity to ensure that each development proposal is consistent with the plan's goals and objectives and that each development proposal constructs or funds the corridor improvements that are needed to mitigate the project's traffic impact.

**MEMORANDUM OF UNDERSTANDING**
**FOR**
**COORDINATING HIGHWAY ACCESS MANAGEMENT**

**BETWEEN**

**NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION**
**AND**
**THE TOWN OF _____**

This Memorandum of Understanding is made between the State of New Hampshire, Department of Transportation (hereinafter referred to as "DEPARTMENT") and the Town of _____ (hereinafter referred to as "TOWN" and entered into on _____.

The Parties to this Understanding witness that:

WHEREAS, the DEPARTMENT has the statutory responsibility and permitting authority, under RSA 236, to issue driveway access permits on state highways; and

WHEREAS, the TOWN, has the ***statutory authority, pursuant to RSA 237:13, V, for highways under their jurisdiction to issue driveway and access permits, where the Planning Board regulates the subdivision of land under RSA 674:34; additionally under RSA 674, the Town may regulate the use and site development of property adjoining the highwa***y; and

WHEREAS, the DEPARTMENT and the TOWN mutually recognize the continuing necessity to plan and coordinate future land use and access to highways, in order to preserve highway capacity and public safety, and;

WHEREAS the DEPARTMENT and the TOWN mutually recognize and agree that the preserving the safety and maximizing the capacity of state highways is in the public interest,

THEREFORE, BE IT RESOLVED, that the following provisions of this Memorandum of Understanding are agreeable to all parties;

**Article I: Statement of Purpose**

The DEPARTMENT and Town enter into this Understanding to improve access management of state highways within its boundaries. For the purposes of this Understanding, access management shall include coordination in the planning, design, control, and determination of access points to facilities, and in the issuance of driveway access permits.

**Article II: Scope of Understanding:**

The provisions of this Understanding shall apply to all state highways or segments of state highways located within the Town as identified in Town access management plan and agreed upon by the Town and the Department (List as follows:)

_____
_____
_____

**Article III: Joint Responsibilities**

1. It shall be the joint responsibilities of the DEPARTMENT and the TOWN to develop and adopt agreed upon procedures for the coordination between site plan approvals and driveway access permits.

2. The TOWN and the DEPARTMENT may establish an Access Management Technical Guidance Committee for the purpose of coordinating the concurrent review of site plans and driveway access permit applications to ensure their conformance with state and local access management plans and/or standards.

**Article IV: Responsibilities of the TOWN**

1. Access management standards developed, adopted, and/or enforced by a Town shall not conflict with best practices for access management where a state highway is involved. These standards may take the form of zoning ordinances, site plan review, subdivision regulations and requirements, roadway construction standards, or a combination of these, and shall be applied to all future development and redevelopment of land accessing state highways. Such standards shall be developed in consultation with the DEPARTMENT and Regional Planning Commissions. Copies of all such standards, and subsequent amendments thereto, shall be provided to the DEPARTMENT to be kept on file at the Central and District Offices.

2. Where appropriate and necessary as determined by the Town, the Town may develop, in cooperation or consultation with the DEPARTMENT, adopt, and amend site or parcel-specific access management plans for specific highway corridors or segments. Such plans shall define the number, as well as, general location and design of future access locations to be permitted on specific parcels or sites. The Plans, and any subsequent amendments thereto, shall be forwarded to the DEPARTMENT to be kept on file at the Central and District Offices. The number, location, and design of access points shall be consistent with the Department's "Policy for the Permitting of Driveways and Other Accesses to the State Highway System".

3. In the event that waivers or variances to the adopted access management standards or plans are proposed, the Town shall inform the DEPARTMENT of such waivers or variances prior to local approval of the plans. Notice will be made prior to the issuance of the local approval and with sufficient time to allow for comment from and consultation with the DEPARTMENT.

4. The Town shall notify the DEPARTMENT District Engineer upon receipt of any development proposal or change of use that will require a state driveway access permit and solicit input regarding access design.

5. The Town shall require that driveway access(es), including type, design, number, and location, be permitted only in accordance with its adopted access management standards and any applicable site-specific access plans.

6. The Town shall coordinate and cooperate with the Department throughout the development/driveway permitting process (including approval of access development), as described in the procedures set forth in Article III Section 1.

**Article V: Responsibilities of the DEPARTMENT**

1. The DEPARTMENT's Design Bureaus and District Engineer will provide information, technical assistance, and advice to the TOWN in the development of local access management standards and site or parcel level access management plans.

2. The DEPARTMENT District Engineer shall notify the TOWN designee upon receipt of any application for driveway access permits and scheduled scoping meetings by transmitting a copy of such application or meeting notice, along with a request for comments. On Department sponsored projects, the Department's Project Manager will bear the responsibility to notify the TOWN of the Department's intentions.

3. The DEPARTMENT District Engineer shall coordinate and cooperate with the municipality throughout the development/driveway permitting process (including issuance of drive permits), as described in the procedures set forth in Article III Section 1.

**Article VI: Effective Date and Amendments to Memorandum of Understanding**

1. This Understanding shall become effective upon execution by the DEPARTMENT and the TOWN and shall remain in force until terminated under provisions of Article VII, or until superseded by a new Understanding.

2. This Understanding may be amended from as facts or circumstances warrant or as may be required by state or federal laws, administrative regulations, or other orders or guidelines having the full force and effect of law.

**Article VII: Termination of Understanding**

The DEPARTMENT or TOWN may terminate this Understanding by giving ninety (90) day written notice of such termination to the other party.

IN WITNESS WHEREOF, the parties have hereto caused this Understanding to be executed by their proper officers and representatives.

**FOR THE TOWN OF_____:**

**Planning Board**

**by**_____ **Date**_____
**Chair**

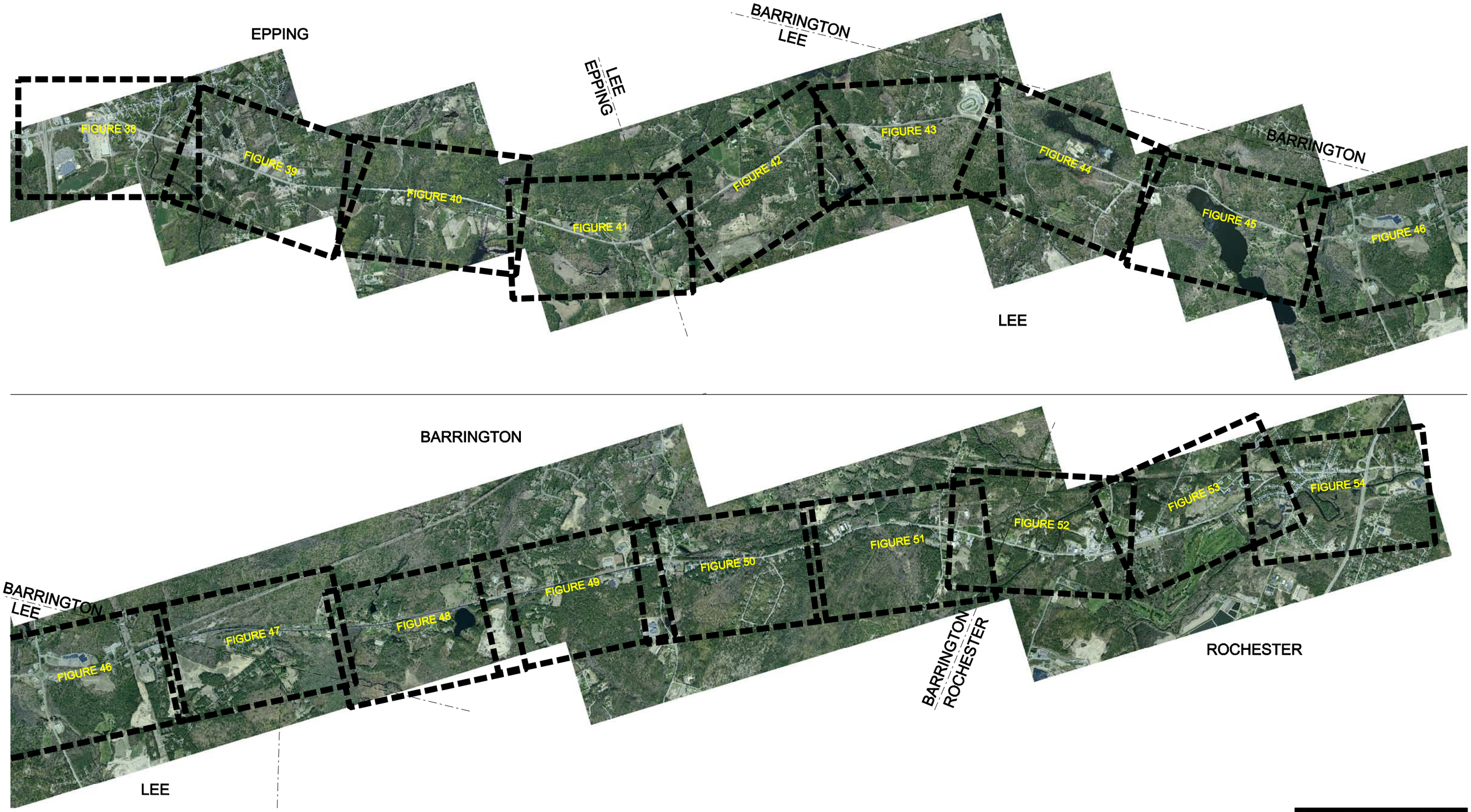
**Board of Selectmen**

**by**_____ **Date**_____
**Chair**

**FOR STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION:**

**by**_____ **Date**_____
**District Engineer**

**by**_____ **Date**_____
**Commissioner**



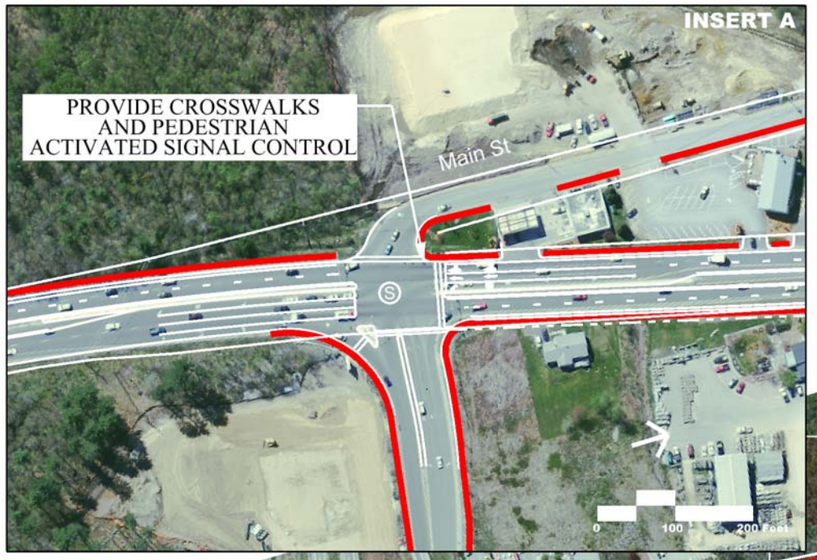

NOT TO SCALE

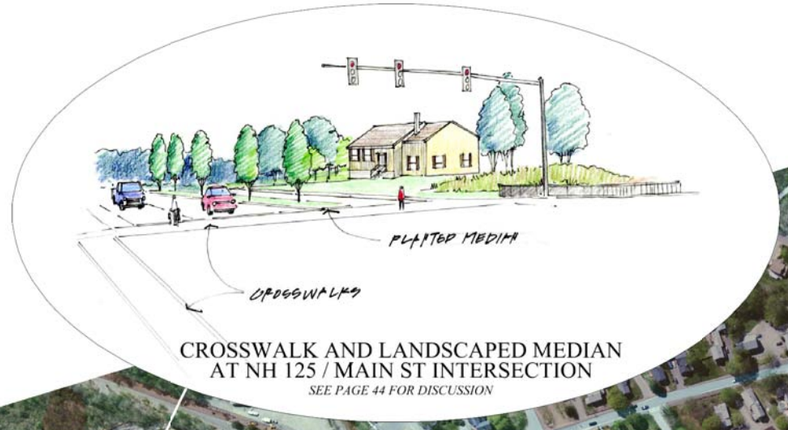
***Vanasse Hangen Brustlin, Inc.***

Figure 37

Corridor Improvement Plan Index

NH Route 125
Corridor Management Study



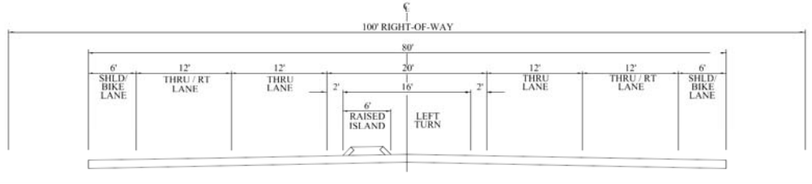

CROSSWALK AND LANDSCAPED MEDIAN AT NH 125 / MAIN ST INTERSECTION

*SEE PAGE 44 FOR DISCUSSION*

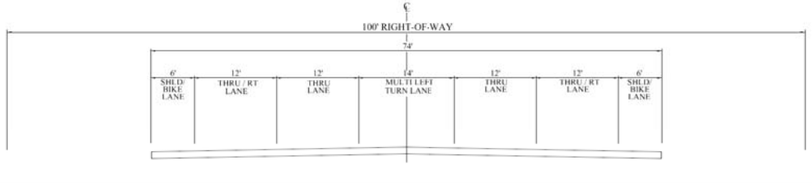


NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- S — TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

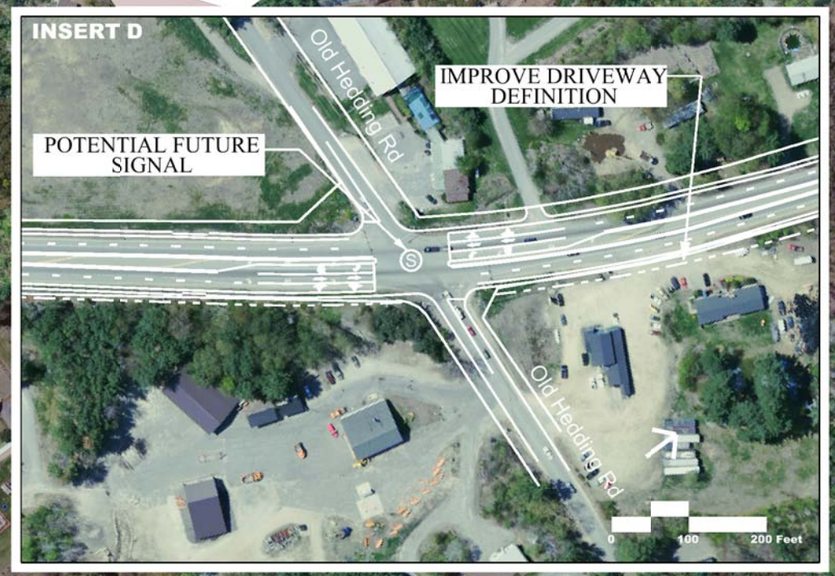
**Vanasse Hangen Brustlin, Inc.**

Figure 38

Corridor Improvement Plan
Epping

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure1.dgn

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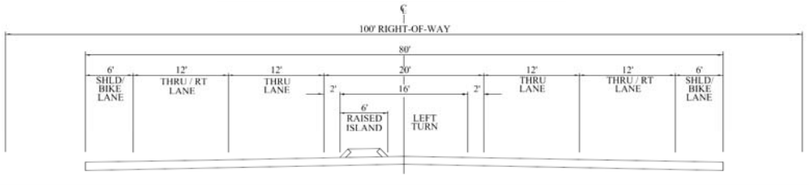
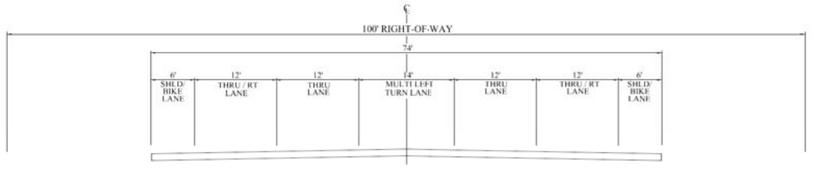



FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 39

Corridor Improvement Plan
Epping

NH Route 125
Corridor Management Study

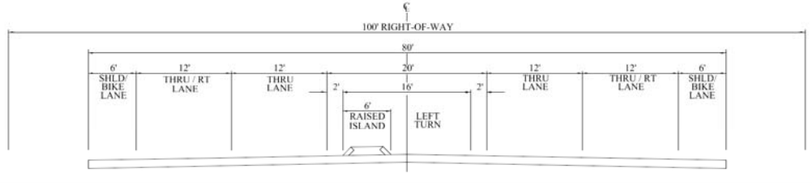
Date Created:3/19/2008 Figure2.dgn



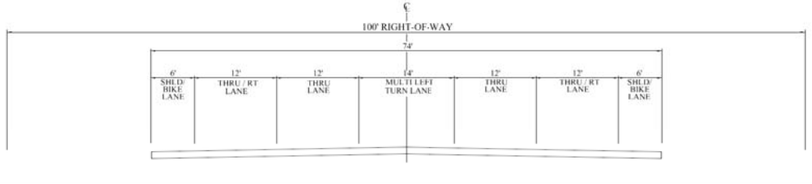


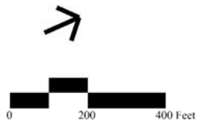
NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- S — TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

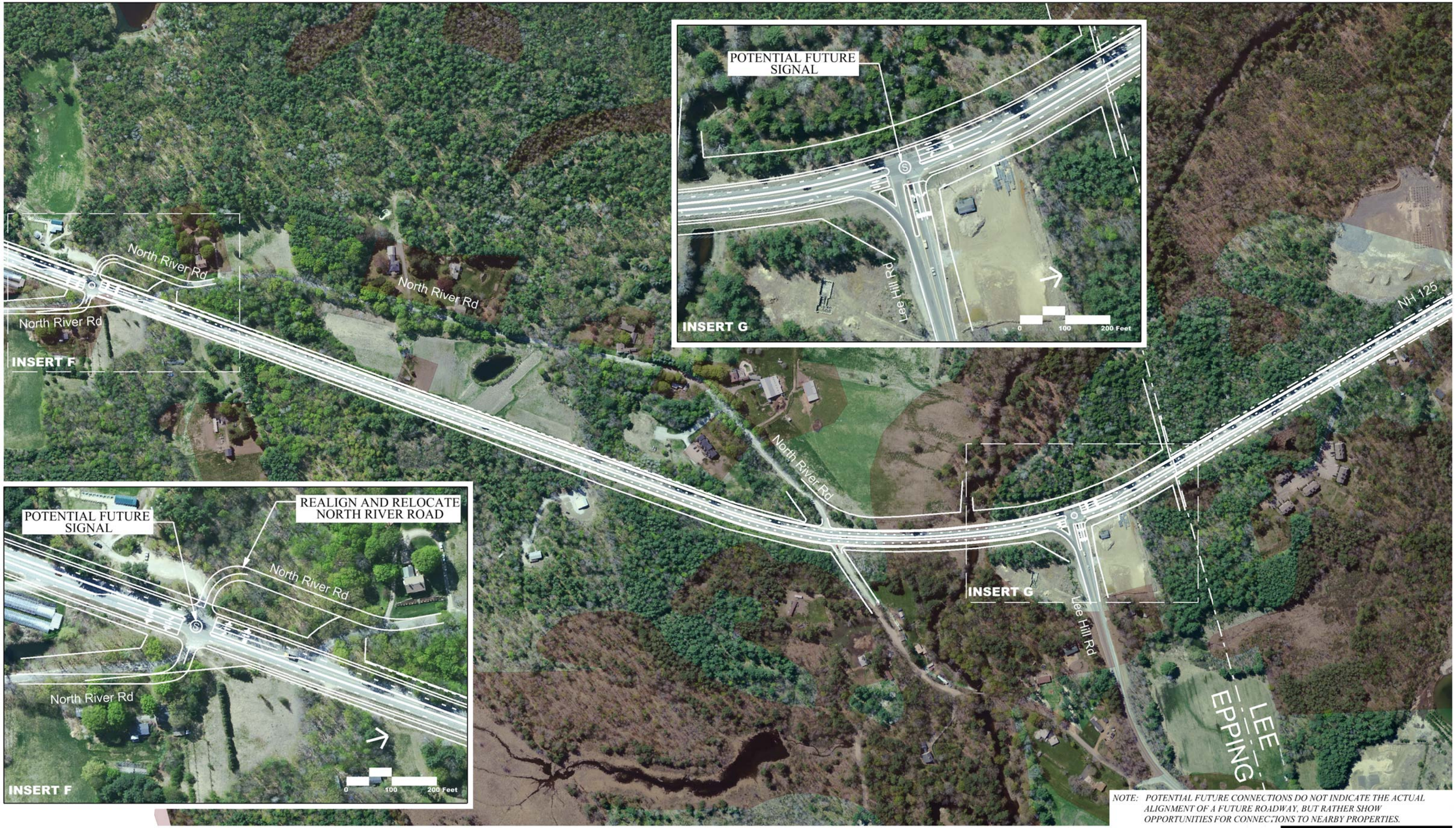
**Vanasse Hangen Brustlin, Inc.**

Figure 40

Corridor Improvement Plan
Epping

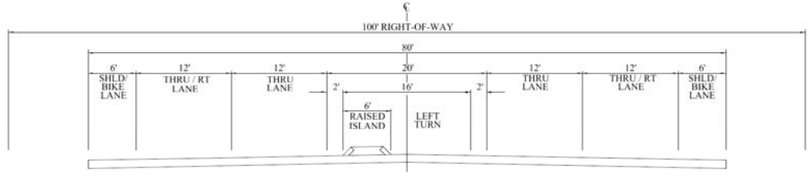
NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure3.dgn

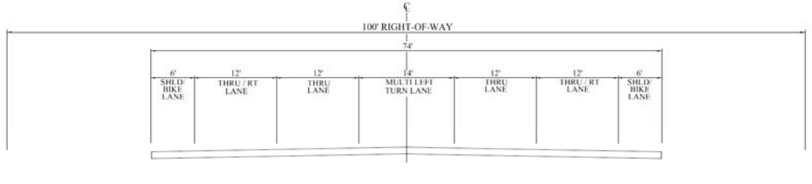



NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROFOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

***Vanasse Hangen Brustlin, Inc.***

Figure 41

Corridor Improvement Plan
Epping/Lee

NH Route 125
Corridor Management Study

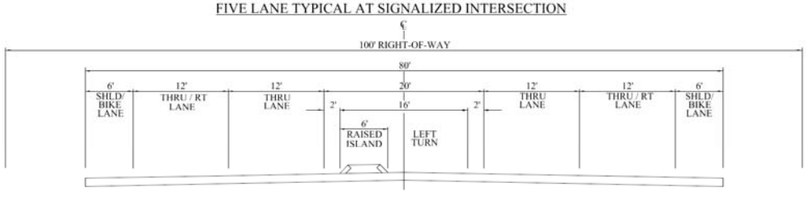
Date Created:3/19/2008 Figure4.dgn



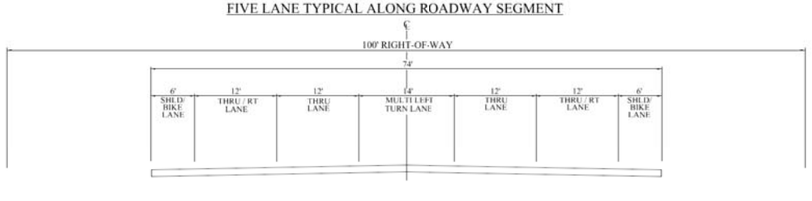


NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 42

Corridor Improvement Plan
Lee

NH Route 125
Corridor Management Study

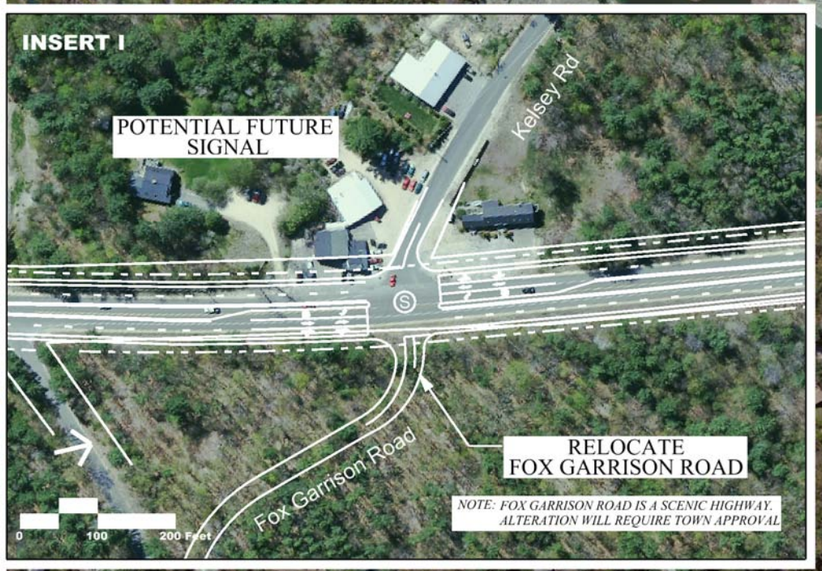
Date Created:3/19/2008 Figure5.dgn

NH 125

INSERT I

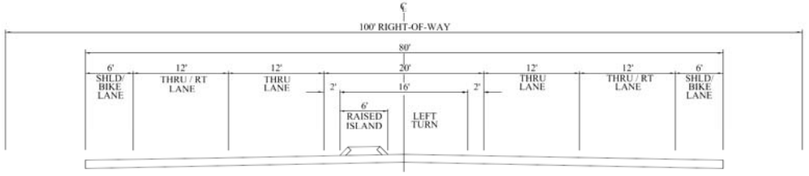
Kelsey Rd

Fox Garrison Road

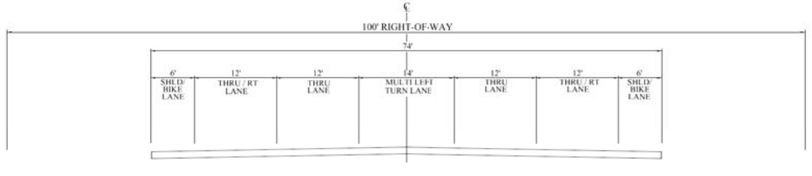



NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 43

Corridor Improvement Plan
Lee

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure6.dgn

Mill Pond Rd

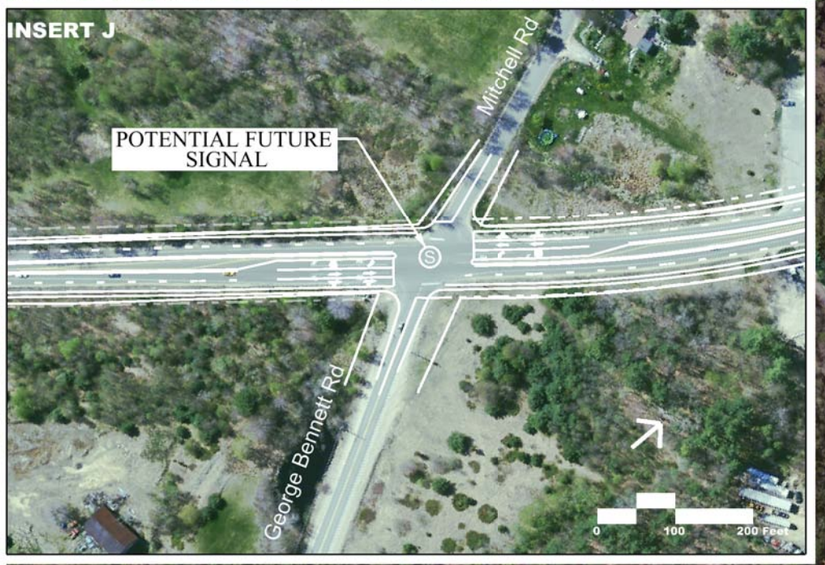
NH 125

Lee Hill Rd

INSERT J

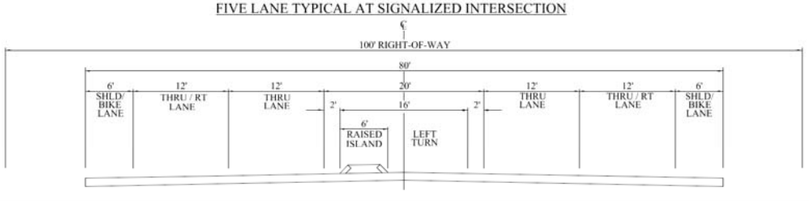
Mitchell Rd

George Bennett Rd

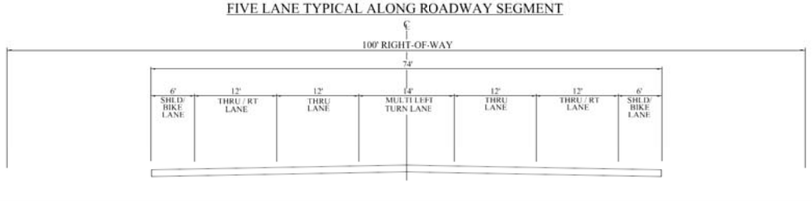



NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

***Vanasse Hangen Brustlin, Inc.***

Figure 44

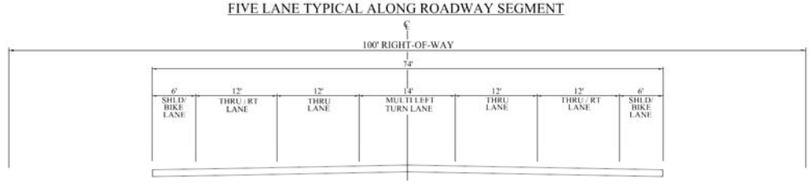
Corridor Improvement Plan
Lee

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure7.dgn


NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

0 200 400 Feet

***Vanasse Hangen Brustlin, Inc.***

Figure 45

Corridor Improvement Plan
Lee

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure8.dgn

POTENTIAL FUTURE CONNECTIONS

Route 4

Tibbitts Rd

NH 125

INSERT K

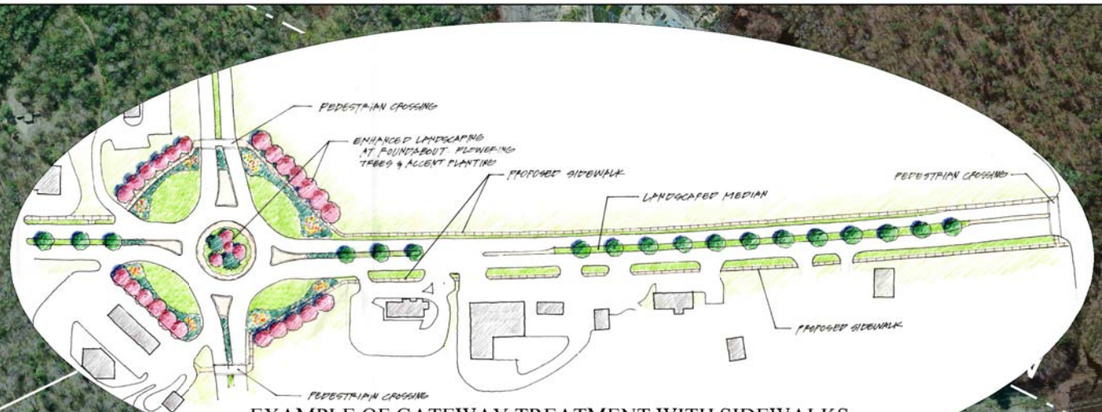
INSERT L

Plaza Driveway

Lee Cir

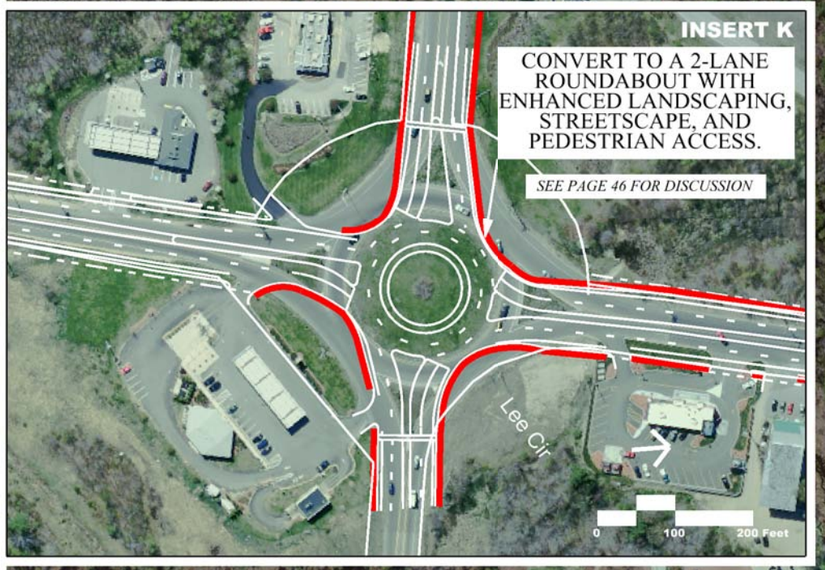
POTENTIAL FUTURE CONNECTIONS

IMPROVE DRIVEWAY DEFINITION

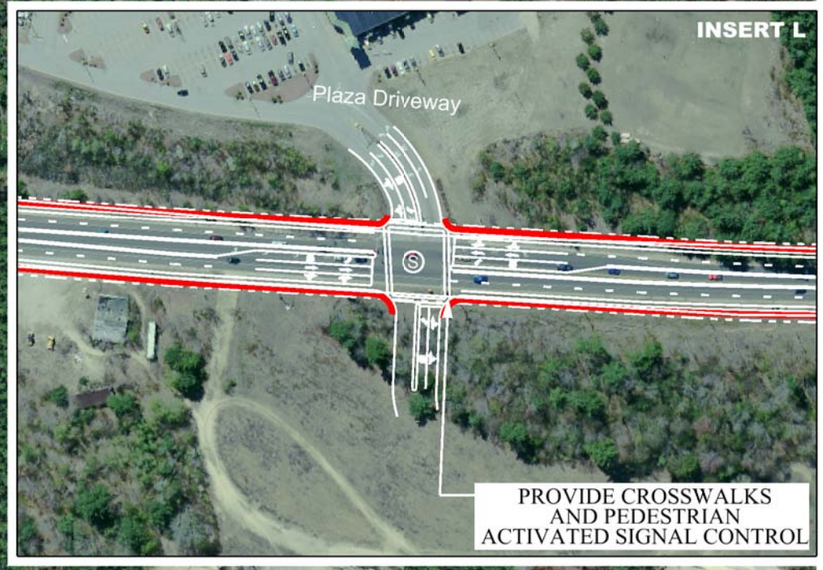



EXAMPLE OF GATEWAY TREATMENT WITH SIDEWALKS, CROSSWALKS, LANDSCAPED ROUNDABOUT, AND MEDIAN

*SEE PAGE 46 FOR DISCUSSION*

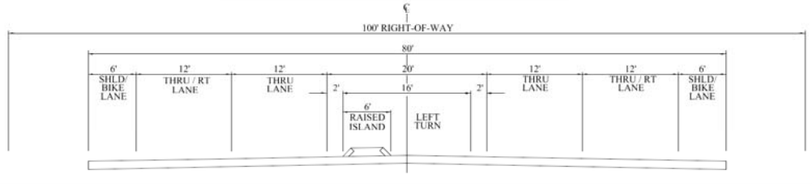



POTENTIAL FUTURE CONNECTIONS

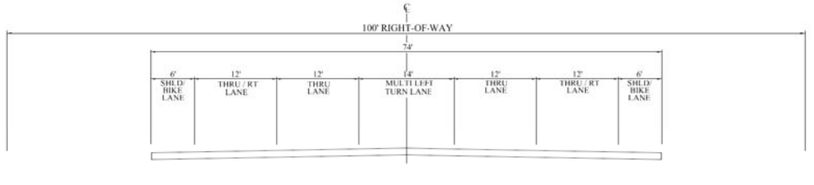



NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

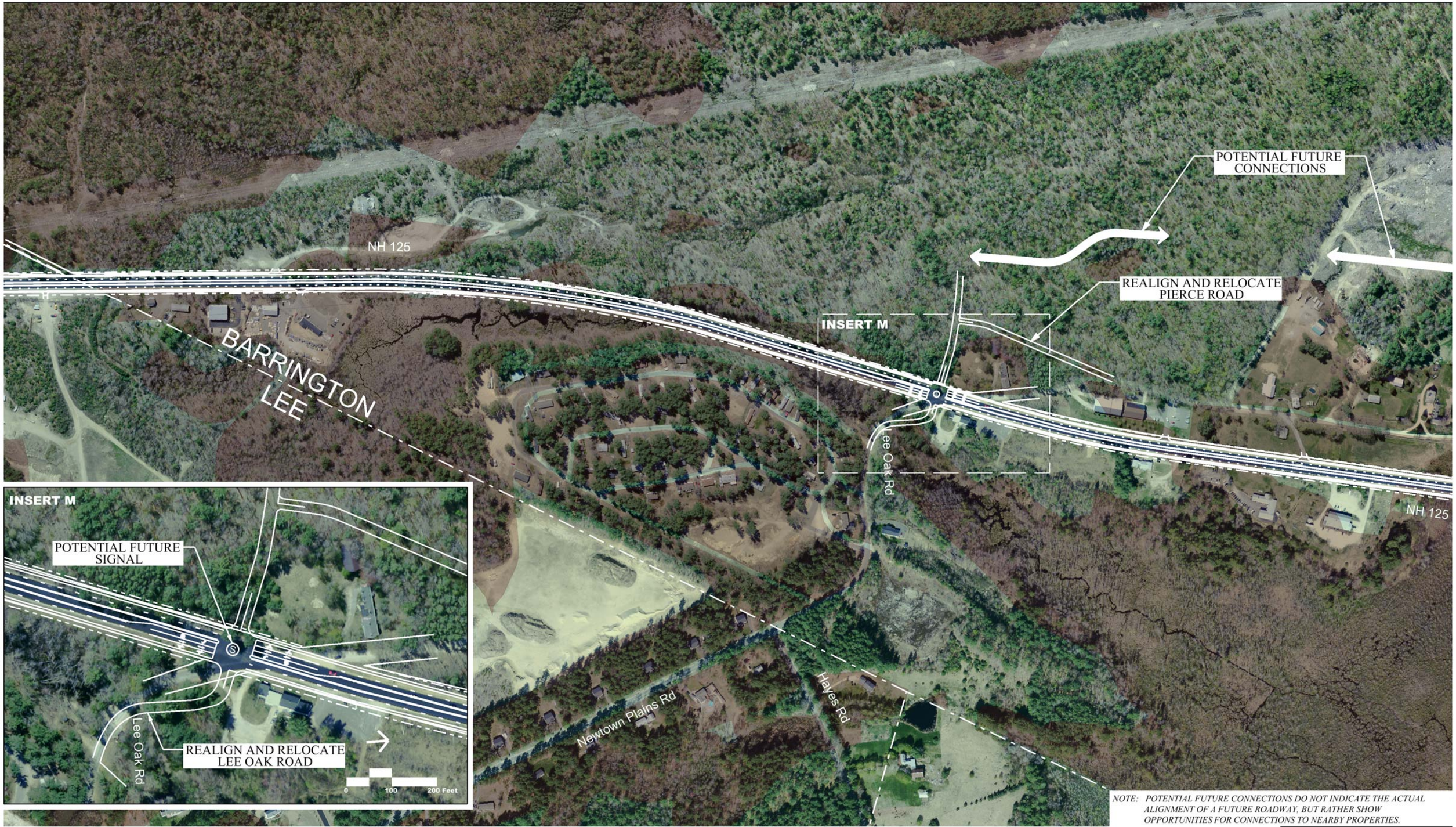
*Vanasse Hangen Brustlin, Inc.*

Figure 46

Corridor Improvement Plan
Lee/Barrington

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure9.dgn

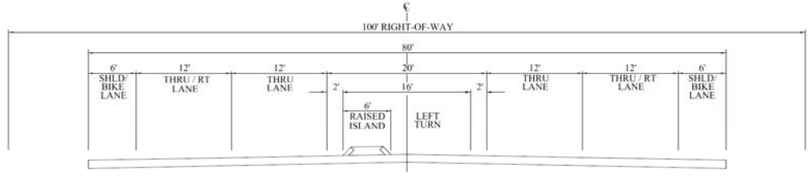




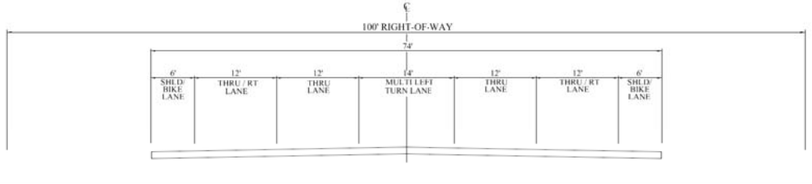


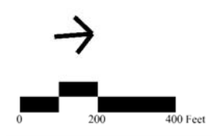
NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

***Vanasse Hangen Brustlin, Inc.***

Figure 47

Corridor Improvement Plan
Lee/Barrington

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure10.dgn

POTENTIAL FUTURE CONNECTIONS

REALIGN AND RELOCATE BEAUTY HILL ROAD

*NOTE: RECENTLY ADOPTED AS CONSERVATION LAND. MODIFICATION WILL REQUIRE TOWN APPROVAL.*

POTENTIAL FUTURE CONNECTIONS

INSERT N

Pierce Rd

NH 125

Winkley Pond Rd

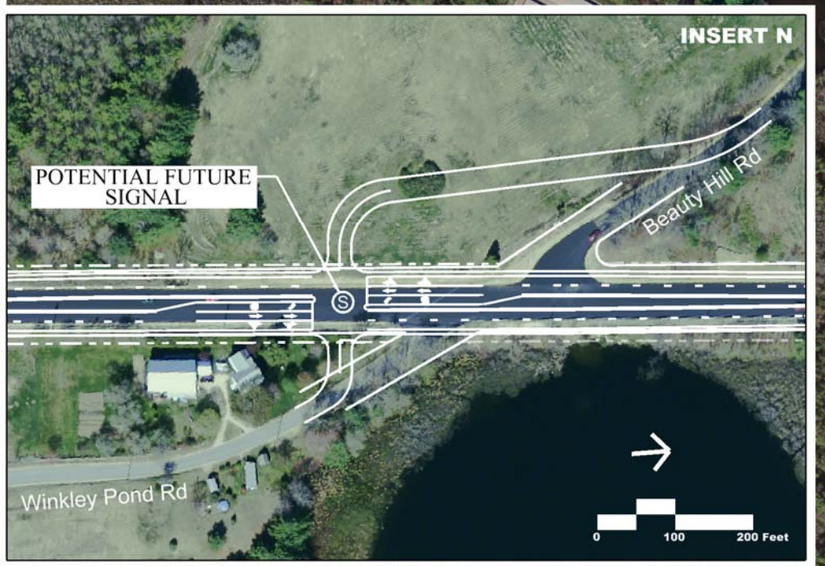
Lee Rd

Beauty Hill Rd

NH 125

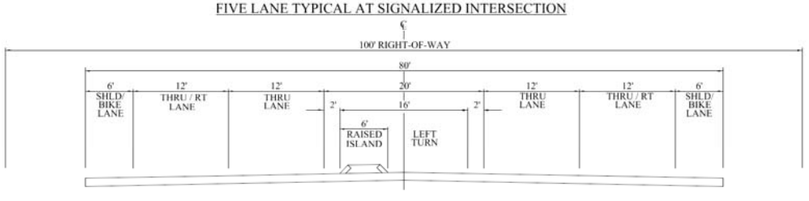
Winkley Pond Rd

REALIGN WINKLEY POND ROAD

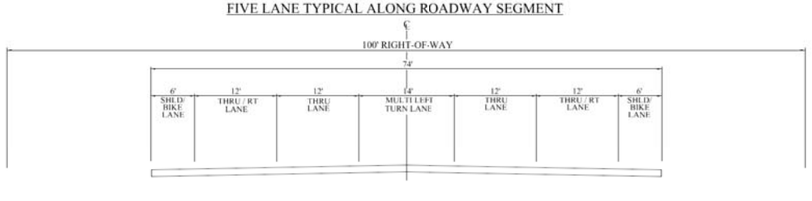



*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 48

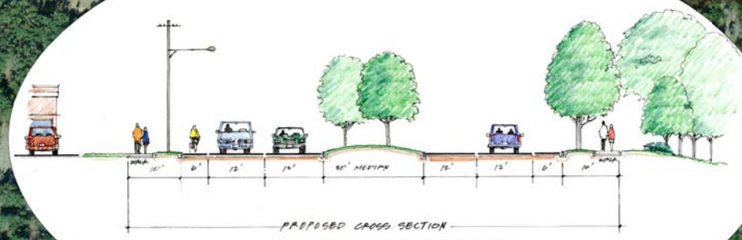
Corridor Improvement Plan
Barrington

NH Route 125
Corridor Management Study

0 200 400 Feet

Date Created:3/19/2008 Figure11.dgn

TYPICAL LANDSCAPED EDIAN SECTION



PROPOSED CROSS SECTION

PROVIDE LANDSCAPED
CENTER MEDIAN ON NH 125
BETWEEN PROVINCE ROAD
AND FOREST BROOK DRIVE

SEE PAGE 47

POTENTIAL FUTURE
CONNECTIONS

NH 125

Province Rd

Province Rd

INSERT O

POTENTIAL FUTURE
CONNECTIONS

POTENTIAL FUTURE
CONNECTIONS

PROVIDE CROSSWALKS
AND PEDESTRIAN
ACTIVATED SIGNAL CONTROL

Province Rd

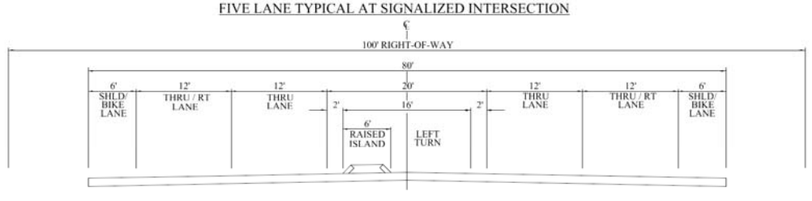
Province Rd

INSERT O

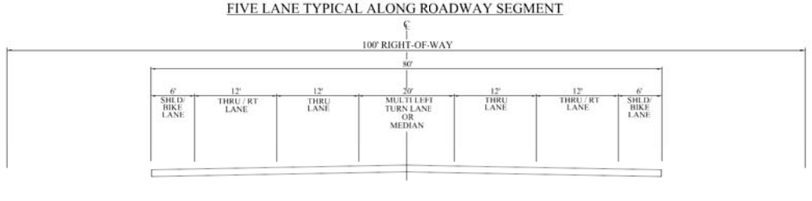
0 100 200 Feet

NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- S — TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

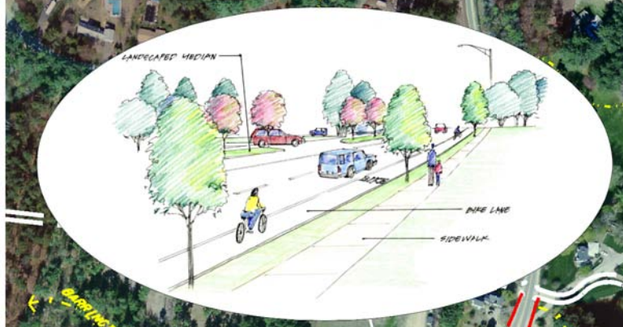
**Vanasse Hangen Brustlin, Inc.**

Figure 49

Corridor Improvement Plan
Barrington

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure12.dgn




PROPOSED BARRINGTON TOWN CENTER CONCEPT

PROVIDE MULTI-USE PED / BIKE PATH CONNECTION TO GONIC VILLAGE ALONG ABANDONED RAIL LINE

CONSIDER PED BRIDGE OR TUNNEL CROSSING

INSERT Q

INSERT P

NH 125

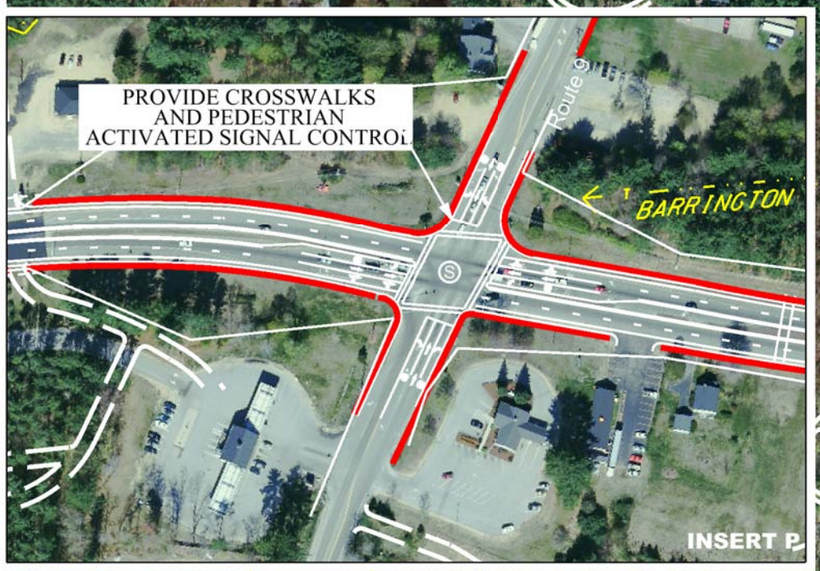
Route 9

Century Pines Dr

Forest Brook Dr

Deer Ridge Rd

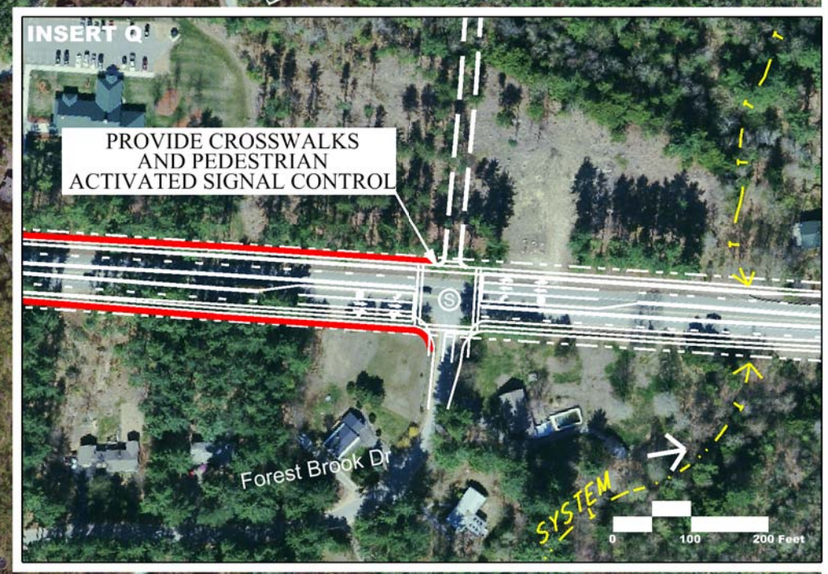
BARRINGTON TRAIL SYSTEM




TYPICAL LANDSCAPED EDIAN SECTION

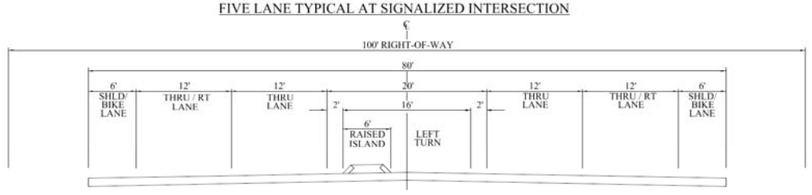

PROVIDE LANDSCAPED CENTER MEDIAN ON NH 125 BETWEEN PROVINCE ROAD AND FOREST BROOK DRIVE

SEE PAGE 47

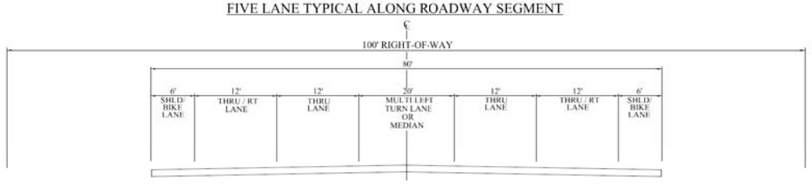


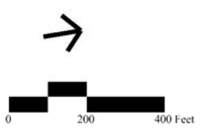

*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 50

Corridor Improvement Plan
Barrington

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure13.dgn

POTENTIAL FUTURE CONNECTIONS

PROVIDE MULTI-USE PED / BIKE PATH CONNECTION TO GONIC VILLAGE ALONG ABANDONED RAIL LINE

POTENTIAL FUTURE CONNECTIONS

INSERT R

Scruton Pond Rd

Green Hill Rd

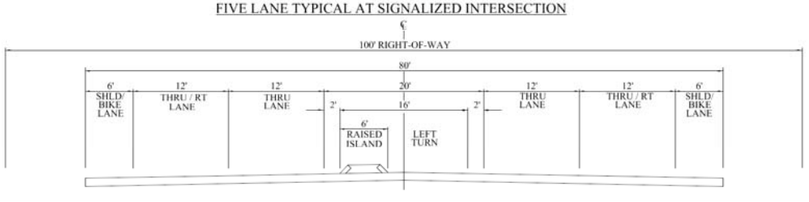
Tolend Rd

NH 125

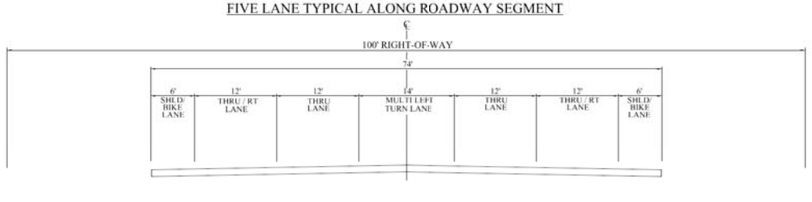

POTENTIAL FUTURE CONNECTIONS

NOTE: *POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- S — TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

**Vanasse Hangen Brustlin, Inc.**

Figure 51

Corridor Improvement Plan
Barrington

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure14.dgn

PROVIDE MULTI-USE PED / BIKE PATH CONNECTION TO GONIC VILLAGE ALONG ABANDONED RAIL LINE

POTENTIAL FUTURE CONNECTIONS

POTENTIAL FUTURE CONNECTIONS

POTENTIAL FUTURE CONNECTIONS

BARRINGTON / ROCHESTER

NH 125

Chapman Dr

Jonathan Av

Flagg Rd.

Flagg Rd

Isinglass River

Rochester Neck Rd

INSERT S

PROVIDE CROSSWALKS AND PEDESTRIAN ACTIVATED SIGNAL CONTROL

0 100 200 Feet

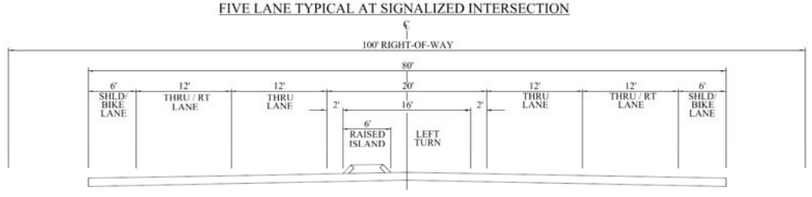
PROVIDE SIDEWALK ON ROCHESTER NECK ROAD TO CONNECT NH 125 TO GONIC TRAIL SYSTEM

PROVIDE MULTI-USE PATH CONNECTING GONIC TRAIL SYSTEM TO RESIDENTIAL NEIGHBORHOODS TO THE NORTH

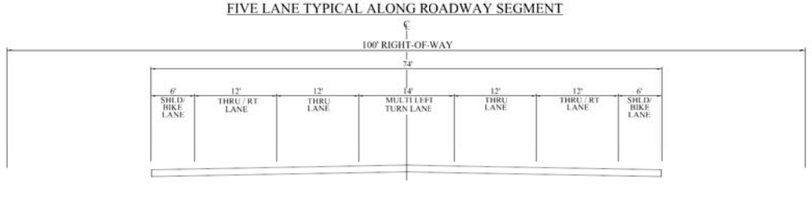
GONIC TRAIL SYSTEM

*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- S — TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

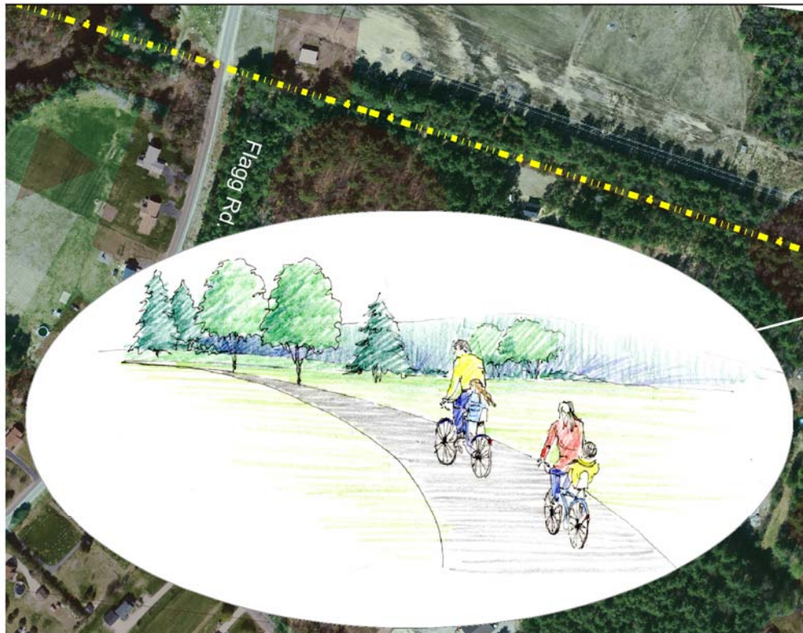
***Vanasse Hangen Brustlin, Inc.***

Figure 52

Corridor Improvement Plan
Barrington/Rochester

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure15.dgn




POTENTIAL FUTURE CONNECTIONS

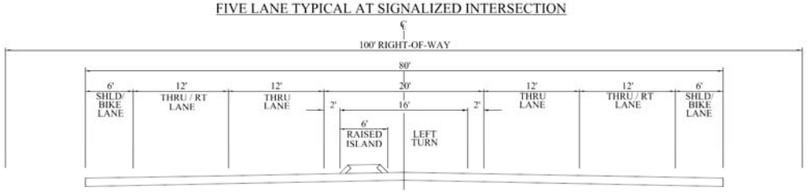
PROVIDE MULTI-USE PED / BIKE PATH CONNECTION TO GONIC VILLAGE ALONG ABANDONED RAIL LINE

PROVIDE CROSSWALKS AND PEDESTRIAN ACTIVATED SIGNAL CONTROL

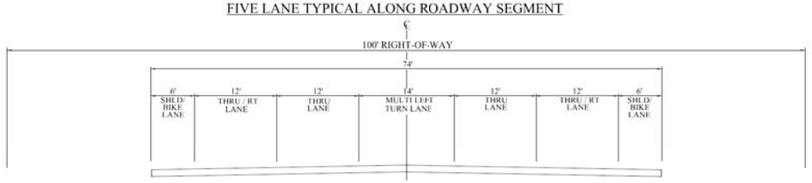
Flagg Rd
Gear Rd
Cemetery Rd
Loring Dr
Colonial Dr
Sherman St
Church St
INSERT T

0 200 400 Feet

FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

LEGEND

- TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

***Vanasse Hangen Brustlin, Inc.***

Figure 53

Corridor Improvement Plan
Rochester

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure16.dgn

PROVIDE MULTI-USE PED/BIKE PATH

MEET PLANNED NHDOT INTERCHANGE PROJECT

INSERT V

INSERT U

Oak St

Patriots Way

Grove St

Norman St

Grove St

Ancil Ct

Colby St

Main St

Shelby Ln

Sherman St

Gonic Village

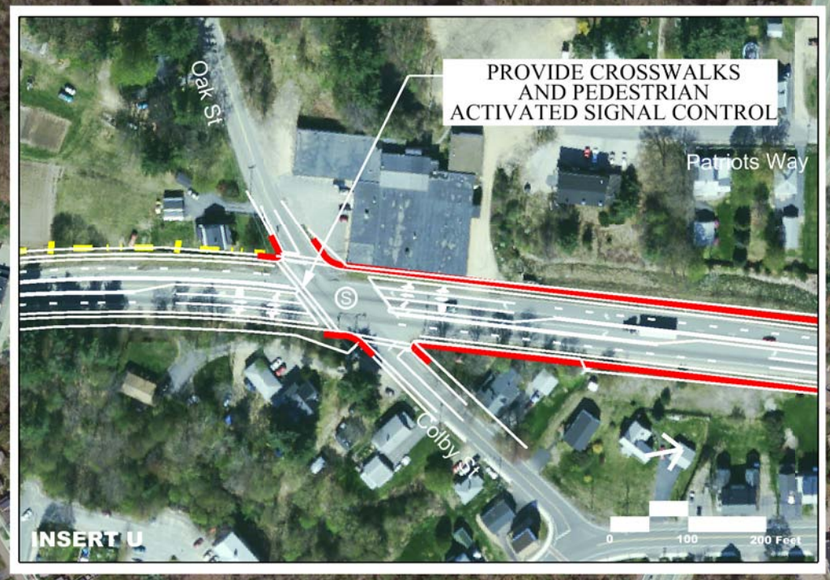
Church St

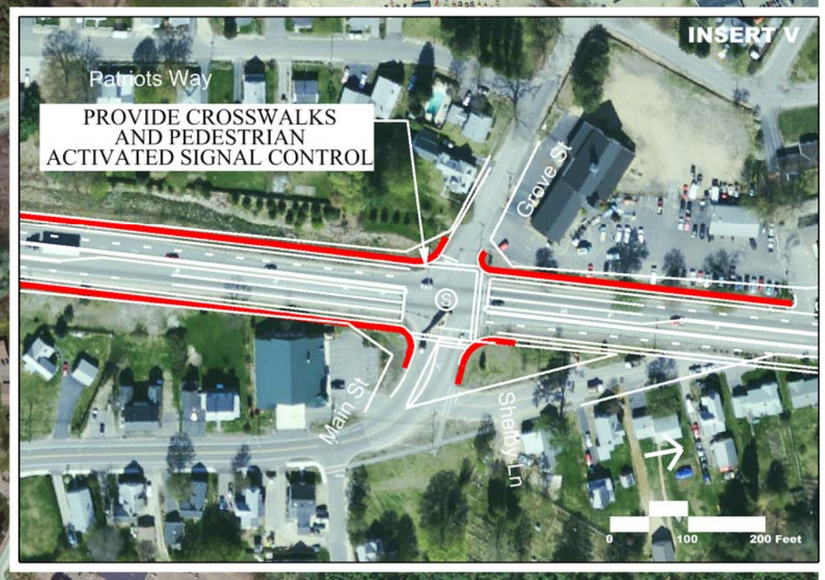
Spaulding Tpk

NH 125

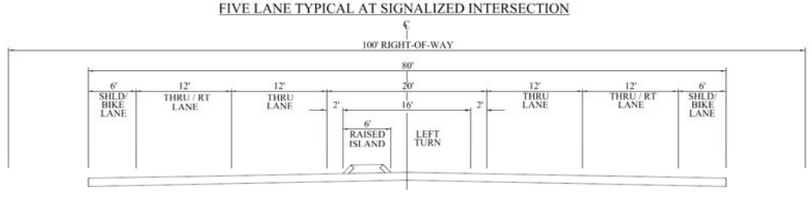
*SEE FIGURE 55 FOR CONCEPTUAL DEPICTION OF GATEWAY TREATMENT OF GONIC VILLAGE AREA*

*NOTE: POTENTIAL FUTURE CONNECTIONS DO NOT INDICATE THE ACTUAL ALIGNMENT OF A FUTURE ROADWAY, BUT RATHER SHOW OPPORTUNITIES FOR CONNECTIONS TO NEARBY PROPERTIES.*

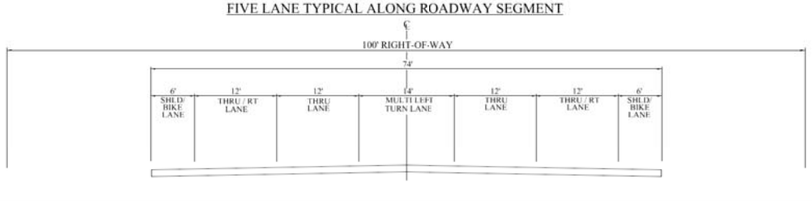



FIVE LANE TYPICAL AT SIGNALIZED INTERSECTION




FIVE LANE TYPICAL ALONG ROADWAY SEGMENT




0 200 400 Feet

LEGEND

- S TRAFFIC SIGNAL
- EXISTING ROW
- SIDEWALK
- PROPOSED ROW
- ENVIRONMENTALLY CONSTRAINED LAND

*Vanasse Hangen Brustlin, Inc.*

Figure 54

Corridor Improvement Plan
Rochester

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure17.dgn


Conceptual Depiction of Gateway Treatment of Gonic Village Area with Crosswalks, Sidewalks,
Landscaped Median and Multi-Use Pedestrian / Bicycle Path Connection Southward to the Barrington Town Center

Not to Scale

*Vanasse Hangen Brustlin, Inc.*

Figure 55

Corridor Improvement Plan
Rochester

NH Route 125
Corridor Management Study

Date Created:3/19/2008 Figure18.dgn