4

Environmental Consequences and Identification of Mitigation Measures

4.1 Introduction

This section describes the environmental consequences or impacts of the Proposed Action and provides a brief description of the existing or baseline conditions. Where impacts could not be avoided with the Proposed Action, measures to mitigate for the project's impacts are described.

4.2 Transportation Evaluation

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4.2.1 Existing Traffic and Travel Characteristics

A data collection program was conducted during the months of November and December of 2001 to determine the base traffic and travel characteristics within the NH 125 study area. These inventories include the collection of daily and weekday peak period traffic volumes and turning movement counts, and a review of seasonal, daily, and hourly traffic volume trends. In addition, vehicle crash statistics were compiled and reviewed.

Traffic counts were conducted at key locations along NH 125 and at eleven study area intersections. Table 4.2-1 summarizes the automatic traffic recorder counts that were conducted along NH 125. As shown in the table, traffic volumes along the corridor vary from approximately 23,000 vehicles per day (vpd), north of East Road in Plaistow to approximately 12,400 vpd, north of Old Coach Road in Kingston. The percentage of daily traffic occurring during the weekday morning and evening peak hour ranges from approximately 6 to 9 percent. The heavier volumes of traffic are predominantly southbound in the morning and northbound in the evening.

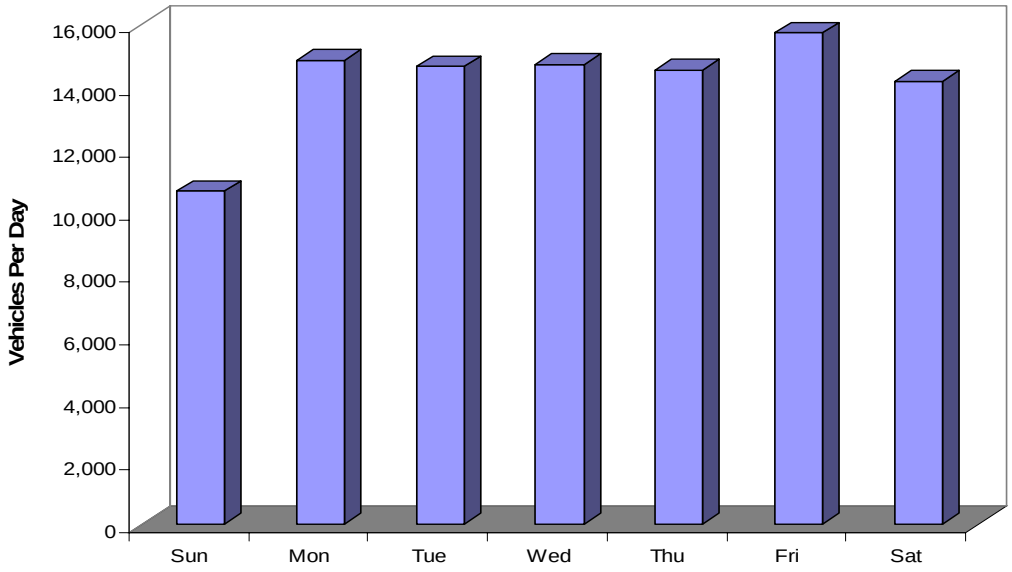
Table 4.2-1
NH 125 Traffic Volumes (November/December 2001)

Location	ADT[1] (vpd)[2]	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
		Peak Hour (vph)[3]	"K" Factor[4] (Percent)	"D" Factor[5] (Percent)	Peak Hour vph	"K" Factor (Percent)	"D" Factor (Percent)
NH 125 north of East Road	23,000	1,300	5.7	65 SB	1,800	7.8	62 NB
NH 125 south of Old County Road	13,400	790	5.9	65 SB	1,120	8.4	61 NB
NH 125 south of Newton Junction Road	14,900	990	6.6	68 SB	1,190	8.0	65 NB
NH 125 north of Old Coach Road	12,400	940	7.6	66 SB	970	7.8	56 NB
Newton Junction Road east of NH 125	3,900	350	9.0	53 EB	360	9.2	57 WB
Hunt Road west of NH 125	2,300	180	7.8	66 EB	210	9.1	66 WB

1 ADT = Average Daily Traffic
2 vpd = vehicles per day
3 vph = vehicles per hour
4 "K" Factor = Percent of ADT
5 "D" Factor = Percent of peak hour traffic in peak direction

Examination of daily traffic volume variations along the corridor revealed little variation during the weekdays with the highest daily volume recorded on a Friday. The Saturday volume is nearly as high as the weekday volume, which demonstrates the corridor's dual role of accommodating commercial activity as well as commuter traffic. Daily variations for NH 125, south of Newton Junction Road (recorded in December 2001) are depicted in **Figure 4.2-1.**

Figure 4.2-1
Daily Traffic Variations
NH Route 125 in Kingston
(South of Newton Junction Road - 2001)



A breakdown of the hourly variations for a typical weekday and Saturday (December 2001) on the corridor south of Newton Junction Road revealed markedly different trends. The weekday count exhibited typical commuter route characteristics with the highest volumes of the day occurring during the 7:00 to 8:00 AM and 4:00 to 5:00 PM commuter peak periods. Conversely, the Saturday count revealed a more substantial peak extending throughout the middle of the day (10:00 AM to 4:00 PM). The hourly variations for both weekday and Saturday are depicted in Figures 4.2-2 and 4.2-3 respectively.

Figure 4.2-2
Hourly Variations in Weekday Traffic
NH Route 125 in Kingston
(South of Newton Junction Road - 2001)

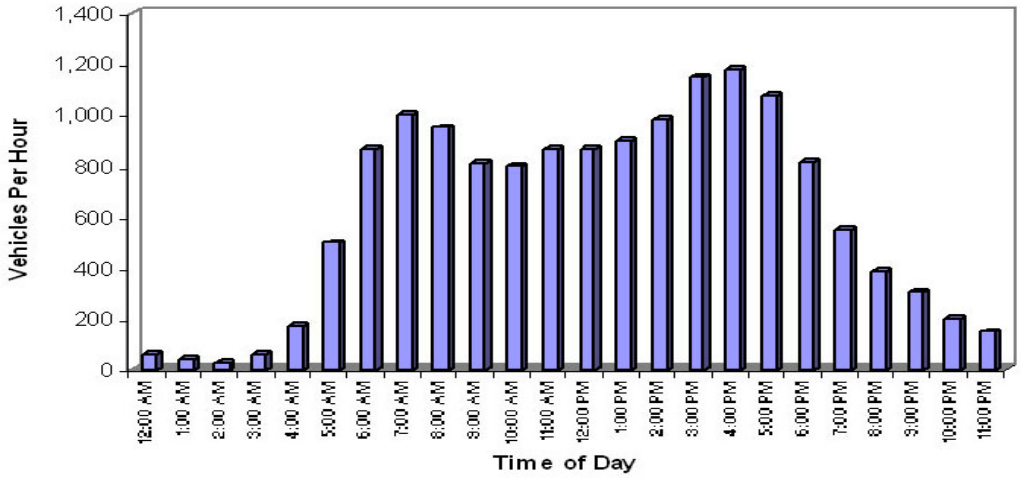
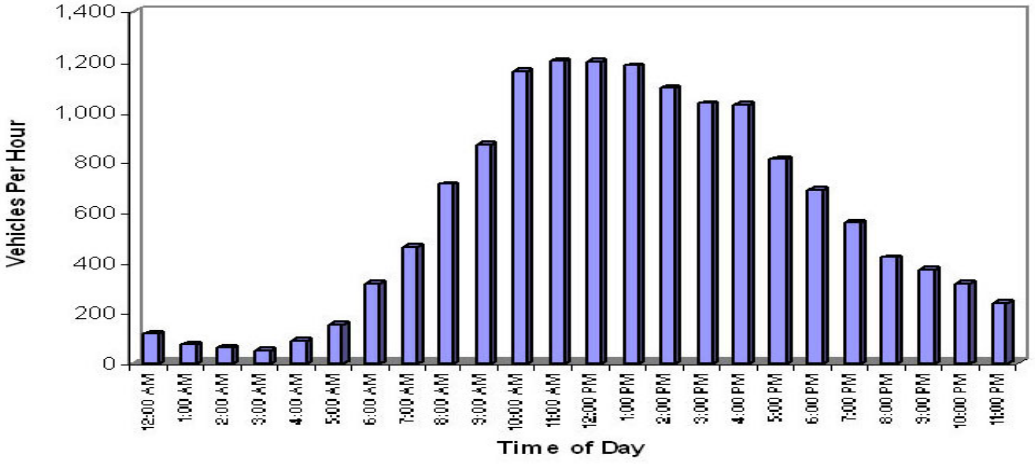


Figure 4.2-3
Hourly Variations in Saturday Traffic
NH Route 125 in Kingston
(South of Newton Junction Road - 2001)



As recommended in *A Policy on Geometric Design of Highways and Streets,* the hourly traffic volume that should generally be used for the design of a highway facility is the 30th highest hour volume of the year. Given the economic considerations involved in the planning and design of roadway facilities, this design criteria is selected since the 30th highest hourly volume generally reflects a "point of diminishing return" in that a substantial increase in design requirements would accommodate only very few periods of higher traffic volumes.

The November traffic volumes were adjusted (increased by 4 percent and 12 percent during the weekday morning and weekday evening peak hour periods, respectively) to approximate the 30th highest volume condition. The existing 2001 weekday morning and weekday evening peak hour traffic volumes are depicted in **Figures 4.2-4 and 4.2-5,** respectively.

Measuring the volume of traffic along the NH 125 corridor indicates the importance of the corridor 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.[4]

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[5] 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 analyses show that currently all of the segments of NH 125 south of NH 121A operate at LOS E during the weekday morning and evening peak hours. In addition, the segment from Kingston Road to Hunt Road operates at LOS E during the weekday evening. All other segments of the corridor operate at LOS D.

4 2000 Highway Capacity Manual, Special Report 209, Transportation Research Board, Washington, D.C.
5 Ibid.

Each of three signalized intersections operate well (LOS C or better) during both peak periods. Poor operating conditions (LOS E and F) and long delays are experienced by motorists entering the corridor from many of the unsignalized side streets. The results of the roadway segment, and signalized and unsignalized intersection analyses are summarized in Tables 4.2-2, 4.2-3 and 4.2-4.

Table 4.2-2
2001 Existing Roadway Segment Capacity Analyses Summary

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
Roadway Segment	**Volume[1]**	**LOS[2]**	**Volume**	**LOS**
East Road and Joanne Drive to Old Road	1,455	E	2,035	E
Old Road to Danville Road	1,505	E	2,050	E
Jesse George Road to Main Street (NH 121A)	885	E	1,320	E
Main Street (NH 121A) to Old County Road	890	D	1,325	D
Kingston Road to Hunt Road and Newton Junction Road	1,080	D	1,530	E
Hunt Road and Newton Junction Road to Old Coach Road	1,075	D	1,275	D
Old Coach Road to NH 111	985	D	1,140	D

1 The number of vehicles in both directions during the hour of operation.
2 Level of service.

Table 4.2-3
2001 Existing Signalized Capacity Analyses Summary

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Intersection	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**
NH 125 / East Road / Joanne Drive	0.51	20	C	0.51	21	B
NH 125 / Main Street (NH 121A)	0.63	23	C	0.83	34	C
NH 125 / NH 111	0.57	18	B	0.58	19	B

1 Volume to capacity ratio
2 Average delay per vehicle expressed in seconds
3 Level of service

Table 4.2-4
2001 Existing Unsignalized Capacity Analyses Summary

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Location	**Demand[1]**	**Delay[2]**	**LOS[3]**	**Demand**	**Delay**	**LOS**
NH 125 / Old Road						
Left from NH 125 SB	20	9	A	20	13	B
All movements from Old Road WB	65	18	C	55	76	F
NH 125 / Danville Road						
Left from NH 125 NB	165	21	C	460	88	F
Right from Danville Road EB	495	77	F	285	21	C
NH 125 / Jesse George Road						
Left from NH 125 NB	5	9	A	20	9	A
Left from NH 125 SB	5	8	A	5	10	A
All movements from Jesse George Road WB	80	32	D	50	67	F
All movements from Jesse George Road EB	75	49	E	40	83	F
NH 125 / Old County Road						
Left from NH 125 NB	15	9	A	25	9	A
Left from NH 125 SB	10	8	A	5	10	A
All movements from Old County Road WB	50	31	D	120	259	F
All movements from Old County Road EB	65	25	C	95	338	F
NH 125 / Kingston Road						
Left from NH 125 SB	185	9	A	70	11	B
Left from Kingston Road WB	10	33	D	10	40	E
Right from Kingston Road WB	50	11	B	230	39	E
NH 125 / Hunt Road / Newton Junction Road						
Left from NH 125 NB	30	10	A	100	9	A
Left from NH 125 SB	140	9	A	125	11	B
All movements from Newton Jct. Road WB	135	60	F	155	766	F
All movements from Newton Jct. Road EB	100	85	F	90	271	F
NH 125 / Old Coach Road						
Left from NH 125 SB	20	10	A	95	9	A
All movements from Old Coach Road EB	85	18	C	55	15	B

1 Demand indicates number of vehicles making movement
2 Average delay per vehicle expressed in seconds
3 Level of service

■

4.2.2 Crash Statistics

Crash statistics compiled by the NHDOT for the five-year period of January 1996 through December of 2002 were reviewed. The crash data for the study area revealed a total of 457 crashes during the seven-year period. A summary of the crash data is presented in Tables 4.2-5 and 4.2-6.

Table 4.2-5
NH 125 Crash Summary (1996 – 2002)

Location on NH 125	Property Damage Only	Personal Injury	Fatality	Total
East Road Intersection	29	11	0	40
Segment: East Road to Old Road	8	5	0	13
Old Road Intersection	17	4	0	21
Segment: Old Road to Danville Road/ Jesse George Road	5	3	0	8
Danville Road/Jesse George Road Intersection	30	22	0	52
Segment: Danville Road/Jesse George Road to Main Street	1	0	0	1
Main Street (NH 121A) Intersection	63	32	0	95
Segment: Main Street to Old County Road	14	3	0	17
Old County Road Intersection	23	10	0	33
Segment: Old County Road to Kingston Road	1	0	0	1
Kingston Road Intersection	9	5	0	14
Segment: Kingston Road to Hunt Road/Newton Junction Road	21	9	0	30
Hunt Road/Newton Junction Road Intersection	30	16	0	46
Segment: Hunt Road/Newton Junction Road to Old Coach Road	11	2	0	13
Old Coach Road Intersection	14	7	1	22
Segment: Old Coach Road to Meeks Road	1	4	0	5
Meeks Road Intersection	12	10	0	22
Segment: Meeks Road to NH 111	8	1	1	10
NH 111 Intersection	10	4	0	14
Total	307	148	2	457

Table 4.2-6
Crash Summary by Surface Condition, Season and Year

Surface Condition		Season		Year	
Clear / Dry	352	Winter	109	1996	61
Wet	84	Spring	117	1997	53
Snow / Ice	18	Summer	102	1998	56
Other / Unknown	3	Fall	129	1999	60
Total	457	Total	457	2000	70
				2001	82
				2002	75
				Total	457

The following trends have been identified:`

- The intersection of NH 125 with Main Street (NH 121A) recorded the highest number of crashes with 95 (21 percent). Fifty-two crashes (11 percent) were recorded at the intersection of NH 125 with Danville Road and Jesse George Road and 46 crashes (10 percent) were recorded at the intersection of NH 125 with Hunt Road and Newton Junction.

- The roadway surface condition was recorded as dry for 352 crashes (77 percent), wet for 84 (18 percent), snow or ice for 18 (4 percent). The road condition for the remaining three crashes was unknown.

- Of the total 457 crashes, 307 (67 percent) were limited to property damage only, while 148 crashes (32 percent) resulted in personal injury. There were two fatal crashes in the study area over the five-year period.

- There was a steady increase in the number of crashes from 1997 (53 crashes) through 2001 (82 crashes). The first and last year of the seven-year period did not fit into this trend, as 61 crashes were recorded in 1996 and 75 crashes were recorded in 2002.

- Although the highest number of crashes [129 (23 percent)] was recorded in the Fall, there was little seasonal fluctuation in the number of crashes. One-hundred and seventeen crashes (26 percent) were recorded in the Spring, 109 crashes (24 percent) were recorded in the Winter, and 102 crashes (22 percent) were recorded in the Summer.

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4.2.3 Future Traffic Conditions

To evaluate future travel demands within the study area, the year 2004 and design year 2024 traffic volume conditions were developed. The 1999 Feasibility Study included a comprehensive evaluation of future land use potential along the corridor. The methodology used to estimate future land use potential was to take the total acreage of land along the corridor and subtract the amount of existing developed land as well as any land that is constrained from future development due to such factors as poor soils, water/wetlands, and conservation land. This exercise resulted in an estimate of approximately 182 developable hectares (450 acres) (40 hectares [100 acres] in Plaistow and 142 hectares [350 acres] in Kingston) of land along the corridor. Vehicle-trip estimates were determined by applying standardized Institute of Transportation Engineers (ITE) formulas to three broad land use categories (residential, retail, and industrial) based on existing zoning.

The results of the evaluation showed that if the full build-out (defined as the development of all developable parcels) of the corridor were to occur over a 20-year period the average annual growth rate would range as high as 5.2 percent per year with the higher growth rate occurring along the northern segments of the corridor, and a lower growth rate of approximately 2.0 percent per year expected along the already built-up southern segment of the corridor. However, given that historical growth trends have generally shown increased growth at approximately 2.0 percent per year, it is reasonable to conclude that the full build-out of the corridor would not occur within a 20-year period. In fact, if the full build-out were to occur within a 20-year period, the growth rate would substantially exceed the 1 to 2 percent annual growth rate projected for the corridor by the Rockingham Planning Commission's traffic model.

In an effort to reflect a reasonable growth rate, the full build-out projections were adjusted while maintaining the relative distributions of growth throughout the corridor. The adjustment resulted in average growth rates ranging from 1.5 percent along the southern segment, to 1.75 percent along the central segment, to 2.0 percent along the northern segment.

The 2004 and 2024 weekday morning and weekday evening peak hour traffic volumes for the No-Build condition are depicted in **Figures 4.2-6 - 4.2-7, and 4.2-8 - 4.2-9,** respectively.

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4.2.4 Summary of Traffic Impacts

The results of the year 2004 No-Build analyses show poor operating conditions for the all roadway segments south of NH 121A, which operate at LOS E. Acceptable operations are maintained at the three signalized intersections. However, the NH

125/NH 121A intersection deteriorates to LOS D during the weekday evening peak hour. Poor operating conditions (LOS E and F) and long delays are experienced by motorists entering the corridor from many of the unsignalized side streets.

Under the 2024 No-Build condition the roadway segments from East Road to Danville Road are expected to operate at a failure condition (LOS F). All other roadway segments along the study corridor are expected to operate at LOS E. Acceptable operations (LOS C) continue to be maintained at the NH 125/East Road and NH 125/NH 111 signalized intersections. However, the NH 125/NH 121A signalized intersection is expected to deteriorate to LOS F. In addition, motorists entering the corridor from all of the study area unsignalized side streets are expected to experience substantial delay. These movements are expected to operate at LOS F.

The results of the roadway segment, and signalized and unsignalized intersection analyses for the 2004 and 2024 No-Build conditions are summarized in Tables 4.2-7 through 4.2-12.

Table 4.2-7
2004 No-Build Roadway Segment Capacity Analyses Summary

	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
Roadway Segment	**Volume[1]**	**LOS[2]**	**Volume**	**LOS**
East Road and Joanne Drive to Old Road	1,530	E	2,140	E
Old Road to Danville Road	1,585	E	2,155	E
Jesse George Road to Main Street (NH 121A)	935	E	1,385	E
Main Street (NH 121A) to Old County Road	935	D	1,390	D
Kingston Road to Hunt Road and Newton Junction Road	1,140	D	1,605	E
Hunt Road and Newton Junction Road to Old Coach Road	1,140	D	1,355	D
Old Coach Road to NH 111	1,045	D	1,210	D

1 The number of vehicles in both directions during the hour of operation.
2 Level of service.

Table 4.2-8
2004 No-Build Signalized Capacity Analyses Summary

	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
Intersection	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**
NH 125 / East Road / Joanne Drive	0.53	21	C	0.54	21	B
NH 125 / Main Street (NH 121A)	0.66	24	C	0.87	37	D
NH 125 / NH 111	0.60	19	B	0.62	20	B

1 Volume to capacity ratio.
2 Average delay per vehicle expressed in seconds.
3 Level -of service.

Table 4.2-9
2004 No-Build Unsignalized Capacity Analyses Summary

Location	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Demand[1]	Delay[2]	LOS[3]	Demand	Delay	LOS
NH 125 / Old Road						
Left from NH 125 SB	20	9	A	20	13	B
All movements from Old Road WB	70	19	C	55	99	F
NH 125 / Danville Road						
Left from NH 125 NB	520	109	F	300	24	C
Right from Danville Road EB	175	23	C	485	121	F
NH 125 / Jesse George Road						
Left from NH 125 NB	5	10	A	20	9	A
Left from NH 125 SB	5	8	A	5	10	A
All movements from Jesse George Road WB	85	40	E	50	81	F
All movements from Jesse George Road EB	80	72	F	40	107	F
NH 125 / Old County Road						
Left from NH 125 NB	15	10	A	25	9	A
Left from NH 125 SB	10	9	A	5	10	A
All movements from Old County Road WB	50	34	D	125	354	F
All movements from Old County Road EB	65	27	D	95	714	F
NH 125 / Kingston Road						
Left from NH 125 SB	195	9	A	75	11	B
Left from Kingston Road WB	10	36	E	10	46	E
Right from Kingston Road WB	55	11	B	240	49	E
NH 125 / Hunt Road / Newton Junction Road						
Left from NH 125 NB	5	10	A	55	9	A
Left from NH 125 SB	105	9	A	75	11	B
All movements from Newton Jct. Road WB	140	134	F	165	>1000	F
All movements from Newton Jct. Road EB	105	165	F	90	708	F
NH 125 / Old Coach Road						
Left from NH 125 SB	20	10	A	100	9	A
All movements from Old Coach Road EB	90	19	C	60	16	C

1 Demand indicates number of vehicles making movement.
2 Average delay per vehicle expressed in seconds.
3 Level of service.

Table 4.2-10
2024 No-Build Roadway Segment Capacity Analyses Summary

Roadway Segment	Weekday Morning Peak Hour		Weekday Evening Peak Hour	
	Volume[1]	LOS[2]	Volume	LOS
East Road and Joanne Drive to Old Road	2,165	F	3,030	F
Old Road to Danville Road	2,245	F	3,055	F
Jesse George Road to Main Street (NH 121A)	1,330	E	1,960	E
Main Street (NH 121A) to Old County Road	1,325	D	1,970	E
Kingston Road to Hunt Road and Newton Junction Road	1,615	E	2,265	E
Hunt Road and Newton Junction Road to Old Coach Road	1,695	E	2,015	E
Old Coach Road to NH 111	1,550	E	1,795	E

1 The number of vehicles in both directions during the hour of operation.
2 Level of service.

Table 4.2-11
2024 No-Build Signalized Capacity Analyses Summary

Intersection	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS
NH 125 / East Road / Joanne Drive	0.71	25	C	0.72	27	C
NH 125 / Main Street (NH 121A)	0.91	44	D	1.21	118	F
NH 125 / NH 111	0.88	31	C	0.90	30	C

1 Volume to capacity ratio.
2 Average delay per vehicle expressed in seconds.
3 Level of service.

Table 4.2-12
2024 No-Build Unsignalized Capacity Analyses Summary

Location	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Demand[1]	Delay[2]	LOS[3]	Demand	Delay	LOS
NH 125 / Old Road						
Left from NH 125 SB	30	9	A	30	20	C
All movements from Old Road WB	100	66	F	80	>1000	F
NH 125 / Danville Road						
Left from NH 125 NB	735	600	F	425	162	F
Right from Danville Road EB	250	86	F	685	591	F

Table 4.2-12 (continued)

Location	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Demand[1]	Delay[2]	LOS[3]	Demand	Delay	LOS
NH 125 / Jesse George Road						
Left from NH 125 NB	5	11	B	30	11	B
Left from NH 125 SB	5	9	A	5	12	B
All movements from Jesse George Road WB	115	>1000	F	70	>1000	F
All movements from Jesse George Road EB	115	>1000	F	55	>1000	F
NH 125 / Old County Road						
Left from NH 125 NB	20	11	B	35	10	A
Left from NH 125 SB	15	9	A	5	12	B
All movements from Old County Road WB	70	293	F	175	>1000	F
All movements from Old County Road EB	90	123	F	135	>1000	F
NH 125 / Kingston Road						
Left from NH 125 SB	275	10	A	105	14	B
Left from Kingston Road WB	15	111	F	15	188	F
Right from Kingston Road WB	80	12	B	340	453	F
NH 125 / Hunt Road / Newton Junction Road[4]						
Left from NH 125 NB	5	12	B	90	10	A
Left from NH 125 SB	155	10	A	120	16	C
All movements from Newton Jct. Road WB	205	>1000	F	245	>1000	F
All movements from Newton Jct. Road EB	165	>1000	F	130	>1000	F
NH 125 / Old Coach Road						
Left from NH 125 SB	30	12	B	150	11	B
All movements from Old Coach Road EB	130	57	F	85	30	D

1 Demand indicates number of vehicles making movement.
2 Average delay per vehicle expressed in seconds.
3 Level of service.
4 Analyses do not take improvement, currently under construction, into account.

The Proposed Action consists of the reconstruction and widening of NH 125 to four travel lanes (2 lanes in each direction) from East Road in Plaistow to Hunt Road/Newton Junction Road in Kingston. A two-lane section (1 lane in each direction) would be maintained north of the Hunt Road/Newton Junction Road intersection. Where the 4-lane section is provided, a raised center median would separate directional flow and provide median openings to accommodate left-turn movements. Exclusive left-turn lanes, traffic signal control, and full access and egress would be provided at nine major intersections. In addition, "directional median openings" would be provided at several key locations along NH 125. Directional median openings would allow motorists to turn

left from NH 125 onto certain side streets or driveways while prohibiting left-turn movements onto the corridor.

The results of the level of service analyses for the Proposed Action demonstrate that under the 20-year condition (2024), the Proposed Action will operate at acceptable levels. The 4-lane section of NH 125 extending from East Road in Plaistow to Hunt Road/Newton Junction Road in Kingston is expected to operate at LOS C or better. Each of the signalized intersections would operate at LOS C or better, with the one exception of the NH 125/ NH 121A intersection that would operate at LOS D (still acceptable) during the weekday evening peak hour.

Note that the northernmost sections of the corridor, north of the Hunt Road/Newton Junction Road intersection, will not be widened to a 4-lane section under the Proposed Action. As a result, the northern segment would operate at the same level of service (LOS E) in 2024 as the No-Build condition. However, with far fewer intersecting side streets and curb cuts along this section of NH 125 as compared to the remainder of the corridor, the NHDOT and the communities concluded that widening this segment of the corridor was not necessary to meet the project's purpose and need. The Proposed Action does provide a two-way center turn lane (3-lane section) from 200 meters (±650 feet) south of Meeks Road to 200 meters (±650 feet) north of Stoney Brook Road to accommodate the relatively high concentration of left turns in that area. In addition, the NHDOT is providing the towns of Kingston and Plaistow a comprehensive access management manual that will be used by the towns as a long-term planning tool to guide future development decisions and to enhance the efficient movement of traffic along NH 125.

The results of the roadway segment, and signalized and unsignalized intersection analyses for the 2004 and 2024 Build conditions are summarized in Tables 4.2-13 through 4.2-15.

Table 4.2-13
2024 Build Roadway Segment Capacity Analyses Summary

	Weekday Morning Peak Hour				Weekday Evening Peak Hour			
	Northbound		Southbound		Northbound		Southbound	
Roadway Segment	Volume[1]	LOS[2]	Volume	LOS	Volume	LOS	Volume	LOS
East Road and Joanne Drive to Old Road	530	A	1,565	C	1,820	C	1,140	B
Old Road to Danville Road	595	A	1,565	C	1,830	C	1,140	B
Jesse George Road to Main Street (NH 121A)	600	A	910	B	1,735	C	750	A
Main Street (NH 121A) to Old County Road	415	A	910	B	1,170	B	800	A
Kingston Road to Hunt Road and Newton Junction Road	445	A	1,130	B	1,395	B	820	A

1 The number of vehicles during the hour of operation.
2 Level of service.

Table 4.2-14
2024 Build Signalized Level of Service Summary

Location	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	v/c[1]	Delay[2]	LOS[3]	v/c	Delay	LOS
NH 125 / East Road / Joanne Drive	0.71	24	C	0.72	26	C
NH 125 / Access Road[4]	0.85	30	C	0.66	19	B
NH 125 / Danville Road	0.83	21	C	0.62	10	B
NH 125 / NH 121A (Main Street)	0.81	31	C	0.95	49	D
NH 125 / Old County Road	0.45	12	B	0.67	17	B
NH 125 / Kingston Road / Roadstone Drive	0.45	14	B	0.69	15	B
NH 125 / Colonial Road / Debra Road	0.44	9	A	0.58	11	B
NH 125 / Hunt Road / Newton Junction Road	0.55	22	C	0.73	24	C
NH 125 / NH 111	0.88	30	C	0.90	30	C

1 Volume to capacity ratio.
2 Average delay (in seconds) per vehicle.
3 Level of service.
4 Intersection opposite old drive-in.

Table 4.2-15
2024 Build Unsignalized Level of Service Summary

Location	Weekday Morning Peak Hour			Weekday Evening Peak Hour		
	Demand[1]	Delay[2]	LOS[3]	Demand	Delay	LOS
NH 125 / Old Road						
Right from Old Road WB	85	11	B	65	28	D
NH 125 / Jesse George Road						
Right from Jesse George Road WB	5	10	B	5	14	B
Right from Jesse George Road EB	5	9	A	5	9	A
NH 125 / Old Coach Road						
Left from NH 125 NB	30	12	B	150	10	B
All movements from Old Coach Road EB	130	56	F	85	30	D

1 Demand indicates the number of vehicles making the movement.
2 Average delay (in seconds) per vehicle.
3 Level of service.

4.3 Wetlands

■

4.3.1 Introduction

Wetlands are federally protected under the Clean Water Act and activities resulting in impacts to them require a permit from the U.S. Army Corps of Engineers (USACOE) under Section 404 of that same Act. Executive Order 11990 also requires that federal actions which affect wetlands must include a "finding that there are no practicable alternatives" to the proposed construction in wetlands and the Proposed Action includes all practical means to reduce harm to wetlands. Wetlands are also protected under State of New Hampshire statutes, with a permit required from the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau.

Wetlands were identified and mapped within the project corridor using National Wetlands Inventory (NWI) maps, Natural Resource Conservation Service (NRCS) soil surveys, aerial photographs, and field reconnaissance. Wetland boundaries were determined based on field verification of vegetation, soils and hydrology, in accordance with the *1987 Corps of Engineers Wetland Delineation Manual*. Consistent with the 1987 Manual and the USACOE *Highway Methodology Workbook Supplement*, wetland boundaries were formally field delineated and surveyed in November 2001. Function and value assessments were conducted in August/September 2002. Additional wetland delineations were also performed in September/October 2003 to include areas where certain project elements (*i.e.*, intersection improvements, access drives, and connector roads) were designed after the initial delineation was performed in November 2001. USACOE New England District Wetland Delineation Data Sheets and Highway Methodology Function and Value Assessment Forms are contained in a separately bound report.

NWI mapping was obtained from the GRANIT Geographic Information System and combined with field delineated wetland information to provide extensive mapping within the study area. The resulting wetlands mapping is depicted in **Figure 4.3-1**.

NWI maps use the U.S. Fish and Wildlife Service (USFWS) *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin *et al*, 1979). The Cowardin approach classifies wetland "systems" according to plants, soils, and frequency of flooding. The systems are then further divided into subsystems, classes, and subclasses based on substrate material, flooding regime, and vegetation type. Wetland classification types for each delineated wetland were field-verified using the Cowardin system.

Detailed descriptions, locations, cover type classifications, and a summary of functions and values of wetlands within the project area are provided in the following sections. In addition, potential mitigation sites were identified and field

checked for their current status and suitability for providing compensatory mitigation to offset project-related impacts. These sites are described in Section 4.3.4.

■

4.3.2 Description of Existing Conditions

General Wetland Descriptions

The majority of wetland systems within the study area are associated with several named and unnamed streams and ponds, within the watersheds of the Little River and the Powwow River. Other wetlands are located within forested depressional areas, or associated with roadway drainage structures. They include mowed highway shoulders and drainage ditches, and wetlands located in the vicinity of intersections. In general, wetlands within the southern one-third of the study area are more disjointed, disturbed and altered, largely attributable to a greater amount of land development and fragmentation than in the northern two-thirds of the highway corridor. In some areas adjacent to NH 125 and commercial properties, large quantities of debris, trash, fill piles, and sand and silt from roadway runoff were noted. Other wetland areas within the project corridor have noteworthy vegetative communities, such as around Bayberry Pond in Kingston. The majority of wetlands within the study area are palustrine forested (PFO) and palustrine emergent (PEM) wetlands. Lesser amounts of palustrine scrub-shrub (PSS) wetlands are generally found transitional between wooded and herbaceous wetlands or marginal to larger forested or emergent systems adjacent to the roadway. Smaller PSS wetlands are also located in highly disturbed locations adjacent to some commercial properties.

In Plaistow, wetlands border the Little River and its tributaries, Kelly Brook, Bryant Brook, and other small, unnamed tributaries and ponds. In Kingston, west of NH 125, wetland areas are found adjacent to Bayberry Pond, Mill Pond and Great Pond. East of the highway, wetlands that drain to Country Pond, Cedar Swamp Pond and Powwow Pond extend from the ponds to the shoulders of NH 125 in many locations. The ponds themselves, however, lie over 305 meters (1,000 feet) from NH 125, and are outside the study area.

Wetlands are identified with one, two or three letter designations. These letter designations correspond to the flagged wetland boundaries in the field, which in many cases are hydrologically connected. Thirty-seven wetland systems were identified in the study area. These wetland systems are described on the following pages and are shown on **Figure 4.3-1**.

Little River Watershed

At the southern terminus of the project in Plaistow, to a point approximately 0.8 kilometers (0.5 miles) to the north, there are several wetland areas on the east side of the highway which drain eastward toward the Little River. The Little River flows southward and parallel to NH 125. An extensive area of wetland, consisting of PFO,

PSS, and PEM is located between the highway and the Little River. Wetlands A and C include two small ponds (one near Joanne Drive and another approximately 305 meters [1,000 feet] to the north) fringed with shrubs such as silky dogwood (*Cornus amomum*), speckled alder (*Alnus rugosa*), glossy buckthorn (*Rhamnus frangula*), and red maple (*Acer rubrum*). Small areas of emergent herbaceous wetlands (Wetland D and E) are located further north (in the vicinity of automobile dealerships), and are dominated with invasive species such as purple loosestrife (*Lythrum salicaria*), and common reed (*Phragmites australis*). Portions of these wetlands have been altered or disturbed, or consist of constructed stormwater management areas. Wetlands C and D drain to Wetland FR3, which is described below.

North and west of the East Road/NH 125 intersection, a large area of PEM (Wetland GGG) is fringed with woody vegetation and drains via a culvert to the east of the highway to Wetland B (described below). The emergent marsh portion of Wetland GGG is vegetated largely with the invasive species, purple loosestrife and common reed, and with broad-leaved cattail (*Typha latifolia*). Forested wetlands bordering the marsh are vegetated with red maple, American elm (*Ulmus americana*), arrow-wood (*Viburnum dentatum*), highbush blueberry (*Vaccinium corymbosum*), speckled alder and species of *Spiraea*. This wetland system has been subject to disturbance in many areas, as piles of fill, debris (lawn clippings, branches) and items of trash are located on and at the bottom of slopes to the rear of many of the buildings and residences immediately west of the highway.

Wetland B is a large wetland east of the highway and bordering the Little River. Consisting of areas of PFO, PSS, and PEM, the wetland system extends to the highway in many locations where it collects direct highway drainage and stormwater runoff from paved surfaces associated with dense commercial development. Wetland B, which drains to Wetland FR3, is vegetated with many of the same plant species previously mentioned, including invasive exotics. Large portions of these wetlands have been altered and disturbed, or consist of constructed stormwater management areas.

Wetlands FR1, FR2, FR3 and FR4 are located east of the highway, bordering and draining directly to the Little River. Wetland FR1 is a created wetland formed in a large detention basin adjacent to the North American Van Lines property. The majority of this PEM wetland is vegetated with cattail, purple loosestrife, reed-canary grass and sedges. Red maple, speckled elder, elm, and willow are found in the marginal areas of PSS. Wetland FR1 drains to Wetland FR4.

Wetland FR2 is a large wetland system consisting of forested, shrub and emergent wetlands. Portions of this wetland include a detention/retention basin, and drainage channels located to the east of these commercial properties: 125 Auto & Truck Sales, Cycle-Rama and 125 Tools/Discount Photo. At its northern end (toward Old Road), the majority of this wetland is disturbed and altered by human activities. Large piles of fill, construction materials, and dumped debris are located in portions of the wetland. In other areas, apparent removal of sand and gravel to the water, table is

evidenced by deeply cut channels with flowing water and large area sediment deposition further east and nearer the Little River.

Wetland FR3 is located to the south of Wetlands FR1 and FR2, east of the Village Curtain Shops, Irving Gas Station, Auto Exchange, Subaru and Jiffy Lube. Wetland FR3 receives drainage from Wetlands C and D. Consisting primarily of PSS and PEM, portions of this wetland appear to be disturbed and altered, Large quantities of trash and dumped debris are located in this thickly vegetated wetland, which has a similar plant community as other shrub and emergent wetlands described previously.

Wetland FR4 consists of a stormwater detention area that receives overflow drainage from Wetland FR1 and sheet flow from paved parking areas east of the Irving Gas Station and American Van Lines properties. Wetland FR4 has a shrub and emergent plant community that is common in other areas along the highway. This wetland drains to Wetland FR3 via a culvert beneath an existing dirt road which extends southeast from commercial property along NH 125.

West of the highway, about 610 meters (2,000 feet) north of the southern project terminus, an area of PFO and PSS wetland (Wetland FFF) receives drainage directly from the highway stormwater management system and from upgradient areas adjacent to a former drive-in theatre. A deeply scoured channel carries large quantities of sand and silt into the wetland from the upslope area, as evidenced by several feet of layered sand and silt in the wetland near NH 125. An emergent marsh extends further to the west of the degraded wetlands. This wetland system drains southward toward the large emergent marsh located near East Road (Wetland GGG). Many of the plant species previously mentioned are also found in these wetlands.

In the vicinity of the NH 121A (Main Street) and NH 125 intersection, two areas of predominantly emergent marsh drain into larger forested wetland areas. One area of PEM (Wetland EEE) is located immediately to the west of NH 125 and north of NH 121A, receives direct untreated surface runoff from the Plaistow Commons retail strip, and drains westward toward a PFO wetland located amidst a residential area. Largely vegetated with cattail and common reed, the emergent marsh is ringed with a narrow strip of PFO wetland near NH 125. Wooded plant species include eastern white pine (*Pinus strobus*), red maple, eastern hemlock (*Tsuga canadensis*), and yellow and black birch (*Betula alleghaniensis* and *B. lenta*), arrow-wood, highbush blueberry, and winterberry holly (*Ilex verticillata*). Trees have been extensively cut along the roadway shoulder, in the forested wetland that faces the highway, and in areas immediately adjacent to paved surfaces of the retail area. The second PEM/PFO wetland area (Wetlands F and G) is located about 0.25 kilometers (850 feet) south of the NH 125/NH 121A intersection. This wetland system receives drainage from areas north of Jesse George Road, then discharges northeast toward the Little River. A large stand of common reed and apparent fill material was noted between Main Street and the forested wetland.

East of NH 125, opposite Plaistow Commons, Wetland H is a small area of emergent and shrub wetland vegetated largely with species of sedges (*Carex* spp. and *Cyperus* spp.), cattail, willow (*Salix* spp.), speckled alder, and gray birch (*Betula populifolia*). This wetland appears to be located in a highly altered area which has been stripped of surface soil layers and/or filled and graded. Soils in the wetland were noted as mostly sand and gravel at the surface with many redoximorphic features, with some areas underlain by an organic stratum. Some of the vegetation in the wetland appeared stunted. Adjacent to this area, a deep drainage ditch (Wetland I) carries flow (apparently from nearby commercial development and from apparent groundwater discharge) to the east toward the Little River. Heavily stained sediments, trash, and strong anaerobic odors were noted in the drainage channel.

Further north, in the vicinity of Walton Road, Kelly Brook flows beneath the highway from the west and turns southward to meet the Little River. Depressional forested wetland areas (Wetland CCC) are found near Walton Road. These areas collect roadway drainage which discharges via culverts to wetlands directly bordering Kelly Brook. East of NH 125, a larger area of PFO (Wetland J) has a pronounced pit and mound micro-topography that extends to the toe-of-slope of the highway. Further from NH 125, the large forested wetland transitions to emergent marsh (Wetland K) nearer the Little River. Vegetation in forested wetland areas includes many of the common species mentioned above, in addition to a well-developed fern community consisting of cinnamon and royal fern (*Osmunda cinnamomea* and *O. regalis*), sensitive fern (*Onoclea sensibilis*), New York fern (*Thelypteris noveboracensis*), marsh fern (*T. palustris*), and lady fern (*Athyrium filix-femina*), and a shrub community of common winterberry, withe-rod (*Viburnum cassinoides*), and sweet pepperbush (*Clethra alnifolia*). The PEM is vegetated with cattail, sedges, and purple loosestrife.

Between Old County Road and Colonial Road, a distance of 2 kilometers (1.25 miles), several areas of wetland are located both to the west and east of NH 125 and extend to the toe-of-slope in many locations. Wetlands BBB, AAA, ZZ and YY consist of PEM, PSS, and PFO. Wetland DB1 is a small area of PSS on the east side of NH 125 approximately 300 meters (1,000 feet) north of Old County Road. Drainage from these wetlands flows to the Little River, which flows beneath the highway via a 91-centimeter (36-inch) culvert. Areas of PSS wetland are found adjacent to the perennial stream on both sides of the roadway (Wetland YY and M), and are vegetated with speckled alder, silky dogwood, swamp rose (*Rosa palustris*), and species of *Spiraea*. Further northward, areas of PFO are located in the vicinity of the proposed Kingston Road Extension. Wetland M borders the Little River and is vegetated with many of the species previously mentioned for other wooded swamps, such as red maple, common winterberry, and cinnamon fern. Wetland L is located between NH 125 and Granite Road. Wetland GR is a small PEM lying on the opposite side of Granite Road.

The southern bank of the Little River near NH 125 is highly altered and artificially constructed of tires, timbers, stone rip rap and fill. The northern bank of the perennial watercourse is much less defined, as the stream flows through an area of

emergent marsh which transitions to a forested wetland (Wetland M). East of the access drive to the Granite Fields Sports Complex, Wetland FR5 consists of an area of PFO and PEM wetland bordering the Little River. As with the northern bank of the stream, near NH 125, the stream banks here are gradual and not well-defined, with the wetlands functioning largely as a floodplain forest and vegetated with similar plant species as Wetland M. Closer to Colonial Road, vegetation in the areas of emergent marsh (Wetlands N and O) includes cattail, purple loosestrife, sedges, and rushes (*Juncus* spp.).

North of Wetlands N and O, near Happy Hollow Road, an isolated wetland (Wetland ISO1) is located in a depression between NH 125 and Colonial Road. Field investigation in the spring of 2004 determined that this area was not a vernal pool as it does not support vernal pool species.

The remaining wetlands located within the Little River watershed are in the vicinity of Hunt Road and Newton Junction Road, and are associated with Bayberry Pond. Located between Debra Road and Hunt Road, the wetlands consist largely of PFO and extend to the toe-of-slope, where they collect stormwater runoff directly from the highway. They appear to be in contact with groundwater as evidenced by seepage at the toe-of-slope. One area of PFO (Wetland P) is located east of NH 125, immediately south of a furniture store and opposite a small business office building. This wetland is ditched parallel to the roadway, and drains via a culvert to the forested wetland (Wetland WW) located west of the highway, where drainage continues in a ditch that flows through an area of PSS wetland. The shrub wetland transitions to a larger forested wetland that borders Bayberry Pond. Another area of PFO (Wetland VV) is located about 0.3 kilometers (0.2 miles) further northward, and receives runoff via several culverts that drain to a large emergent marsh/dead wood swamp that lies adjacent to Bayberry Pond. The large marsh contains numerous small islands that are thickly vegetated with shrubs. This marsh is noteworthy, in that it contains a few individuals of Atlantic white cedar (*Chamaecyparis thyoides*). Other common species include red maple, highbush blueberry, sweet pepperbush, maleberry (*Lyonia ligustrina*), common winterberry, and cattail. Closer to the roadway (on the former Sullivan Property), a large area of fill consisting of large boulders, sections of concrete, stones, and gravel was apparently dumped down the steep roadway shoulder and graded. The altered wetland separates the two areas of PFO (previously described) that extend to the bottom of slope. (The forested wetland areas may have been one continuous wetland area prior to alteration by fill.) In the graded fill area, emergent herbaceous species such as sedges, purple loosestrife, and common reed were observed. The property has been investigated for suitability as a wetland mitigation site (See Section 4.3.4).

Powwow River Watershed

Continuing northward along the project corridor, the next group of wetlands (Wetlands TT, SS, RR, and QQ) is located within the Powwow River Watershed and is associated with Mill Pond. West of NH 125, at a point approximately 60 meters

(200 feet) north of Hunt Road and extending to a point near Old Coach Road, the large forested wetland (Wetland TT, SS and RR) collects drainage from several locations along the roadway and directs it toward Mill Pond. Outflow from Mill Pond (Wetland QQ) is carried beneath NH 125 via two 150-centimeter (60-inch) culverts, toward Country Pond, located further to the east. Along the banks of the stream, vegetation in the narrow Wetland QQ is dominated by woody shrubs such as red maple, speckled alder, sweet pepperbush, silky dogwood, and gray birch, portions of which are cut or trimmed apparently as part of the Mill Pond restaurant's property maintenance activities.

Opposite Mill Pond, a small depressional isolated wetland (Wetland S) is located east of the highway between the driveways to two properties. This wetland was likely historically connected to the wetland areas to the south and north. Approximately 100 meters (330 feet) to the north, Wetland T conveys drainage from Wetland PP2 located to the west of the highway. Vegetation in Wetland T includes red maple, eastern white pine, highbush blueberry, common winterberry, and various species of ferns.

North of Wetland T, on Harold's Campground property, the unnamed stream to Country Pond flows through altered areas of Wetland U. Here, the stream channel appears to have been excavated as water flows very slowly through a U-shaped channel that discharges to a large forested wetland bordering Country Pond. This wetland extends northward for about 0.5 kilometers (0.3 miles) to an access road to another campground that is located along the north shore of Country Pond. Dominated by red maple, this large area of PFO (Wetland V) has been the location of a wetland restoration project associated with the Beede Superfund Site remediation project located directly to the west of the highway. Wetland OO borders the soil remediation site to the north.

East of NH 125, extending for approximately 1.2 kilometers (0.8 miles) between Meeks Road and Folly Brook Terrace, Wetlands W, X, Y and Z consist of primarily PFO wetlands that extend to the bottom of slope. Wetland Y also drains via an intermittent stream further east toward the Powwow River. These wetlands all collect roadway drainage and flow toward wetlands that border Country Pond and Cedar Swamp Pond located outside the study corridor. Some of the wetlands are altered and may have been created by extensive sand and gravel removal operations in this area. Vegetation includes all of the species mentioned thus far throughout the corridor, with well-developed shrub layers in some areas, and invasive herbaceous vegetation noted in others. A power line easement extends across NH 125 bisecting the area immediately north of Meeks Road. Vegetation is routinely cleared along the easement, through upland and wetland areas.

Summary of Wetland Functions and Values

The following table summarizes functions and values of wetlands assessed during Summer 2002. Wetland functional assessments were performed at locations which

are representative of impacts throughout the study area. Locations were chosen based on USACOE guidance in the Highway Methodology, the size of the impact relative to other impact areas, and the location of the impact within a wetland system relative to other wetland systems. In total, function and value assessments were performed at eight locations within the study area. Table 4.3-1 provides the results of the wetland function and value assessment conducted in the study area.

As shown in Table 4.3-1, assessed principal functions of study area wetlands include: floodflow alteration, sediment/toxicant/pathogen retention, and nutrient removal/retention/transformation. Some of the wetlands also function principally as wildlife habitat, but to a lesser degree. Groundwater recharge/ discharge, production export and shoreline/sediment stabilization are also found in some wetlands but are not generally principal functions of these wetlands. All other potential functions and values are provided minimally or are nonexistent.

Prime Wetlands

Prime wetlands are those designated and assessed by individual towns and registered with the NHDES Wetlands Bureau for the purpose of providing a greater level of protection through increased regulatory scrutiny. In essence, impacts to prime wetlands are not allowed unless truly unavoidable. Neither Plaistow nor Kingston currently has designated prime wetlands within their respective municipal borders.

■

4.3.3 Summary of Impacts

The Proposed Action will result in approximately 1.8 hectares (4.5 acres) of permanent impact to wetlands. Design modifications to the service road completed since release of the Draft EA reduced the original estimate of impacts by approximately 0.2 hectares (0.5 acres) (see Appendix A for a list of impacts by location). In addition, the proposed mitigation package will compensate for approximately 0.5 hectares (1.2 acres) associated with the Hunt Road/Newton Junction Road intersection reconstruction (in Kingston) early action project constructed in 2005 and the 0.4 hectares (1.0 acres) of impact associated with the Kingston Road Bridge replacement project in Plaistow (recently constructed). The package is also intended to compensate for approximately 0.25 hectares (0.65 acres) of impact associated with the reconstruction of the Old Coach Road and New Boston Road intersections constructed in 2000.

Table 4.3-1
Summary of Wetland Functions and Values Assessment[1]

Wetland ID[2]	Functions and Values												
	Groundwater Recharge & Discharge	Floodflow Alteration	Fish & Shellfish Habitat	Sediment, Toxicant & Pathogen Retention	Nutrient Removal, Retention & Transformation	Production Export	Sediment & Shoreline Stabilization	Wildlife Habitat	Recreation	Educational & Scientific Value	Uniqueness & Heritage	Visual Quality & Aesthetics	Endangered Species Habitat
Plaistow													
K	✓	☑	✓	☑	☑	✓	✓	☑			✓	✓	
EEE	✓	☑		☑	☑	✓		✓					
FFF	✓	✓		☑	☑			✓					
Kingston													
L		☑		☑	✓			✓					
V	✓	☑		☑	☑	✓	✓	☑					
PP	✓	☑		☑	☑	✓	✓	✓					
SS	☑	☑		✓	✓	✓		☑					
VV		✓		☑	☑			☑					

1 Wetland functional assessments performed at representative impact locations only.
2 Wetland IDs are indicated by one, two or three letter codes.
✓ Denotes that wetland has a particular function or value.
☑ Denotes a principal wetland function or value.

Combined, these three projects have approximately 2.96 hectares (7.34 acres) of impact as summarized in Table 4.3-2.

Table 4.3-2
Summary of Permanent Wetland Impacts[1] for Which Mitigation Is Proposed[2]

Town	Proposed Action (Plaistow-Kingston #10044B) Hectares (Acres)	Hunt Rd/Newton Jct (Kingston #10044C) Hectares (Acres)	Kingston Rd. Bridge Replacement (Plaistow #10005) Hectares (Acres)	Old Coach/ New Boston Roads (Kingston #13012) Hectares (Acres)	Total Impacts (For Mitigation) Hectares (Acres)
Plaistow	0.89 (2.20)	0.0 (0.0)	0.4 (1.0)	0.0 (0.0)	1.29 (3.20)
Kingston	0.92 (2.29)	0.5 (1.2)[3]	0.0 (0.0)	0.25 (0.65)	1.67 (4.14)
Total	1.81 (4.49)	0.5 (1.2)	0.4 (1.0)	0.25 (0.65)	2.96 (7.34)

1 Impact calculations are current as of February 6, 2004 and concur with impact calculations for NHDES permit applications.
2 Due to rounding, impact area measurements do not convert exactly between hectares and acres.
3 Impact measurements are the amount of wetland impact stated in the NHDES Wetlands and Non-Site Specific Permit (#2003-01010) issued for NHDOT project # 10044C.

The majority of wetlands impacted by the project are palustrine forested and emergent wetlands (Table 4.3-3). Lesser amounts of shrub-dominated wetlands, which are generally found in transitions between wooded and herbaceous wetlands or marginal to larger forested or emergent systems adjacent to the roadway, are affected. Small areas of scrub-shrub wetlands located in highly disturbed locations adjacent to some commercial properties are also affected. There are no tidal or prime wetlands located in the project study area and hence none is affected. While the initial study area contains some Atlantic white cedar swamps, these areas are not impacted by the project, and are located far from proposed roadway improvements.

Table 4.3-3
Impacts by Wetland Type. Units in Hectares (Acres)[3]

Dominant Wetland Class[1]	Proposed Action
Palustrine Forested	1.15 (2.85)
Palustrine Emergent Marsh	0.27 (0.67)
Palustrine Scrub-Shrub	0.29 (0.71)
Palustrine Open Water	0.01 (0.03)
Riverine	0.09 (0.23)
Totals[2]	1.81 (4.49)

1 Wetland Class as defined by Cowardin et al. 1979.
2 Calculated impacts and totals may not covert exactly between metric and English equivalents due to rounding.
3 Impacts were calculated from the conceptual design and permit application wetland plans current as of April 15, 2005.

Impacts to Wetland Functions and Values

Forested wetlands in the study area principally function as areas of flood protection, nutrient removal, and wildlife habitat. Most impacts to forested wetlands due to roadway improvements will be incremental in nature to already disturbed or impacted wetlands along the edges of these resources where they extend to the bottom of the slope of NH 125. A few small depressional forested wetlands near commercial or residential development will also be impacted. These areas function primarily as groundwater recharge and nutrient uptake areas.

The principal functions of emergent marshes include the settling of sediments and trapping of pollutants, recharging groundwater, nutrient uptake, and habitat for wildlife. Because the proposed widening occurs adjacent to the existing highway, there is minimal impact on important wetland functions such as floodflow alteration or wildlife habitat that are typically associated with larger wetlands and those further from the highway. Impacts to marshes within the study area are largely to those areas which have been altered by commercial development and illegal dumping, or are overrun by invasive species, such as purple loosestrife or common reed.

Shrub wetlands provide similar functions as forested wetlands. Within the project area, most impacts to these wetlands will occur in the vicinity of the proposed new service road north of East Road in Plaistow. Much of the wetland landscape in this area has been altered by clearing, filling, and deposition of eroded materials from upgradient areas, and as such, the shrub wetlands functions have been negatively impacted.

The section below discusses the relative merit of each the proposed compensatory mitigation measures to offset lost functions and values due to the proposed highway improvements.

■

4.3.4 Mitigation

A sequential approach to mitigation, including avoidance, minimization, and compensation, was taken during planning for this project. Avoidance of impacts to wetlands was the first priority and was accomplished during macro-scale screening of the four original widening alternatives using a wetlands constraints map. Measures taken to minimize impacts during preliminary design include realigning and scaling back the connector roads and tightening slopes to avoid wetland impacts. The practicability of other measures to reduce impacts will be studied in final design and could include further steepening of side slopes where possible or using retaining walls.

4.3.4.1 Identification of Potential Compensatory Mitigation Opportunities

Compensatory mitigation measures including restoration, enhancement, creation and preservation were explored to offset the unavoidable loss of wetlands. To find potential mitigation opportunities, the NH Office of Energy and Planning (NHOEP), the NHDES and the local conservation commissions were contacted to identify wetland creation, restoration or preservation sites within the project vicinity. In addition, several sites were identified during wetland delineation and evaluation field work during the 2001 and 2002 field seasons. A GIS evaluation of the Towns of Kingston and Plaistow was also used to assist in mitigation parcel identification.

Creation/Restoration Parcels

Potential creation and restoration areas were identified primarily through consultations with natural resource scientists familiar with the area as well during wetland field work. During review of potential mitigation sites, wetland scientists visited two potential wetland creation/restoration areas in Kingston as well as one site in Plaistow. The following criteria were used to evaluate the suitability of creation/restoration areas:

- The site must have a suitable geomorphic setting;
- Restoration sites are preferred to creation sites; and
- The site should be related to the wetland systems impacted by the project.

Based on these criteria, restoration of wetlands at the former Sullivan parcel in Kingston is recommended as further discussed below.

Preservation Parcels

Potential preservation parcels within Plaistow and Kingston were identified in consultation with local and state resource agencies and by using GIS analysis. To identify candidate preservation parcels, published information was reviewed, including aerial photographs, USGS mapping, NWI mapping and the location of existing conservation areas. Combining these sources, priority mitigation parcels were selected using the following criteria:

- The parcels should be between 10.1 and 30.4 hectares (25 and 75 acres) in size;
- Parcels should have at least 10 percent NWI wetland;
- Parcels must abut existing conservation lands; and
- The lots should be largely undisturbed/undeveloped. (The evaluation was based on 1998 aerials.)

Using these selection criteria, 10 potential preservation parcels were identified in Plaistow and Kingston. Each of these sites was visited by a wetland scientist to review their condition and assess their ecological value. This review quickly pointed to the Kelly Brook watershed as a priority conservation area. The Kelly Brook

watershed was also recommended as a preferable location by resource agencies during a field review of potential mitigation properties.

4.3.4.2 Development of the Mitigation Package

Kingston Mitigation

Wetland impacts in Kingston are estimated to be approximately 1.67 hectares (4.14 acres) in total, including impacts associated with the Hunt Road/Newton Junction Road project to be constructed in 2004, and the Old Coach Road/New Boston Road project previously constructed in 2000. The Former Sullivan Properties have been acquired for mitigation and will provide a combination of wetland creation/preservation as described below. **Figure 4.3-2** shows the approximate boundaries for each of the properties.

Former Sullivan Properties (Map R-5/Lot 20, R-5/19, and R-5/1B)

Within Kingston, the site known as the Sullivan Properties would provide areas of creation/restoration and preservation. The three Sullivan parcels, which comprise about 5.9 hectares (14.7 acres) of contiguous area, are located west of NH 125, adjacent to Bayberry Pond. Portions of each parcel lie within the 76.2 meters (250-feet) protected shoreland zone associated with the pond. Additionally, Map R-5/Lot 1B lies almost entirely within an aquifer protection zone (APZ) that encompasses Bayberry Pond and surrounding areas. A portion of Map R-5/Lot 20 is also located within the APZ. Specific attributes of each parcel and their contribution to the mitigation strategy are described below.

Map R-5/Lot 20

- 2.2 hectares (5.4 acres) – largely disturbed/altered by filling and grading.
- Consists of approximately 20 percent wetland and 80 percent upland.
- Excellent candidate for creation and/or restoration based on landscape position and past wetland impact.
- Estimate that approximately one acre of storm water treatment would be provided.
- Estimate that approximately 0.8 hectare (2.0 acres[6]) could be created/restored on the parcel.
- Restored wetlands would tie into existing wetlands on the parcel providing additional wetland buffer to the pond and aquifer.

Map R-5/Lot 19

- 0.5 hectares (1.3 acres) – consists of nearly 100 percent undisturbed forested upland.

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6 The actual amount of wetland restoration will be determined during final design of the restoration. This estimate is based on a field review of existing site conditions.

- Preservation of parcel would maintain natural buffer to Bayberry Pond.
- Resource agencies expressed a preference for maintaining integrity of this lot rather than locating a proposed stormwater detention basin within the forested upland buffer to Bayberry Pond during the August 2003 field meeting.

Map R-5/Lot 1B

- 3.2 hectares (8.0 acres) – undisturbed forested, scrub-shrub, and emergent wetland and deciduous forested upland.
- Consists of approximately 75 percent wetland and 25 percent upland.
- Preservation of parcel would maintain natural forested upland and emergent marsh buffer to pond, preserving notable wildlife habitat and a small stand of *Chamaecyparis thyoides* (Atlantic white cedar).
- Lies almost entirely within an Aquifer Protection Zone (APZ) that encompasses Bayberry Pond.

During the field visit on August 7, 2003, resource agencies recommended consideration of acquisition of lands adjacent to Bayberry Pond in addition to the Sullivan properties. It was determined that NHDOT would investigate acquisition of an approximate 40-acre portion of Parcel R-5, Lot 1C. This portion of R-5/Lot 1C is described below and depicted on **Figure 4.3-2**.

Map R-5/Lot 1C

- Approximately 28.3 hectares (70 acres) in total – herbaceous emergent and forested wetlands and forested upland. (NHDOT intends to acquire up to 16.2 hectares (40 acres).)
- Total lot consists of approximately 55 percent wetland and 45 percent upland.
- Parcel lies to the west of the Sullivan Properties and to the north and west of Bayberry Pond.
- Preservation of entire parcel (or portion thereof) would provide protected buffer of up to 30 percent of shoreline of Bayberry Pond.
- Parcel almost entirely located within Aquifer Protection Zone.
- Borders existing town-owned conservation land (Dorre Road Town Forest) located to the west of the parcel.
- Suggested by NHDES staff member as integral component of protection strategy for the pond.
- Subdivision of this lot from corner of Lot R-5/Lot 1C westerly in a line parallel to Hunt Road would create a lot of approximately 16.2 hectares (40 acres) (75 percent wetland/25 percent upland).

While Parcel R-5, Lot 1C is NHDOT's preferred parcel for conservation, a portion of Map R-2, Lot 11 [approximately 12.1 hectares (30 acres) of the total 40-hectare (84-acre) lot] would be pursued in the event that Lot 1C becomes unavailable. This portion of Map R-2/11 described below and depicted on **Figure 4.3-2**.

Map R-2/Lot 11

- Approximately 40 hectares (84 acres) in total – mostly forested wetland and forested upland. (NHDOT would pursue acquisition of approximately 12.1 hectares (30 acres) should Map R-5/Lot 1C become unavailable.)
- Total lot consists of approximately 85 percent wetland and 15 percent upland.
- Parcel directly abuts Bayberry Pond
- Preservation of entire parcel (or portion of) would provide protected buffer of up to 20 percent of shoreline of Bayberry Pond.
- Portion of parcel lies within Aquifer Protection Zone.
- Borders existing town-owned conservation land (Dorre Road Town Forest) located to the west of the parcel.
- Suggested by NHDES staff member as integral component of protection strategy for the pond.
- Subdivision of this lot could create a lot of approximately 12.1 hectares (30 acres) (85 percent wetland/15 percent upland).

Plaistow Mitigation

Total wetland impacts in Plaistow are estimated to be approximately 1.29 hectares (3.20 acres) (including the previous Kingston Road Bridge project scheduled for completion in 2004). Upon review of mitigation opportunities, a strategy is recommended that would acquire conservation land within the Kelly Brook watershed in northwest Plaistow. Note that Kelly Brook crosses the NH 125 corridor lower in its watershed and is an important perennial tributary to the Little River. The Kelly Brook watershed has been and is currently under severe pressure from residential development. Despite this, the Towns of Plaistow, Hampstead and Atkinson have preserved portions of the watershed as town forests and other conservation lands totaling more than 202 hectares (500 acres).

In addition to being favored by the Town, resource agencies favor protection of acreage in the vicinity of Kelly Brook. NHF&GD recommends land protection in this watershed, as Kelly Brook has a high quality fishery based on field surveys of the brook by NHF&GD.

Several parcels are undeveloped in the area which would add to an already large block of conservation land in this area of Plaistow and adjacent to Atkinson and Hampstead. Several potential parcels that, based on research to date, appear to be available and would be good candidates for conservation are discussed below.

Several undisturbed "non-protected" parcels within the Kelly Brook watershed area (known locally as "Frog Pond Woods") have been identified for potential inclusion in the mitigation package (**Figure 4.3-3**). All of the available parcels in this area were reviewed to determine their suitability as conservation land. Parcels were excluded if they were already developed or if they were already under conservation. Based on

their landscape position and the recommendation of the Town of Plaistow, the list was narrowed to five high priority parcels:

- Tax Map 6, Lot 15 (17.7 hectares [43.8 acres]),
- Tax Map 7, Lot 3 (8.5 hectares [21.0 acres]),
- Tax Map 6, Lot 7 (3.1 hectares [7.7 acres]),
- Tax Map 8, Lot 24 (2.4 hectares [6 acres]), and
- Tax Map 8, Lot 25 (2.4 hectares [6 acres]).

NHDOT's preferred site is a 17.7-hectare (43.8-acre) parcel (Map 6, Lot 15). The other parcels (not being pursued) are described below and will be considered further if the preferred parcel is either acquired by the Town for conservation or developed prior to NHDOT's ability to acquire right-of-way following the public hearing and approval by the Special Committee.

Map 6/Lot 15

- 17.7 hectares (43.8 acres) – mixed coniferous/deciduous forested upland and wetland bordering other conservation parcels.
- Consists of approximately 10 percent wetland and 90 percent upland.
- Access parcel from Carleton Path which extends from Lynwood Street.
- According to the Town, lot was recently purchased for development.
- Selective logging performed regularly from established dirt road and narrow trails through property.
- Property impacted by some ATV use and illegal dumping (junked automobiles and construction debris).
- Town favors placing conservation restriction or purchasing portion of lot not being developed.
- Would add considerable forested acreage to large unfragmented block and limit expansion of sub-division.
- Favored by the Town of Plaistow for conservation.

Map 7/Lot 3

- 8.5 hectares (21.0 acres) – largely undisturbed mixed coniferous and deciduous forested upland and wetland communities; noteworthy hemlock groves with considerable evidence of deer and moose activity (browsing, scat, tracks).
- Consists of approximately 15 percent wetland and 85 percent upland.
- Nearly surrounded by existing (or newly designated) conservation land.
- Lot contains a large vernal pool, with numerous juvenile and adult wood frogs observed.
- Large (>15 nests) Great Blue Heron (Ardea herodias) rookery observed northwest on adjacent Map 7 Lot 1.
- Would complete a large block of unfragmented conservation land providing varied habitat and plant communities.
- Favored by the Town of Plaistow for conservation.

Map 6/Lot 7

- 3.1 hectares (7.7 acres) – mixed coniferous and deciduous forested upland bordering existing conservation land in Plaistow and Atkinson.
- Consists of nearly 100 percent upland.
- Land sloping moderately toward Map 7/Lot 3 and 7/4 – adjacent to designated conservation land.
- Some clearing from logging, but areas re-vegetating quickly providing additional habitat variation; evidence of use by deer (browsing, scat).
- Would provide additional buffer to Kelly Brook from residential development located to the west in Atkinson and additional acreage to the unfragmented conservation block.
- Favored by the Town of Plaistow for conservation.

Map 8/Lot 24

- 2.4 hectares (6.0 acres) – undisturbed forested upland bordering existing conservation land.
- Consists of nearly 100 percent upland.
- Bottom of hill slope, with extensive hemlock stand directly bordering Kelly Brook makes this parcel attractive for preservation.
- Owner is not known; Town currently researching property history and may be purchasing or placing into conservation.

Map 8/Lot 25

- 2.4 hectares (6.0 acres) (approximately) – undisturbed forested upland and wetland bordering existing conservation land in Plaistow and Hampstead.
- Owner is not known; Town currently researching property history and may be purchasing or placing into conservation.
- Consists of about 5 percent wetland and 95 percent upland.
- Bottom of slope of hill, with extensive hemlock stand directly bordering Kelly Brook.

Final Mitigation Package

A field meeting with resource agencies was conducted on August 7, 2003 and with USACOE representatives on April 12, 2005. The final mitigation package is based on the findings of these field reviews as well as consultation with the other resource agencies as well as officials from both Plaistow and Kingston. The final mitigation package involves three main components:

- Acquisition of 5.9 hectares (14.7 acres) comprising the three Sullivan Properties in Kingston. Wetland creation, habitat restoration, and preservation of a buffer around Bayberry Pond are the goals for this area. The conceptual design (see **Figure 4.3-4**) for the parcel identified as Map R-5/Lot 20 creates 0.5 hectares (1.23 acres) of forested wetlands, which transition into restored shrub and forested uplands as one approaches NH 125 to the east. This design is intended to

maximize wildlife habitat value and includes an upland island that will provide sandy areas for turtle nesting. In addition, the mature trees that currently grow at the boundary of site and in an area close to NH 125 will be preserved to the greatest extent possible. A detention basin was also constructed on the western side of R-5, Lot 20 as part of the Hunt Road/Newton Junction Road project. This basin provides both flood storage and stormwater treatment. The remainder of the three Sullivan parcels, approximately 4.7 hectares (12 acres), will provide an important conservation buffer to Bayberry Pond.

- Acquisition of a conservation easement on either a portion of parcel Map R-5/Lot 1C at the northwest corner of Bayberry Pond or a portion of parcel Map R-2/Lot 11 at the southwest corner of the pond. Either acquisition will result in the preservation of a buffer of some 12-16 hectares (30-40 acres) around the pond. The amount of wetlands on both parcels is 75 to 85 percent.

- Acquisition of a conservation easement on the entire parcel identified as Map 6/Lot 15, totaling approximately 17.7 hectares (43.8 acres), in the Kelly Brook watershed in northwest Plaistow. This acreage will add to a block of approximately 202 hectares (500 acres) of existing conservation lands in that area.

The above described package complies with recent guidance on mitigation from USACOE (RGL 02-02). The mitigation contains a combined strategy of restoration and preservation of wetlands as well as upland buffer preservation and has a clear connection to the watersheds impacted by the proposed NH 125 project. The restoration portion of the package will mitigate for wildlife habitat and water quality functions lost due to the NH 125 project, while the preservation component will help to ensure the future integrity of the important Bayberry Pond and Kelly Brook and their associated wetland systems. The proposed wetland restoration and preservation is in addition to the stormwater treatment measures that will be employed by the NHDOT to minimize potential permanent and temporary impacts on water quality due to the project (see Sections 4.4, 4.5, and 4.19).

4.4 Surface Water Resources

■

4.4.1 Introduction

Protection of surface water resources is under the jurisdiction of both the USACOE and the NHDES. Information on water bodies in the project corridor was obtained from several sources including the National Park Service (Wild and Scenic Rivers Program), NH Rivers Management and Protection Program (NHRMPP; state designated rivers), and NHDES Biology Bureau (4th order streams and Shoreland Protection Act).

■

4.4.2 Description of Existing Conditions

There are five perennial streams or rivers crossing the project corridor: Kelly Brook, Little River, outlet stream from Mill Pond, an unnamed tributary to Mill Pond Stream (flowing towards Country Pond), and the Powwow River (**Figure 4.3-1).** There are also four medium to large ponds either within the corridor or immediately adjacent to it: Bayberry Pond, Mill Pond, Great Pond, and Country Pond. All of the surface waters in the project corridor have a legislative water quality classification of "B" meaning that the goal is that they be suitable for swimming and fishing. None is used as a public water supply.

Streams

Kelly Brook, which crosses NH 125 in the vicinity of the Walton Road intersection in Plaistow, is a tributary stream to the Little River. The confluence of these two streams is just south and east of the corridor. Both streams support a brook trout fishery. Kelly Brook is contained within a culvert where it passes under NH 125.

Little River crosses the corridor in Kingston and flows east and then south paralleling the corridor into Plaistow. This stream is contained within a culvert when it passes under NH 125.

Mill Pond Stream in Kingston flows easterly and empties into the large Country Pond just off the project corridor. This stream is bridged by NH 125.

An unnamed tributary to Mill Pond Stream is located just north of the intersection of Old Coach Road and NH 125. This stream is contained within a culvert where it passes under NH 125.

The Powwow River drains Great Pond in Kingston and flows southeasterly before emptying into Country Pond. This stream is bridged by NH 125.

Ponds

Bayberry Pond, south of Hunt Road in Kingston, is approximately 11 hectares (27 acres) and is surrounded by a large emergent marsh/forested wetland complex.

Mill Pond, located in Kingston, is also approximately 11 hectares (27 acres) but is largely undeveloped around its edge. A restaurant is located adjacent to the dam near its outlet along NH 125.

Great Pond is a very large pond, approximately 243 hectares (600 acres), lying just northwest of the corridor in Kingston. Extensive residential development has occurred around this water body. Kingston State Park (outside the project corridor) is located on the northeast corner of Great Pond.

Country Pond in Kingston is also a very large, but shallow, pond with extensive wetlands associated with it. It is approximately 103 hectares (255 acres). The pond is bordered by residences and campgrounds along its northern and eastern shores. The pond supports a popular warm water fishery for largemouth and smallmouth bass, pickerel, and horned pout.

■

4.4.3 Summary of Impacts/Mitigation

Physical Impacts

Direct physical impacts to streams in the project corridor are described in Section 4.8.3.1 (Summary of Fisheries Impacts/Mitigation).

Road Salt

On March 22, 2004, a stream sampling effort was conducted to obtain background data regarding specific conductance levels and chloride concentrations in three principal streams in the project corridor including Kelly Brook, Little River and Mill Pond Stream. This background data could then be used to assess the relative risk of future chloride concentrations potentially reaching levels of concern as a result of increased road salt use associated with the proposed widening of NH 125. NHDES has adopted surface water quality criteria for chloride at concentrations of 860 and 230 mg/l for acute and chronic life protection, respectively (Env-Ws 1703.21). There are no criteria established for specific conductance, although it is often used as indicator for chloride levels due to its strong correlation with sodium and chloride ions, as described by others[7], and it can readily be measured in the field with a hand-held conductivity meter. Determining actual chloride concentrations requires laboratory analysis. Previous studies[8] have determined that observed specific conductance levels of 850 and 2,855 µs/cm roughly correspond to chloride concentrations of 230 and 860 mg/l, respectively.

Sampling and field measurements were conducted both upstream and downstream of the existing NH 125 (see Field Report in Appendix B). In general, the observed specific conductance levels ranged from below 100 µs/cm in the Little River to around 300 µs/cm in Kelly Brook and 114 µs/cm in Mill Pond Stream. There was little difference in the readings recorded at the upstream and downstream locations in all three steams. These observed levels are relatively low.

In a review of NHDES's database of water quality data for streams in the Plaistow-Kingston area (Appendix Table B-1), of the three streams sampled only Kelly Brook had previous specific conductance data. In June and July 1999, specific conductance

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7 Granato, G.E. and K.P. Smith. 1999. Estimating Concentrations of Road Salt Constituents in Highway Runoff Measurements of Specific Conductance. U.S. Geological Survey, Water Resources Investigation Report 99-4077.
8 Ibid.

levels, measured upstream of the NH 125 at the Kelly Road bridge, were recorded to be 268 and 240 µs/cm, respectively, which are quite similar to the reading of 290 µs/cm recorded during the March 2004 sampling effort.

The laboratory chloride concentrations are also relatively low ranging from 23 to 62 mg/l in the three streams (Field Report, Appendix B). Kelly Brook had the highest concentrations at 56 and 62 mg/l measured at upstream and downstream stations, respectively. Little River had the lowest concentrations at 23 mg/l measured both upstream and downstream of the roadway. These chloride concentrations are well below the chronic aquatic life criteria of 230 mg/l. Based on these results, there would need to be at least a four-fold increase in chloride concentrations in Kelly Brook and even a larger increase in the other two brooks for future chloride concentrations to approach or exceed the established chronic aquatic life criteria. This represents a much larger increase than would be expected with the proposed widening of an additional two lanes. Thus, it is reasonable to conclude that even with the added road salt used on the proposed travel lanes there would be a relatively low risk of future concentrations exceeding aquatic life criteria.

Other Contaminants

The potential for runoff contamination of surface waters in the project corridor will be minimized by the incorporation of advanced best management practices (BMPs) for stormwater runoff. These measures will include properly-sized and designed detention/retention basins and grassed swales. Studies indicate that vegetated detention basins have average contaminant removal rates varying from 20 percent for total nitrogen to 65 percent for total suspended solids and lead (USEPA 1993). Grassed swales have also been shown to effectively filter highway runoff. Strict BMPs for erosion and sedimentation control will also be followed during construction (see Section 4.17 for additional details).

4.5 Groundwater Resources

■

4.5.1 Introduction

Information on groundwater resources was obtained from the US Geological Survey (USGS 1992 a,b) and the NHDES' Water Supply Engineering Bureau. The latter agency provided GIS mapping of both public and known private wells in the project corridor.

■

4.5.2 Description of Existing Conditions

NH 125 crosses stratified drift aquifers in several areas along the project corridor (**Figure 4.5-1**). Approximately 47 percent (13.2 sq. km [5.1 sq. mi]) of Plaistow and 57 percent of Kingston (29.3 sq. km [11.3 sq. mi.]) are underlain by stratified drift aquifers as compared to 14 percent of the entire State (Medalie and Moore 1995). Stratified drift aquifers are an important source of ground water for commercial, industrial, domestic, and public water supplies. Potential yield from these aquifers is measured by transmissivity or the rate at which water can pass through the sand and gravel deposits.

The entire corridor through Plaistow is underlain by stratified drift with a relatively low transmissivity or potential yield (less than 1,000 square feet per day[9]; (**Figure 4.5-1**). In contrast, the corridor crosses aquifers with moderately high transmissivity (1,001 to 2,000 square feet per day) just north of the Hunt Road/Newton Junction Road intersection and again north of the northern-most intersection of Old Coach/NH 125 to the project terminus. The highest yielding aquifer (2,001 to 4,000 square feet per day) occurs just outside the project corridor, about 1.1 km (0.75 mi.) north of Meeks Road, and is associated with the Powwow River.

Since there is no public water or sewer along the section of NH 125 encompassing the project corridor, there are a number of wells immediately adjacent to or a very short distance from the roadway. Of particular note are the public wells or "public water systems." Public wells are classified as "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; "transient, non-community water systems" (N) that serve hotels, restaurants, campgrounds and similar establishments; and "non-transient, non-community water systems" (P) that serve 25 people or more for over 6 months such as schools, hospitals, and businesses. A list of the C and P public systems along the project corridor is given in Table 4.5.1, while N systems are listed in Table 4.5-2. The population served by each well is also shown in the two tables.

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, while for wells, a radius is defined forming a circular Wellhead Protection Area (WHPA). The radius is determined, in general, by the type, capacity, and depth of the well. DWPAs along the project corridor are shown in **Figure 4.5-2**.

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9 Since English units are used by USGS in mapping aquifer transmissivity, no metric equivalent is provided.

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 defines four levels of protection along with suggested BMPs, which are summarized in Table 4.5-3. 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 (NHDES, November 1995).

Since there are no municipal water systems in the project corridor, private wells will also be associated with all residences adjacent to NH 125. Well locations, however, are unknown since only wells installed since 1984 are registered with NHDES[10]. Whether any private wells will be impacted will be investigated during the right-of-way interviews with property owners.

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10 NHDES records indicate only three private wells in Plaistow and two in Kingston are within 152 meters (500 feet) of the roadway.

Table 4.5-1
Community (C) and Non-Community/Non-Transient (P) public wells with Drinking Water Protection Areas either crossed (bold type) or within 500 feet of NH 125

System Name	PWS ID#	Address	Town	System Status[1]	System Type[2]	Population Served	DWPA Type[3]	DWPA Radius (Ft)	Applicable Level of Protection[4]
Brickyard I Plaza	1938090	95 Plaistow Rd	Plaistow	A	P	28	(Data Not Available)		
Great Elm Plaza	**1938190-001**	**37 Plaistow Road**	**Plaistow**	**A**	**P**	**30**	**DEF**	**4000**	**2**
Scandia Plastics Inc.	**1936110-001**	**55 Westville Road**	**Plaistow**	**A**	**P**	**70**	**W**	**1300**	**2**
Westview Park Condo	**1932030-002**	**48 Westville Road**	**Plaistow**	**A**	**C**	**215**	**W**	**1500**	**2**
Westview Park Condo	**1932030-001**	**48 Westville Road**	**Plaistow**	**A**	**C**	**215**	**W**	**1500**	**2**
Little Explorers	**1935070-001**	**3 Blossom Road**	**Plaistow**	**A**	**P**	**44**	**W**	**1300**	**3**
Walnut Ridge/Bryant Woods	**0112080-005**	**Rt. 121, East Road**	**Plaistow**	**A**	**C**	**2120**	**PS**	**2050**	**2**
Walnut Ridge/Bryant Woods	**0112080-004**	**Rt. 121, East Road**	**Plaistow**	**A**	**C**	**2120**	**W**	**3600**	**2**
Walnut Ridge/Bryant Woods	**0112080-003**	**Rt. 121, East Road**	**Plaistow**	**A**	**C**	**2120**	**W**	**3600**	**2**
Chart Storage System Division	1936070-002	146 Main Street	Plaistow	A	P	110	W	1300	1
Timberlane Regional High School	**1935030-001**	**38 Greenough Road**	**Plaistow**	**A**	**P**	**1388**	**W**	**2050**	**2**
Bryant Brook	**1932110-001**	**11 Greenough Road**	**Plaistow**	**A**	**C**	**55**	**W**	**1300**	**1**
Plaistow Commons	**1936130-001**	**NH 125**	**Plaistow**	**A**	**P**	**100**	**W**	**1300**	**4**
Stonebridge Village	**1932080-003**	**Stonebridge Drive**	**Plaistow**	**A**	**C**	**60**	**NW1**	**2050**	**2**
Stonebridge Village	**1932080-001**	**Stonebridge Drive**	**Plaistow**	**A**	**C**	**60**	**W**	**1500**	**2**
Tuxbury Meadows	1932180-002	Tuxbury Road	Plaistow	A	C	75	W	1500	1
Tuxbury Meadows	1932180-001	Tuxbury Road	Plaistow	A	C	75	W	1500	1
Howard Manor Condominium	**1932160-002**	**182 Plaistow Rd., off NH 125**	**Plaistow**	**A**	**C**	**30**	**PS**	**1300**	**4**
Anns Landing	**1272020-001**	**Ann's Terrace, NH 125**	**Kingston**	**A**	**C**	**63**	**PH1**	**-[5]**	**2**
Play & Learn Children Center	1275040	3 Newton Jct. Rd.	Kingston	I	P	50	-	-	-
Seacoast Learning Center	1276030	48 NH 125	Kingston	I	P	25	-	-	-

1 System Status A = Active public water system, I = Inactive (no DWPA designated)
2 System Type: C = Community water system defined as a residential system designed to serve at least 25 residents on a year round basis (e.g., municipal systems, condominiums, single family residences, and mobile home parks,)
P = Non-community/Non-Transient water system defined as a public water system designed to serve at least 25 people for at least 6 months a year (e.g., workplaces, day cares, schools, and commercial property).
3 DWPA Type (Source delineation method):
W = fixed radius based on max daily withdrawal reported under DES sampling waiver program
PS = fixed radius based on max daily withdrawal reported during a DES telephone survey
PH1 = Phase 1 delineation based on hydrogeologic data
NW1= Phase 1 delineation completed for a new community well
DEF= Default 4000-ft. circle, Phase 1 delineation effort produced the max area used
4 See Table 4.5-3 for explanation of protection levels
5 Not applicable since actual boundary of DWPA is delineated.

Table 4.5-2
Non-Community, Transient (N) public wells along NH 125 in the project corridor.

System Name	PWS ID#	Address	Town	System Status[1]	Population Served
Brickyard II Plaza	1938150	97 Plaistow Rd.	Plaistow	A	150
Cedars Mediterranean	1938120	132 Plaistow Rd.	Plaistow	I	25
Chunkys Cinema Pub	1938200	148 Plaistow Rd.	Plaistow	I	50
Cottage Plaza	1938170	93 Plaistow Rd.	Plaistow	A	100
Danos Pizza and Subs	1938010	113 Plaistow Rd.	Plaistow	I	120
Dunkin Donuts Plaza	1938110	74 Plaistow Rd.	Plaistow	A	1100
Eggies Diner	1938040	127 Plaistow Rd.	Plaistow	A	75
Larrys Clam Bar	1938060	172Plaistow Rd.	Plaistow	A	500
Off The Wall Gymnastics	1937010	191 Plaistow Rd	Plaistow	A	300
Plaistow Petro King	1938220	119 Plaistow Rd.	Plaistow	A	25
Primo Pasta	1938020	93 Plaistow Rd.	Plaistow	I	25
Primo Pasta	1938050	133 Plaistow Rd.	Plaistow	A	100
Sawyers Banquet Function Facility	1939030	180 Plaistow Rd.	Plaistow	A	300
The Corner Pocket	1938080	181 Plaistow Rd.	Plaistow	A	25
Harolds Grove Campground	1277120	NH 125	Kingston	I	158
Lone Tree Camp/Kitchen	1277040	12 West Shore Rd.	Kingston	A	165
Lone Tree Camp/Shower House	1277060	12 West Shore Rd.	Kingston	A	170
Cool Cones and Pizza Too	1278100	23 NH 125	Kingston	I	50
AGR Food Mart	1278130	126 NH 125	Kingston	A	100
Country Shore Campground	1277090	125 NH 125	Kingston	A	405
Granite Fields Sports Complex	1277150	7 NH 125	Kingston	A	150
The Pond View Restaurant	1278010	NH 125	Kingston	A	280
VFW Post	1279060	NH 125	Kingston	A	25

1 System Status A = Active public water system, I = Inactive

Table 4. 5-3
Summary of Groundwater Protection Measures and Applicability[1]

Protection Level	Level 1	Level 2	Level 3	Level 4
Applicability	• Statewide	• Wellhead protection areas • Locally-designated groundwater/ aquifer protection areas • GA1 areas	• Within 1,000 ft. of large C or P well • Within 500 ft. of a small C or P well	• Within 400 ft., of a large C or P well • 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 • Level 3 or 4 areas	• Where a competent impermeable layer exists between well screen and road's drainage area • Bottom of well is above elevation of highway • Overburden well and WHPA does not include highway drainage area • 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.

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4.5.3 Summary of Impacts/Mitigation

Although most contaminants from highway runoff, including heavy metals, nutrients, and oils and grease, are typically bound up by soil particles, salts (i.e., sodium and chloride ions) are quite mobile and may infiltrate groundwater supplies. Data on salt levels (sodium and chloride) are available from NHDES for 31 of the 40 public wells along NH 125 in the project corridor (Appendix Table B-2)[11]. These data were reviewed to determine if there is any evidence of potential groundwater contamination due to runoff of highway salt.

All of the wells for which data were available had sodium and chloride levels below the secondary drinking water standard of 250 mg/l. Twenty-six of the 31 wells had levels below 100 mg/l.[12]

Five of the wells had elevated chloride levels: three in the 150 mg/l range (Eggies Diner, Pond View Restaurant, Ann's Landing) and two approaching or exceeding 200 mg/l (Primo Pasta, Cottage Plaza). Since it is generally accepted that road salt is the primary source of contamination when sodium levels are 30 to 40 percent of chloride levels, this ratio was examined in the present data. The percent sodium ranged from 17 to 92 percent. Because onsite water treatment measures like water softeners add salt to the water, this could be the explanation for the elevated salt levels. Onsite investigation and owner interviews would be necessary to determine the reason for these elevated levels and whether they are related to the proximity of the highway.

Potential highway impacts on groundwater typically involve effects on both water quantity and quality. Paved impervious surfaces restrict recharge of the underlying aquifer during precipitation events. In addition, runoff from highways may contain contaminants that can infiltrate the groundwater. The Proposed Action adds 13.9 ha (34.4 ac.) of pavement over the stratified-drift aquifers in the project corridor. It also directly crosses through 14 active DWPAs in Plaistow and one in Kingston (Table 4.5-1)[13] . Although not crossed by the present highway or its proposed improvements, three additional DWPAs lie within 152 meters (500 feet) of the highway; all in Plaistow[14]. The recommended level of protection around these resources is shown in Table 4.5-1 (NHDES 1995).

Two of the affected DWPAs are associated with Level 4 protection, i.e., the highest level of protection (Plaistow Commons and Howard Manor Condominium). Level 4

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11 One community well (C) (Tuxbury Meadows) had only sodium reported and one (Stonebridge Village) had only chloride reported.
12 One transient (N) well (The Corner Pocket) had a chloride reading at 110 mg/l and another at 75 mg/l.
13 Seacoast Learning Center at 48 NH 125 was listed as an active well in 2002 but has since been delisted by NHDES. A field visit on October 8, 2002 indicated that the commercial building once housing the Seacoast Learning Center is now vacant.
14 One additional non-community/non-transient (P) well (Brickyard I Plaza) lies just east of NH 125 in Plaistow but its DWPA is not available.

protection includes the use of closed drainage systems, with conveyance of runoff outside the protection areas; non-structural measures, such as providing detailed well locations to emergency response crews or reducing salt application rates on the roadway itself; and raised railings to prevent truck turnovers. During final design, NHDOT will develop an emergency response plan in cooperation with its District 6 maintenance staff and emergency response officials from both Plaistow and Kingston. This plan will provide specific protocols to follow if a hazardous waste spill occurs on NH 125. NHDOT will also explore means to reduce salt use throughout the entire project corridor. Since the two DWPAs in Plaistow span approximately 1500 meters (0.9 miles) of highway, collecting all of the runoff in this section and diverting it out of these protection areas was deemed impracticable.

Only one of the affected DWPAs (Little Explorers) is associated with Level 3 protection, which includes lined-grassed swales, lined snow storage areas, raised railings, and non-structural measures. Little Explorers is located just south of the project start at 3 Blossom Road so a substantial portion of its DWPA is outside the project corridor. Runoff along the reconstructed portion of NH 125 within the DWPA flows northward and will be collected by a closed drainage system (i.e., curbed) and directed to a detention basin east of the proposed service road before discharge into the adjacent wetland (#FR3). NHDOT will also explore means to reduce salt use in this section as well as the entire corridor. The installation of raised railings to prevent truck turnovers is impractical in this area considering the small probability of a turnover where the side slopes are only minimal. Vehicle speeds will also be reduced by the presence of signals at both East Road and the new service road intersection. NHDOT will continue to work with Town officials to ensure emergency protocols are in place should there be an accidental spill in this section.

Eleven of the affected DWPAs are associated with Level 2 protection, which includes standard BMPs practices like grassed swales, detention basins, etc. as well as non-structural measures. Both grassed swales and detention basins have been incorporated into the project's design. In addition, NHDOT will continue to explore means to reduce salt use in these areas and will work with local officials to ensure emergency protocols are in place to contain hazardous material spills along the highway.

The remainder of the groundwater resources, including the four additional DWPAs and 17 active non-community, transient wells (N), will be protected with Level 1 measures or the standard BMPs used by NHDOT, i.e., grassed swales and detention basins. Any wells, either public or private, that are impacted by the proposed improvements, will be replaced. NHDOT will continue to implement its Well Replacement Policy on a case-by-case basis when a water quality problem is identified as having been caused by highway maintenance activities. NHDOT has personnel to investigate any road salt-related complaints throughout the state.

The NHDOT will continue to investigate opportunities to reduce its use of road salt for deicing purposes as technology in snow and ice control continues to advance.

Newly designed plow blades have already shown promise in keeping pavement surfaces clear especially on new roadways (such as proposed here) having roadbed specifications to inhibit frost heaving.

4.6 Floodplains

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4.6.1 Introduction

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). In addition, the policies and procedures of the FHWA regarding the impact of projects on floodplains are found in "Location and Hydraulic Design of Encroachments on Floodplains," 23 CFR 650A.

The GRANIT database was used to identify 100-year floodplains in the vicinity of the project corridor in both Plaistow and Kingston. The mapping information in GRANIT utilizes FEMA Flood Insurance Rate Maps (FIRM) (Plaistow, April 15, 1981, and Kingston, April 15, 1992). FEMA has designated floodways only in Plaistow. Floodway map panels associated with the Town of Plaistow Flood Insurance Study (FEMA, October 15, 1980) were used to designate the floodway in that community.

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 0.3 meter (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 0.3 meter (1.0 foot) at any point.

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4.6.2 Description of Existing Conditions

NH 125 crosses three mapped 100-year floodplains in the study corridor (**Figure 4.6-1**): Kelly Brook near the Walton Road intersection, Mill Pond Stream, and Bartlett Brook. Kelly Brook is the only watercourse with a mapped floodway crossed by the highway and is a tributary to Little River (see Section 4.4).

Other watercourses crossed by the project may show seasonal overbank flooding during intense rainfall or snowmelt, but do not have 100-year floodplains or floodways designated along them.

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4.6.3 Summary of Impacts/Mitigation

The Proposed Action will impact approximately 0.83 hectares (2.1 acres) of the 100-year floodplain in three areas: Kelly Brook, Mill Pond Stream, and Bartlett Brook. See **Figure 4.6-1**. The existing culvert at Kelly Brook (a 72 inch RCP constructed in the 1950's) will be replaced with an 8 foot x 8 foot prefabricated concrete box culvert that will reduce existing backwater conditions upstream of this location by approximately 1.2 meters (4 feet) and decrease velocities in the culvert area resulting in more efficient and improved hydraulics through the area. Permanent impacts to a designated floodway occur only at Kelly Brook (0.08 hectares [0.2 acres]) and are included in the floodplain total. The total volume of floodwater storage affected at the three crossings is approximately 4,194 cubic-meters (3.40 acre-feet).

The project has been carefully developed with respect to its effects on floodplains, practicable alternatives to such impacts, and practicable mitigation measures as required under the provision of Executive Order 11988, "Floodplain Management," and 23 CFR 650, Subpart A.

The Proposed Action will not result in substantial (i.e., more than 0.3 meter [1 foot]) increases in the flood elevations of any of the streams crossed by the project and will not result in impacts to structures, nor pose a significant risk relative to property loss or hazard to life. In addition, it should be noted that the Proposed Action will provide a safer and more efficient corridor through the towns of Plaistow and Kingston facilitating movement of emergency and other vehicles thereby improving public safety.

Impacts to the existing floodplains have been largely avoided and minimized by the Proposed Action at all river and stream crossings. Additional measures to minimize encroachment into either the 100-year floodplain or floodway, including the use of retaining walls or 2:1 side slopes, will be explored during final highway design.

Compensatory mitigation for the loss of floodwater storage, including in the floodway, will be provided in part by the creation of 1.2 hectares (3 acres) of wetlands within the watershed of Little River in South Kingston (see Section 4.3.4). The installation of a larger box culvert at Kelly Brook will reduce existing backwater conditions and result in a reduction of approximately 1.2 meters (4 feet) in the upstream 100-year flood elevation. In addition, culvert velocities will be reduced and the new design will provide for a better wildlife crossing opportunity[15].

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15 VHB memo dated June 16, 2004 to C. Waszczuk, NHDOT.

After publication of the Draft EA, NHDOT conducted additional coordination with the USACOE, NH Office of Energy and Planning (OEP), and FEMA relative to the potential floodplain impacts of this project. As a consequence, NHDOT had its engineering consultant perform a more detailed analysis of the Kelly Brook area, which resulted in a more precise estimate of impacts after replacement of the existing culvert. As requested by FEMA[16], NHDOT will prepare a Letter of Map Revision for the study area once final design is completed. A report summarizing the additional analysis for the Kelly Brook area was forwarded to OEP and USACOE on June 10, 2005.

4.7 Farmlands

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4.7.1 Introduction

The Farmland Protection Policy Act (FPPA) of 1984 requires that all Federal agencies assess the effect of converting existing or potential farmland areas to non-agricultural use. Conversion of farmland under FFPA is measured as the loss of important farmland soils due to the project. Under FFPA important farmland soils are classified into four types: prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance. The GRANIT web site was utilized to identify important farmland soils along the project corridor. The classification of important farmland does not take into account whether the land is actively farmed or not. However, land that is currently developed or is identified in a community master plan for non-agricultural uses is exempt from consideration under the FFPA.

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4.7.2 Important Farmland Soils

Only two types of important farmland exist in the project corridor: statewide importance and local importance (**Figure 4.7-1**).

Farmlands of statewide importance are those that economically produce high yields of crops when treated and managed according to acceptable farming methods. Statewide important farmland soils occur only in a few limited areas, primarily in the vicinity of the Old County Road (Plaistow) intersection. Isolated areas also occur along both sides of the highway between Main Street (NH 121A) in Plaistow and Colonial Road in Kingston; and between Debra Road and West Shore Park Road in South Kingston.

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[16] K. Knowles, FEMA, email dated November 12, 2004.

Farmlands of local importance include certain additional farmland soils used for the production of food, feed, fiber, forage, and oilseed crops. The GRANIT database shows extensive areas of locally important farmland soils along the corridor although most of these areas that front the highway are now commercially developed.

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4.7.3 Active Farmlands

Like the rest of New Hampshire, actively farmed land within the project corridor has declined gradually from the turn of the century and more rapidly since World War II. There is no actively farmed land within the project corridor.

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4.7.4 Summary of Impacts/Mitigation

The Proposed Action will affect an estimated 0.3 hectares (0.7 acres) of statewide important farmland soils and 4.2 hectares (10.3 acres) of locally important farmland soils[17].

Total farmland impacts for the Proposed Action were evaluated using the U.S. Department of Agriculture's Farmland Conversion Impact Rating Form (AD-1006; Appendix C). Parts I, III, and VI were prepared by NHDOT. The NRCS completed Parts II, IV, and V. The final score or total points was then computed by NHDOT in cooperation with FHWA.

All three project alternatives used for this analysis had scores of 93 points (see Appendix C). A project alternative receiving a total score of less than 160 points on the form is given a minimal level of consideration for protection and no additional alternatives need to be evaluated (*Supplemental Guidance for Implementation of Farmland Protection Act, FHWA, Jan. 23, 1985*). Because the score is are well below the threshold of 160 points, no further consideration or action is required and the proposed activity can proceed under any of the three alternatives (S. J. Hundley, NRCS, letter dated April 26, 2004, Appendix C).

Because of the relatively small impact on important farmland soils and the absence of impacts on active farmland, no mitigation is being proposed.

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17 Impacts to important farmland soils at the Hunt Rd./Newton Junction Road intersection were addressed as part of the CE for the Kingston Project (10444C). See NHDOT (2003).

4.8 Wildlife and Fisheries Resources

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4.8.1 Introduction

The U.S. Fish and Wildlife Service (USFWS) is responsible for managing and protecting migratory fish and wildlife species, as well as all species listed as federally endangered or threatened. In addition, National Marine Fisheries Service (NMFS) has jurisdiction in all waters designated as essential fish habitat for anadromous fish species like Atlantic salmon.

The New Hampshire Fish & Game Department (NHF&GD) is responsible for managing and protecting resident fish and wildlife species. NHF&GD has promulgated rules (NH Administrative Rules Fis Chapter 1000) for the protection and management of these species. These rules pertain almost entirely to the exploitation of the species and not to their habitats. The rules set seasons, bag and creel limits, size requirements, and legal means for the taking of fish, game and furbearing species.

Agency comments on the wildlife and fisheries resources were received at the monthly natural resource agency meetings (see Section 6.1 for dates) and during a field review of the project corridor conducted on August 7, 2003, attended by NHF&GD and NHDES.

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4.8.2 Wildlife Resources

The study area along this section of NH 125 is primarily a mixture of commercial and residential development, fragmented blocks of forest, shrublands on disturbed or cutover areas, and wetlands. Various types of wetlands including forested and scrub-shrub swamps, emergent marshes, and shallow ponds occur immediately adjacent to the highway or a short distance from it (see Section 4.3).

Additional description of the habitat types found along the corridor are given below. Habitat characteristics and location of each type determine the mix of wildlife species that will be present. Species representative of each type are also given.

4.8.2.1 Upland Habitat Types

Natural upland habitats in the project corridor include shrublands and three forested communities (hardwood dominated, softwood dominated, and mixed). There are no grasslands, including pastures and hayfields, or orchards along this section of NH 125. Although residential yards and other suburban/urban areas provide some

habitat to wildlife, their value is typically low compared to natural, undisturbed areas.

Hardwood Forest

The mature hardwood forests in the study area are typically dominated by red oak and northern hardwoods (American beech, yellow birch, and sugar maple) often with a large component of softwoods (white pine and hemlock). There are usually four layers of vegetation, but only the overstory is dense. Common shrub species include witch hazel, beaked hazelnut, northern wild raisin and seedlings of red maple, American beech, white pine, hemlock, and red oak. The herbaceous layer is typically sparse consisting of Canada mayflower and several species of ferns. A litter layer comprised of leaves and dead twigs covers the ground.

Young hardwood stands, as typically found in recently cutover areas, are dominated by pioneer species like gray birch, quaking aspen and pin cherry, as well as sprouts of red oak. With the reduced canopy layer (i.e., shade) in these young stands, the herbaceous and shrub layer is usually dense.

In general, the greater the number of vegetation layers and the density of each (called structural diversity), the greater is the diversity of bird species (MacArthur and MacArthur 1961). The mature hardwood stands have a moderate level of structural diversity while the young stands are slightly higher. The mature stands are characterized by bird species preferring a closed canopy (e.g., sharp-shinned hawk, barred owl, red-eyed vireo, black and white warbler, scarlet tanager), moderate size tree boles (e.g., downy woodpecker, brown creeper, white-breasted nuthatch) or a forest floor with a thick litter layer including logs and scattered patches of herbaceous cover (redback salamander, wood thrush, ovenbird). Mammals include gray fox, gray squirrel, southern flying squirrel, eastern chipmunk, and white-footed mouse. In comparison, the young stands are characterized by species more commonly associated with early successional stages like shrublands (e.g., ruffed grouse, American redstart, chestnut-sided warbler, willow flycatcher, eastern cottontail, white-footed mouse, short-tailed shrew). White-tailed deer browse in both mature and young hardwood stands. Wild turkeys also forage in both age classes.

Softwood Forest

Areas of softwood forest are dominated by either white pine or hemlock. Structural diversity is typically low to moderate. The dense shading results in an undeveloped shrub and herbaceous layer. The litter layer is characterized by needles and dead branches, leading to a highly acidic environment that also inhibits herbaceous growth.

Although softwood stands typically serve as deer wintering areas (because of the protection they afford from winds and low temperatures), their proximity in the study area to human development and the highway itself probably limit them from serving this function. Other species typically associated with softwood forests include red squirrel, porcupine, black-capped chickadee, veery, and blackburnian warbler.

Mixed Forest

The largest forested stands in the study area are typically mixed forest and composed of species found in both hardwood and softwood types. Structural diversity varies from moderately low to moderately high. Structurally these mixed stands are similar to hardwood stands and contain many of the same wildlife species (veery, rose-breasted grosbeak, red-backed salamander, eastern chipmunk, and gray squirrel).

Shrubland

Shrubland in the study area includes primarily "old fields" reverting to young forest. Old fields are classified as shrubland when they contain a shrub layer of at least 30 percent coverage with the remainder dominated by dense grasses and forbs.

Bird species typically associated with this habitat include chestnut-sided warbler, common yellowthroat, rufous-sided towhee, prairie warbler, American goldfinch, field sparrow, and song sparrow. Common mammal species include white-footed mouse, short-tailed shrew, red fox, and eastern cottontail.

4.8.2.2 Wetland Habitat Types

Wetlands are a particularly important habitat for wildlife (see Section 4.3). All amphibians require water or wet areas for breeding so their occurrence is dependent on wetlands. Vernal pools provide essential breeding habitat for mole salamanders (Genus *Ambystoma*) as well as wood frogs. Many reptile species also depend on wetlands.

Described below are the major wetland types and the wildlife species typically found in them that are located along the project corridor.

Forested Wetland (Forested Swamp)

Forested wetlands in the study area are typically dominated by red maples with varying amounts of hemlock, white pine, spruce and balsam fir intermixed. Just beyond the north end of the project corridor, a rare Atlantic white cedar swamp borders the east side of NH 125.

The typical interspersion of water and trees in a forested wetland creates high structural diversity that enhances this habitat's value for wildlife. Common species include a variety of amphibians (spring peeper, gray treefrog, wood frog, bullfrog, green frog, mole salamanders) and reptiles (eastern ribbon snake, ringneck snake, painted turtle, snapping turtle).

The avian community found in red maple swamps is typically composed of facultative species, those which are found in upland forests as well, e.g., black-capped chickadee, gray catbird, ovenbird, wood thrush, American robin and blue jay;

(Golet *et al*. 1993). Other bird species appear to be attracted to this habitat because of the presence of water, e.g., wood duck, American black duck, and mallard. Bird species perhaps most characteristic of forested wetlands of the northeast include northern waterthrush, Canada warbler, and veery (Golet *et al*. 1993). Among raptors, red-shouldered hawks are probably most characteristic of forested wetlands where they both nest and hunt. Characteristic mammalian species include beaver, raccoon, mink, woodland jumping mouse, and white-footed mouse.

Scrub-Shrub Swamp

Scrub-shrub swamps in the study area are dominated by species like highbush blueberry, willow, alder, dogwood, and northern arrowwood. Structural diversity is low because of the lack of multiple vegetation layers. Nonetheless there is typically dense shrub growth, along with dense herbaceous growth in spots. Seasonally this habitat (like forested wetlands) is frequently flooded by an adjacent stream or runoff from surrounding uplands.

Amphibians and reptiles commonly found in shrub swamps include spring peepers and wood frogs, while the presence of open water enhances the attraction for snapping turtles and painted turtles. Bird species commonly found in this habitat include American woodcock, song sparrow, alder flycatcher, and tree swallow. Mammalian species include white-footed mouse, meadow jumping mouse, and raccoon.

Emergent Marsh

There are generally two types of emergent marshes in the study area: shallow marshes with water depths up to 1.5 feet characterized by persistent vegetation such as cattails, pickerel weed, and two common invasive species, purple loosestrife and phragmites; and deep marshes with water depths up to 6.0 feet characterized by emergent vegetation such as cattails, pickerel weed, and floating-leaved plants like pond lily, yellow water lily, and water shield. Frequently "wet meadows" or "sedge meadows" are included in the shallow marsh category. These meadows will have up to 6 inches of water in winter or early spring, but with an exposed, saturated soil surface in summer (Thomasma *et al*. 1998).

Typical species found in marshes include mallard, sora rail, American bittern, great blue heron, red-winged blackbird, muskrat, foraging white-tailed deer, and common snapping turtle. During the dry summer months, meadow vole, meadow jumping mouse and American kestrel will be observed in shallow marshes and sedge meadows.

Open Water (Ponds and Lakes)

There are four ponds or lakes in the project corridor: Bayberry Pond, Mill Pond, Great Pond, and Country Pond (see Section 4.4).

Wildlife use of these open-waterbodies is largely a reflection of the surrounding or bordering habitats. The margins of the ponds and lakes are typically bordered by either

deep or shallow marshes, scrub-shrub swamps, and forested wetlands. In contrast, much of the shoreline of Great Pond is surrounded by residences.

Wildlife representative of ponds and lakes include bull frog, pickerel frog, painted turtle, common loon, hooded merganser, common merganser, mallard, Canada goose, beaver, otter, and mink.

Vernal Pools

No vernal pools have been identified with the impact area of the project..

Streams/River Corridors

Riparian corridors like Kelly Brook and Little River are important habitat components since they provide travel corridors for wildlife to move between various habitats to meet their life-history requirements. The value of these corridors is diminished when the natural cover along them is removed or artificial barriers (i.e., undersized culverts or bridges with no passage through them) are created during highway improvements.

4.8.2.3 Summary of Wildlife Impacts/ Mitigation

The project will have a minimal impact on wildlife habitat with the permanent loss of approximately 1.8 hectares (4.5 acres) of wetlands and an estimated 25.9 hectares (64 acres) of uplands, primarily within the State's existing right-of-way. All of these habitats, because of their proximity to the highway and disturbance, are of relatively low value.

Mitigation for wildlife impacts will include preservation of 34.8 to 38.8 hectares (86 to 96 acres) of mixed habitat types in both Plaistow and Kingston (see Sec 4.3.4). In addition, 0.5 hectares (1.23 acres) of wetland creation and restoration of another 0.6 hectares (1.5 acres) of upland habitat will be accomplished on the Sullivan properties in Kingston with the goal of providing a replacement for the wildlife habitat values lost due to the project. The final design of the new culvert at Kelly Brook will include a "wildlife shelf" to allow passage of wildlife under NH 125 so as to ensure the connectivity of the riparian travel corridor along the brook.

4.8.3 Fisheries Resources

Surface water resources found in the project corridor were described in Section 4.4. Streams provide habitat for either cold water or warm water fish species depending on their base flows from the underlying groundwater table in late summer. In general, these streams have limited appeal for recreational fishing, at least along the highway. In contrast, ponds both east and west of the corridor provide more popular recreational fisheries.

Both Kelly Brook and Little River support a brook trout fishery in the project corridor. Country Pond just east of the corridor supports a very popular warm water fishery of largemouth and smallmouth bass, pickerel, and horned pout.

Site-specific information on fisheries for the project corridor is very limited (S. Decker, NHF&GD, pers. comm.). An electroshocking sampling of the Little River was conducted in September 1984 (Table 4.8-1). This survey found native brook trout along with American eel, largemouth bass, pumpkinseed, blacknose dace, longnose dace, fallfish and redfin pickerel. More recently, NHF&GD and USEPA conducted a survey of Kelly Brook as part of studies related to the Beede Waste Oil National Priorities List (NPL) site. Since native brook trout were found, NHF&GD considers Kelly Brook an important cold water fishery (W. Ingham, NHF&GD, pers. comm.).

Table 4.8-1
Results of Electroshocking Sampling of Little River, Plaistow, September 20, 1984.

Species	Number Caught	
	Site 34[1]	Site 35[2]
American Eel	15	35
Brook Trout	2	3
Largemouth Bass	1	0
Pumpkinseed	1	0
Redfin Pickerel	1	1
Fallfish	0	2
Blacknose Dace	0	35
Longnose Dace	0	2

1 Site 34 = NH 125 crossing in Plaistow, NH.
2 Site 35 = NH 121A crossing in Plaistow, NH.

None of the rivers or tributaries in the project corridor is listed as Essential Fish Habitat (EFH) for Atlantic salmon (National Marine Fisheries List, undated).

4.8.3.1 Summary of Fisheries Impacts/Mitigation

Existing culverts at four locations will require lengthening to accommodate the widened highway and associated side road improvements (Table 4.8-2). The resultant loss of 82.2 meters (270 feet) of streambed in Kelly Brook, Little River and the tributary to Mill Pond Stream is not expected to adversely affect fish populations or reduce the availability of any critical habitat. Bank impacts total 164.4 meters (539 feet). Since the bridges over Mill Pond Stream and the Powwow River will not be reconstructed, there will be no impacts on these latter two streams.

Table 4.8-2
Perennial Stream Impacts Associated With Culvert Crossings

Stream Crossing	Channel Impact	Bank Impact(Both Sides)
Kelly Brook	32.3 m (106 ft.)	64.6 m (212 ft.)
Little River (NH 125)	22.9 m (75 ft.)	45.8 m (149 ft.)
Little River (Granite Rd.)	20.5 m (67 ft.)	41.0 m (134 ft.)
Tributary to Mill Pond Stream	6.5 m (22 ft.)	13.0 m (44 ft.)
Total	82.2 (270 ft.)	164.4 m (539 ft.)

There will be no direct impact to ponds or lakes in the project corridor under the Proposed Action.

Streambank impacts at the four crossings will result in the loss of overhanging vegetation that provides overhead cover for fish, shade for reducing stream temperatures, nutrient input for benthic communities, and a buffer for sedimentation to the streams. As mitigation, disturbed banks will be revegetated as quickly as practical and the amount of any additional clearing will be minimized. In addition, standard BMPs for erosion and sedimentation control will be utilized to avoid any short-term runoff impacts on the streams during construction.

4.9 Threatened and Endangered Species

■

4.9.1 Introduction

Threatened, endangered, and rare species are protected by both Federal and State statutes. At the Federal level, the USFWS has jurisdiction over species listed or proposed to be listed as threatened or endangered under the Endangered Species Act. At the state level the NH Natural Heritage Bureau (NH Department of Resources and Economic Development) maintains a database of rare, threatened and endangered species and exemplary natural communities. State-listed threatened and endangered animal species are monitored by the Nongame Division of the NHF&GD. These agencies were contacted regarding the presence of any special status species or important natural communities in the project area (see Appendix D).

■

4.9.2 Description of Existing Conditions

The USFWS reported that no federally-listed or proposed, threatened or endangered species under their jurisdiction are known to occur in the project area. They concluded that there will be no impacts to Federally-listed species with the proposed project (letter dated August 27, 2002; see Appendix D). Preparation of a Biological Assessment or further consultation with that agency under Section 7 of the Endangered Species Act is not required.

Currently the New England cottontail (*Sylvilagus transitionalis*), whose known range overlaps the study area, is being studied by the USFWS for possible listing as federally threatened or endangered species. However, it currently has no special protection status associated with it.

A search by the NH Natural Heritage Bureau of their database found records of one rare species, the eastern pondmussel (*Ligumia nasuta*) and three exemplary natural communities: Atlantic white cedar basin swamp, Southern New England (SNE) level bog, and streamside fen ecosystem (see Appendix D). Atlantic white cedar swamps are located near the northern terminus of the project along the east side of the highway and as a component of the large wetland complex ("Tucker Swamp") lying along the Powwow River. The streamside fen ecosystem also lies along that same river. The SNE level bog occurs around Cedar Swamp Pond, just south of this same area.

■

4.9.3 Summary of Impacts/Mitigation

There will be no direct impacts to any of the exemplary natural communities since they either lie just beyond the currently proposed widening or are far enough from the highway so as to avoid being impacted. At the resource agency meeting on August 21, 2002, the USEPA representative asked that the white cedar swamps be protected from any water quality changes associated with highway runoff. None of the proposed highway improvements will entail changes in highway drainage to these sensitive areas.

Coordination with the Nongame Division of the NHF&GD indicates that the habitat of the eastern pondmussel includes Great Pond. Since neither this water body nor any other pond will be affected by the project, the eastern pondmussel will not be impacted.

Since there are no impacts to any endangered or threatened species or exemplary natural community, no mitigation is proposed.

4.10. Air Quality

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4.10.1 Introduction

This section presents the results of the air quality study that evaluated the impacts from project-related motor vehicle traffic associated with the Proposed Action. The 1990 Clean Air Act Amendments (CAAA) and the New Hampshire State Implementation Plan (SIP) require that a proposed project not cause any new violation of the National Ambient Air Quality Standards (NAAQS), or increase the frequency or severity of any existing violations, or delay attainment of any NAAQS.

The air quality study contains a microscale (local) analysis. The microscale analysis evaluated carbon monoxide (CO) concentrations at sensitive receptor locations and changes in CO emissions in the study area from motor vehicles, which are the primary source of CO emissions from the proposed project. The CAAA resulted in states being divided into attainment and non-attainment areas. The proposed project is located in Rockingham County which is an area designated as attainment for CO. The results of the air quality analysis demonstrate that the proposed project will not interfere with the attainment or maintenance of the NAAQS for CO. These results are consistent with the study area's designation as attainment for CO.

The U.S. Department of Transportation (USDOT) and the U.S. Environmental Protection Agency (USEPA) have established conformity procedures to ensure that transportation projects are in compliance with the SIP. This process is called conformity. Project level conformity requires that the proposed transportation project be part of an approved Transportation Improvement Program (TIP). The proposed project was included in NHDOT's State Transportation Improvement Program (STIP) for Fiscal Years 2003-2005. The STIP was approved by the USDOT as satisfying the transportation conformity requirements. The regional air quality impacts of the proposed project were addressed in the transportation conformity analysis and no analysis of regional emissions has been included in this air quality study.

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4.10.2 Modeling Methodology

The air quality study was prepared consistent with USEPA modeling procedures. The microscale analysis calculated maximum CO concentrations at receptor locations for each intersection for existing (2001), the Estimated Year of Completion (2010), and Design (2024) years for three alternatives. These alternatives included the No-Build Alternative for all three analysis years and the Build Alternatives for 2010 and 2024. The traffic (volumes and speeds) and emission data were developed for each alternative. The local air quality impacts of the proposed project were calculated based on these data. The 2001 existing condition represents current traffic conditions

in the study area. The 2010 and 2024 No-Build alternatives reflect the existing traffic volumes increased to account for anticipated background traffic volume growth. The 2010 and 2024 Build alternative volumes reflect the future No-Build Alternative traffic volumes plus the changes in traffic distribution caused by the Build Alternative.

Microscale Analysis

The USEPA has set the NAAQS for CO to protect the public health. The NAAQS for CO is 35 parts per million (ppm) for a 1-hour period and 9 ppm for an 8-hour period, each not to be exceeded more than once per year. The predominant source of pollution anticipated from the proposed project is emissions from project-related motor vehicle traffic. CO is directly emitted by motor vehicles and its impacts can be estimated by computer modeling.

The objective of the microscale analysis was to evaluate the CO concentrations at congested intersections in the study area during the peak CO season (winter). The intersections in the study area were ranked based on traffic volumes and level-of-service. The following intersections (depicted in **Figure 4.10-1**) were selected for analysis because they ranked as the intersections with the highest traffic volumes and worst levels-of-service in the study area:

- NH 125 and East Road/Joanne Drive
- NH 125 and Danville Road
- NH 125 and NH 121A
- NH 125 and NH 111

The microscale analysis calculates maximum 1-hour and 8-hour CO concentrations in the project area. The USEPA's CAL3QHC[18] computer model was used to predict CO concentrations at receptor locations. The CAL3QHC pollution dispersion model calculates the air quality impacts from vehicles in both free-flow and idle operation by creating a three dimensional model that represents the roadway and receptor geometry. Traffic, emission, and meteorological data were entered into the model to predict maximum 1-hour CO concentrations at the receptor locations. The receptor locations were placed in areas where the public has access. Typically, the receptor locations were placed at the edge of the roadway, but not closer than 3 meters (10 feet) from the nearest travel lane, so that they were not within the roadway mixing cell. The microscale analysis evaluated 14 sensitive receptors near intersections in the study area. These sensitive receptors are shown on **Figure 4.10-1**. The microscale analysis predicts values representative of the highest concentrations for each quadrant of each intersection. Receptor locations located farther away from the intersections will have lower concentrations because of the CO dispersion characteristics. Receptors that are along major roadways (NH 125) are also expected

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18 *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*, US Environmental Protection Agency, Office of Air Quality Planning and Standards, Technical Support Division; Research Triangle Park, NC; EPA-454/R-92-006; November 1992.

to have lower CO concentrations, because the emission factors for vehicles traveling along these roadways are much lower than the emission rates for vehicles queuing at intersections.

The 1-hour CO concentrations were calculated directly from the USEPA computer model, using peak hour traffic and emission data. The 8-hour CO concentrations were derived by applying a persistence factor of 0.7 to the 1-hour CO concentrations. USEPA recommends the use of a 0.7 persistence factor when monitoring data for a local area are not available.

The CO concentrations presented in the results include background CO concentrations. The background concentrations are the constant and diffuse levels of CO that are always present due to numerous sources throughout the area. A background CO concentration of 2.0 ppm was used for both the 1-hour and 8-hour analysis.

Emission Factors

The vehicle emission factors used in the microscale analysis were obtained using the USEPA MOBILE 6.2[19] computer model. MOBILE 6.2 calculates CO emission factors for motor vehicles in grams per vehicle-mile. The emission factors calculated in this study were adjusted to reflect New Hampshire-specific conditions such as temperatures representative of the winter CO season (30^0 F). The detailed MOBILE 6.2 input and output data are presented in the Air Quality Technical Report available at NHDOT.

Traffic Data

Motor vehicle emissions will be the predominant project-related sources of CO emissions. The microscale analysis used peak-hour traffic volumes. Vehicle speeds were developed based upon posted speed limits and travel speed observations made during peak traffic periods.

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4.10.3 Existing Conditions

The microscale analysis demonstrated that the 2001 1-hour CO concentrations ranged from a minimum of 3.7 parts per million (ppm) at the intersection of NH 125 and Danville Road to a maximum of 5.5 ppm at NH 125 and East Road/Joanne Drive. The corresponding maximum 8-hour CO concentrations ranged from a minimum of 2.6 ppm to a maximum of 3.9 ppm. The microscale results for all the receptor locations are presented in Tables 4.10-1 and 4.10-2. All the 1-hour and 8-hour concentrations are below the CO NAAQS of 35 and 9 ppm, respectively.

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19 The February, 2004 release of MOBILE 6.2 (Mobile Source Emission Factor Model), US EPA, Office of Mobile Sources, Ann Arbor, MI.

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4.10.4 Project Impacts

Future estimates of project related emissions were based upon changes in traffic and emission factor data. The traffic data include traffic volumes and signal cycle timing. The emission factor data include the years of analysis and roadway speeds. Tables 4.10-1 and 4.10-2 present the maximum predicted 1-hour and 8-hour CO concentrations, respectively, for the Existing, 2010 No-Build, 2010 Build, 2024 No-Build, and 2024 Build conditions. The tables include those receptor locations that exhibited the highest CO concentrations for each quadrant of each intersection. The Air Quality Technical Report provides a detailed breakdown of the microscale modeling results for all receptor locations.

Table 4.10-1
Predicted Maximum 1 Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2]	2001 Existing	2010 No-Build	2010 Build	2024 No-Build	2024 Build
NH 125 and East Road/Joanne Drive					
1. Residential	5.5	4.3	4.3	4.1	4.1
2. Open Space	5.5	4.1	4.1	3.9	3.9
3. Commercial	5.4	4.2	4.2	4.1	4.1
4. Commercial	5.4	4.3	4.3	4.1	4.1
NH 125 and Danville Road					
5. Open Space	4.5	4.1	4.5	4.1	4.8[3]
6. Commercial	3.7	3.6	3.5	4.1	3.6
7. Commercial	4.8	4.3	4.6	4.0	4.6
NH 125 and NH 121A (Main St.)					
8. Open Space	4.6	4.4	4.6	4.2	4.7
9. Commercial	4.8	4.7	5.2	4.5	4.8
10. Residential	4.5	4.4	5.0	4.3	4.9
11. Open Space	4.9	4.4	4.8	4.2	4.5
NH 125 and NH 111					
12. Open Space	4.5	3.8	3.8	3.8	3.8
13. Open Space	4.8	4.0	4.0	3.8	3.8
14. Open Space	4.4	3.8	3.8	3.7	3.7

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in parts per million (ppm) and include a 1-hour background concentration of 2.0 ppm. The 1-hour NAAQS for CO is 35 ppm.

2 Results are presented for the receptors with the highest CO concentration only. For a detailed location of receptors and the predicted maximum CO concentrations at other receptors, refer to the Air Quality Technical Report.

3 CO concentrations under the Build alternative are sometimes higher because of queuing at the new signalized intersections.

Table 4.10-2
Predicted Maximum 8 Hour CO Concentrations (Parts Per Million)[1]

Receptor No. and Location[2]	2001 Existing	2010 No-Build	2010 Build	2024 No-Build	2024 Build
NH 125 and East Road/Joanne Drive					
1. Residential	3.9	3.0	3.0	2.9	2.9
2. Open Space	3.9	2.9	2.9	2.7	2.7
3. Commercial	3.8	2.9	2.9	2.9	2.9
4. Commercial	3.8	3.0	3.0	2.9	2.9
NH 125 and Danville Rd.					
5. Open Space	3.2	2.9	3.2	2.9	3.4
6. Commercial	2.6	2.5	2.5	2.9	2.5
7. Commercial	3.4	3.0	3.2	2.8	3.2
NH 125 and NH 121A (Main St.)					
8. Open Space	3.2	3.1	3.2	2.9	3.3
9. Commercial	3.4	3.3	3.6	3.2	3.4
10. Residential	3.2	3.1	3.5	3.0	3.4
11. Open Space	3.4	3.1	3.4	2.9	3.2
NH 125 and NH 111					
12. Open Space	3.2	2.7	2.7	2.7	2.7
13. Open Space	3.4	2.8	2.8	2.7	2.7
14. Open Space	3.1	2.7	2.7	2.6	2.6

Source: Vanasse Hangen Brustlin, Inc.

1 The concentrations are expressed in parts per million (ppm) and include an 8-hour background concentration of 2.0 ppm. The 8-hour NAAQS for CO is 9 ppm.

2 Results are presented for the receptors with the highest CO concentration only. For a detailed location of receptors and the predicted maximum CO concentrations at other receptors, refer to the Air Quality Technical Report.

The results of the microscale analysis demonstrate that the proposed project satisfies the SIP criteria for CO because all the 2001, 2010, and 2024 No-Build and Build CO concentrations (both 1 and 8 hour values) are below the NAAQS of 35 and 9 ppm, respectively. The results for each intersection analyzed are discussed below.

NH 125 and East Road/Joanne Drive

The maximum 1-hour CO concentrations predicted for the 2010 No-Build Alternative range from 4.1 to 4.3 ppm, and in 2024, from 3.9 to 4.1 ppm. The corresponding maximum 8-hour CO concentrations ranged from 2.9 ppm to 3.0 ppm in 2010, and they ranged from 2.7 to 2.9 ppm in 2024.

The maximum 2010 1-hour Build Alternative concentrations are predicted to range from 4.1 to 4.3 ppm and from 3.9 to 4.1 ppm in the 2024 Build Alternative. The corresponding maximum 8-hour CO concentrations ranged from 2.9 ppm to 3.0 ppm in 2010 and they range from 2.7 to 2.9 ppm in 2024. Under all conditions analyzed, the maximum predicted 1-hour and 8-hour concentrations are below the NAAQS.

NH 125 and Danville Road

The maximum 1-hour CO concentrations predicted for the 2010 No-Build Alternative range from 3.6 to 4.3 ppm, and in 2024, from 4.0 to 4.1 ppm. The corresponding maximum 8-hour CO concentrations ranged from 2.5 ppm to 3.0 ppm in 2010, and they ranged from 2.8 to 2.9 ppm in 2024.

The maximum 2010 1-hour Build Alternative concentrations are predicted to range from 3.5 to 4.6 ppm and from 3.6 to 4.8 ppm in the 2024 Build Alternative. The corresponding maximum 8-hour CO concentrations ranged from 2.5 ppm to 3.2 ppm in 2010 and they range from 2.5 to 3.4 ppm in 2024. Under all conditions analyzed, the maximum predicted 1-hour and 8-hour concentrations are below the NAAQS.

NH 125 and NH 121A (Main Street)

The maximum 1-hour CO concentrations predicted for the 2010 No-Build Alternative range from 4.4 to 4.7 ppm, and in 2024, from 4.2 to 4.5 ppm. The corresponding maximum 8-hour CO concentrations ranged from 3.1 ppm to 3.3 ppm in 2010, and they ranged from 2.9 to 3.2 ppm in 2024.

The maximum 2010 1-hour Build Alternative concentrations are predicted to range from 4.6 to 5.2 ppm and from 4.5 to 4.9 ppm in the 2024 Build Alternative. The corresponding maximum 8-hour CO concentrations ranged from 3.2 ppm to 3.6 ppm in 2010 and they ranged from 3.2 to 3.4 ppm in 2024. Under all conditions analyzed, the maximum predicted 1-hour and 8-hour concentrations are below the NAAQS.

NH 125 and NH 111

The maximum 1-hour CO concentrations predicted for the 2010 No-Build Alternative range from 3.8 to 4.0 ppm, and in 2024, from 3.7 to 3.8 ppm. The corresponding maximum 8-hour CO concentrations ranged from 2.7 ppm to 2.8 ppm in 2010, and they ranged from 2.6 to 2.7 ppm in 2024.

The maximum 2010 1-hour Build Alternative concentrations are predicted to range from 3.8 to 4.0 ppm and from 3.7 to 3.8 ppm in the 2024 Build Alternative. The corresponding maximum 8-hour CO concentrations ranged from 2.7 ppm to 2.8 ppm in 2010, and they ranged from 2.6 to 2.7 ppm in 2024. Under all conditions analyzed, the maximum predicted 1-hour and 8-hour concentrations are below the NAAQS.

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4.10.5 Construction Impacts

Air quality in the study area would not be substantially affected by project construction because of the temporary nature of highway construction and the confined right-of-way. Emissions from the operation of construction machinery (nitrogen oxides, sulfur oxides, carbon monoxide, and particulate matter) are short-term and not generally considered substantial.

Mitigating fugitive dust emissions involves minimizing or eliminating its generation. Mitigation measures that will be used for construction include wetting and stabilization to suppress dust generation, cleaning paved roadways, and scheduling construction to minimize the amount and duration of exposed earth.

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4.10.6 Summary

The air quality analysis demonstrates that the proposed project is in compliance with the 1990 Clean Air Act Amendments and the New Hampshire State Implementation Plan. The results of the microscale analysis demonstrate that the proposed project will not create CO violations in locations where violations do not currently exist. In fact, the results demonstrate that no CO violations currently exist in the air quality study area. The microscale analysis also demonstrates that CO concentrations for the No-Build and Build Alternatives are all predicted to be below the NAAQS standards for CO.

The proposed reconstruction of NH 125 also satisfies the transportation conformity requirements because it was included in the NHDOT's State Transportation Improvement Program (STIP) for Fiscal Years 2003-2005, which was approved by the USDOT.

In summary, the project will not adversely impact the air quality in the Towns of Plaistow and Kingston. The air quality analysis results demonstrate that the proposed project is in compliance with the SIP because:

- No new violation of the NAAQS will be created,
- No increase in the frequency or severity of any existing violations will occur, and
- No delay in attainment of any NAAQS standards will result.

4.11 Noise

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4.11.1 Introduction

NHDOT[20] and FHWA[21] noise impact assessment procedures were used to identify receptor areas, to predict existing and future highway noise levels, to determine project noise impacts, and to evaluate noise mitigation measures in the NH 125 and upgrade project area.

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. The individual human response to noise is subject to considerable variability since there are many emotional and physical factors that contribute to the differences in reaction to noise.

Sound (noise) is described in terms of loudness, frequency, and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB). For community noise impact assessment, sound level frequency characteristics are based upon human hearing, using an A-weighted (dBA) frequency filter. The A-weighted filter is used because it approximates the way humans hear sound. Table 4.11.1 presents a list of common indoor and outdoor sound levels.

The most common way to account for the time-varying nature of sound (duration) is through the equivalent sound level measurement, referred to as L_{eq}. The L_{eq} averages the background sound levels with short-term transient sound levels and provides a uniform method for comparing sound levels that vary over time. The time period used for highway noise analysis is typically one hour. The peak hour L_{eq} represents the noisiest hour of the day/night and usually occurs during the peak periods of automobile and truck traffic. NHDOT and FHWA guidelines and criteria require the use of the one-hour L_{eq} for assessing highway noise impacts on different land uses.

The following general relationships exist between hourly traffic noise levels and human perception:

- A 1 or 2 dBA increase/decrease is not perceptible to the average person.
- A 3 dBA increase/decrease is a doubling/halving of acoustic energy, but is just barely perceptible to the human ear.
- A 10 dBA increase/decrease is a tenfold increase/decrease in acoustic energy, but is perceived as a doubling/halving in loudness to the average person.

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20 *Policy and Procedural Guidelines for the Assessment and Abatement of Highway Traffic Noise for Type I Highway Projects*, New Hampshire Department of Transportation, July 1996

21 *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Federal Highway Administration's Title 23 Code of Federal Regulations, Part 772

Table 4.11-1
Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)		Sound Level (dBA)	Indoor Sound Levels
	3,324,555	-	110	Rock Band at 5 m
Jet Over-Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

Source: Highway Noise Fundamentals, Federal Highway Administration, September 1980.
μPA MicroPascals describe pressure. The pressure level is what sound level monitors measure.
dBA A-weighted decibels describe pressure logarithmically with respect to 20 μPa (the reference pressure level).

The FHWA has established noise abatement criteria[22] to help protect the public health and welfare from excessive vehicle traffic noise. Traffic noise can adversely affect human activities such as communication. Recognizing that different areas are sensitive to noise in different ways, the FHWA has established Noise Abatement Criteria (NAC) according to land use. The NAC are described in Table 4.11.2. The NHDOT endorses the FHWA procedures[23] and considers a receptor area to be impacted by noise when existing or future sound levels approach (within 1 dBA), are at, or exceed the NAC, or when future sound levels exceed existing sound levels by 15 dBA or more. It is generally considered that a

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22 *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Federal Highway Administration's Title 23 Code of Federal Regulations, Part 772
23 *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, Federal Highway Administration, June 1995

0-5 dBA increase/decrease represents a slight change in noise levels, a 6-14 dBA increase/decrease represents a moderate change in noise levels, and a 15 dBA or greater increase/decrease represents a substantial change in noise level. The feasibility of noise mitigation is evaluated when noise impacts are identified at receptor areas.

Table 4.11-2
Noise Abatement Criteria (NAC)
One-Hour, A-Weighted Sound Levels in Decibels (dBA)

Activity Category	$L_{eq}(h)$[1]	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purposes.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR Part 772 - Procedures for Abatement of Highway Traffic Noise and Construction Noise.
1 $L_{eq}(h)$ is a energy-averaged, one-hour, A-weighted sound level in decibels (dBA).

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4.11.2 Methodology

The noise analysis evaluated the highest hourly noise levels in the study area. The highest hourly noise levels were found to occur during the evening peak hour traffic commuting period based upon a review of hourly traffic data and noise monitoring data, which was conducted during peak and off-peak traffic periods. A noise monitoring program measured existing peak hour sound levels at five receptor areas within the study area to help establish existing sound levels and to calibrate the noise model to this specific roadway. The sound levels were calculated using the FHWA's approved noise modeling methodology. The current modeling methodology is FHWA's Traffic Noise Model (TNM)[24]. The modeling input data included peak hour traffic volumes, vehicle mix, vehicle speeds, and roadway and receptor geometry. The existing and future sound level predictions were based on the evening peak hour traffic commuting period. The noise analysis calculated the sound levels at each receptor area and compared the results to the NHDOT and FHWA noise impact

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24 *Federal Highway Administration's Traffic Noise Model (FHWA TNM) version 2.1, February 2003.*

criteria. Where noise impacts were identified, mitigation measures were evaluated to determine if they were reasonable, feasible, and likely to be included in the project.

The study area was evaluated to identify receptor sites that have outdoor activities that might be sensitive to highway noise. Over 500 receptor sites were identified along the existing NH 125 corridor in Plaistow and Kingston. These receptor sites included residences, public buildings, and commercial buildings. Twenty-two receptor areas were selected to represent similar groups of receptor sites. Table 4.11.3 presents the receptor areas by land use.

The receptor areas, which predominately included outdoor ground level areas between the roadways and the buildings, are shown in Figure 4.11-1. The majority of the receptor areas are included in the FHWA's "Activity Category B", which has a noise abatement criterion of 67 dBA. Other land uses, such as commercial buildings, (i.e., those that do not involve temporary overnight residence), are in FHWA "Activity Category C", which has a noise abatement criterion of 72 dBA.

Table 4.11-3
Receptor Areas by Land Use

Receptor Number	Receptor Area	Total Number of Receptor Sites Represented	Land Use	
			Number of Residential	Number of Commercial
1	East Road	20	10	10
2	Joanne Drive	10	5	5
3	Access Road	15	0	15
4	Rose Avenue	25	13	12
5	Old Road	15	10	5
6	Danville Road	35	25	10
7	NH 121A – East	25	17	8
8	Walton Road	65	50	15
9	Old County Rd - East	35	30	5
10	Old County Rd - West	10	8	2
11	Kingston Road	40	30	10
12	Dorre Road	20	10	10
13	Colonial Road	20	15	5
14	Debra Road	15	13	2
15	Hunt Road	10	5	5
16	Newton Junction Road	25	20	5
17	Old Coach Road	20	15	5
18	West Shore Park Road	20	15	5
19	Meeks Road	25	20	5
20	Stoney Brook Road	20	15	5
21	Frontage Road	15	13	2
22	NH 111	25	25	0
	Totals	510	364	146

Source: VHB, Inc.

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4.11.3 Existing Conditions

Sound Level Measurements

The existing conditions were determined from sound level measurements and noise modeling. Sound level measurements and traffic data were collected to conduct model calibration. Sound levels were measured at five receptor areas (residences) on February 6 and 13, 2002 in conformance with the FHWA noise monitoring guidelines[25]. The dominant noise sources in the study area were vehicles traveling on NH 125 and local roadways. The traffic data collected included traffic volumes, vehicle mix (automobiles, medium trucks, and heavy trucks), and operating speeds.

The traffic data and roadway geometry were used to predict sound levels at each noise monitoring site. The results of the predicted sound levels were compared to the monitored sound levels to calibrate the noise prediction model. **Figure 4.11-1** presents the location of the noise monitoring sites. Table 4.11.4 presents the results of the noise monitoring and model calibration. In conclusion, the monitoring results demonstrate that the noise model is appropriate for this project.

Table 4.11-4
Comparison of Noise Monitoring and Prediction Data

Receptor Number	Receptor Area[1]	A-Weighted Sound Level in Decibels (dBA) FHWA Criterion	Monitored L_{eq}	Predicted L_{eq}	Difference
1	Old Road	67	**66**[2]	65	-1
2	Walton Road	67	62	62	0
3	Granite Road	67	60	60	0
4	Kasher Drive	67	**66**[2]	**67**[2]	+1
5	Spruce Lane	67	61	60	-1

Source: VHB, Inc.
1 The monitoring sites are depicted in **Figure 4.11-1**.
2 This sound level approaches, is at, or exceeds the FHWA noise abatement criterion.

Existing Sound Levels

The existing sound levels presented in Table 4.11-5 represent the highest sound levels in the study area that have been calculated using the peak hour traffic data. The study area includes a diversity of building types, such as, residential, commercial,

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25 *Measurement of Highway-Related Noise*, US Department of Transportation, Federal Highway Administration, FHWA-PD-96-046, May 1996

and public buildings. The twenty-two receptor areas listed in Table 4.11-5 were selected to each represent several of the approximately 510 buildings located in their vicinity, which are expected to have similar sound levels. The majority of these buildings are located approximately 15 to 100 meters (50 to 330 feet) from NH 125. The results of the noise analysis demonstrate that nine receptor areas currently have sound levels that approach, are at, or exceed the NAC. These receptor areas (receptors 9, 10, 12, 13, and 15-19) are generally the first row of buildings located along the NH 125 corridor.

Table 4.11-5
Sound Levels

Receptor Number	Receptor Area	Number of Receptor Sites	One-Hour A-Weighted Sound Levels in Decibels [L_{eq} - dBA] FHWA Criterion	2001 Existing Conditions	2024 No-Build	2024 Build
1	East Road	10	67 / 72	59 - 63	61 - 65	61 - 65
2	Joanne Drive	5	67 / 72	54 - 62	55 - 64	55 - 63
3	Access Road	15	72	54 - 65	55 - 67	56 - 67
4	Rose Avenue	25	67 / 72	53 - 57	54 - 58	55 - 59
5	Old Road	15	67 / 72	57 - 65	59 - **67**[1]	59 - **66**[1]
6	Danville Road	35	67 / 72	51 - 60	53 - 62	55 - 62
7	NH 121A – East	25	67 / 72	52 - 63	54 - 65	55 - 65
8	Walton Road	65	67 / 72	51 - 62	53 - 63	55 - 63
9	Old County Rd - East	35	67 / 72	50 - **66**[1]	51 - **67**[1]	51 - **68**[1]
10	Old County Rd - West	10	67 / 72	56 - **66**[1]	58 - **71**[1]	59 - **72**[1]
11	Kingston Road	40	67 / 72	58 – 63	60 - 64	63 - 65
12	Dorre Road	20	67 / 72	53 - **67**[1]	54 - **69**[1]	54 - **70**[1]
13	Colonial Road	20	67 / 72	49 - **66**[1]	50 - **67**[1]	50 - 65
14	Debra Road	15	67 / 72	50 – 58	51 - 59	53 - 62
15	Hunt Road	10	67 / 72	53 - **67**[1]	55 - **69**[1]	55 - **67**[1]
16	Newton Junction Road	25	67 / 72	48 - **71**[1]	50 - **72**[1]	53 - **75**[1]
17	Old Coach Road	20	67 / 72	52 - **66**[1]	54 - **68**[1]	55 - **69**[1]
18	West Shore Park Road	20	67 / 72	52 - **66**[1]	54 - **68**[1]	55 - **69**[1]
19	Meeks Road	25	67 / 72	49 - **68**[1]	51 - **70**[1]	52 - **70**[1]
20	Stoney Brook Road	20	67 / 72	46 – 59	48 - 61	50 - 62
21	Frontage Road	15	67 / 72	51 – 60	53 - 62	53 - 63
22	NH 111	25	67	54 – 58	56 - 60	56 - 60

Source: VHB, Inc.

1 This sound level approaches, is at, or exceeds the FHWA noise abatement criterion.

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4.11.4 Project Impacts

The noise analysis predicted future sound levels for approximately twenty-two receptor areas in the study area. These receptor areas included approximately 364 residential buildings and 146 commercial properties. This analysis predicted changes in sound levels for the 2024 No-Build, and the 2024 Build Alternatives based upon changes in traffic volumes, vehicle speeds, truck percentages, and roadway geometry. Table 4.11.5 presents the predicted sound levels for 2001 Existing, 2024 No-Build, and 2024 Build Alternatives, while Table 4.11.7 provides a summary of the actual impacts for each alternative.

2024 No-Build Alternative

The receptor areas along the existing NH 125 corridor are predicted to experience peak hour sound levels, with the 2024 No-Build Alternative, that vary from 48 to 72 dBA. There is an increase of 1 to 2 dBA (at virtually all the receptors) over the existing conditions. Further, under the No-Build condition, sound levels exceed the NAC at all of the following locations: 5, 9, 10, 11,12, 13, 15, 16, 17, 18, and 19. This increase is due to the growth in traffic over time.

2024 Build Alternative

The 2024 Build Alternative improvements are predicted to have sound levels that approach, are at, or exceed the NAC for receptor areas 5, 9, 10, 12, and 15-19. The 2024 Build Alternative sound levels are not substantially higher than the 2001 Existing sound levels. Although some receptors in the study area experience a change as high as 3 to 5 dBA, the vast majority experience a change of 1 to 2 dBA (which is not perceptible to the average person). Sound levels for the 2024 Build Alternative are expected to vary from 50 to 75 dBA.

The highest increases in the 2024 Build Alternative sound levels will occur along the Kingston Road Extension (Receptor Area 11). These 2024 Build Alternative sound levels at the Kingston Road Extension, while below the NAC, are predicted to vary from 63 to 65 dBA, an increase over the 2001 Existing sound levels of 3 to 5 dBA at some receptors. Other receptor areas will experience some negligible changes due to minor realignment of intersections. In some areas, such as Receptor Area 13, build sound levels are even expected to decrease due to a coordinated signal system, which will reduce vehicular speeds to the posted speed limit. Sound levels are reduced when vehicle speeds are reduced.

■

4.11.5 Construction Noise Impacts

Noise impacts from construction activities are closely related to the phase of construction and the type and placement of construction equipment at the site. Table

4.11.6 shows a variety of construction equipment that may be deployed at various stages of highway construction. Typical noise levels from equipment are also shown.

Construction activities will result in a substantial but temporary noise impact to receptors at various areas adjacent to proposed construction. Noise levels will vary depending on the type and number of pieces of equipment active at any one time. It is expected that noise levels exceeding 67 decibels could occur up to 152 meters (500 feet) away from construction activities. In general, construction noise will be restricted to daylight hours.

Table 4.11-6
Construction Equipment Noise Emissions

Equipment Type	Noise Levels (dBA @15m [50 ft])
Earthmoving	
Front Loader	84
Backhoe	84
Bulldozer	88
Tractor	84
Scraper	90
Grader	83
Truck	90
Paver	84
Vibrator	76
Materials Handling	
Concrete Mixer	83
Crane	82
Derrick	88
Stationary	
Pump	71
Generator	81
Compressor	89
Impact Devices	
Pile Driver	91
Pavement Breaker	89
Pneumatic Tool	80

Source: "Highway Construction Noise: Environmental Assessment and Abatement, Volume IV: User's Manual". Vanderbilt University, Nashville, TN. Report No. VTR-81-3, 1981.

■

4.11.6 Mitigation

Noise mitigation measures were evaluated for receptor areas where noise impacts have been identified. Mitigation measures such as traffic management (the re-routing of truck traffic), alterations of horizontal and vertical alignments, buffer zones, and insulation of public buildings are not appropriate or effective for this project. With respect to traffic management, this measure is not possible as NH 125 is the main highway for trucks with no comparable or reasonable alternative routes through the region.

The primary mitigation measure considered for noise abatement for this project was a noise barrier. Noise barriers provide noise abatement by reducing the transmission of sound waves. This is accomplished by shielding receptor areas from the noise source by blocking the line of sight. Noise barriers are judged as effective when they achieve a 5 dBA or greater noise reduction for the critical receptor areas with noise impacts.

The feasibility and reasonableness of constructing noise barriers were evaluated for the impacted receptor areas along the existing NH 125 corridor (Receptor Areas 5, 9, 10, 12, and 15-19). The construction of noise barriers is not feasible because of the acoustical and engineering restrictions. The numerous driveways and cross streets would result in gaps in potential noise barriers. These driveways and cross streets would prevent the noise barriers from being able to achieve a 5 dBA or greater reduction in sound levels. In most cases, it could make the noise impacts worse by creating an on and off effect as vehicles pass by the openings. Receptor Areas 5, 9, 10, 12, and 15-19 are located so close to the existing NH 125 corridor that they do not provide adequate land to construct a noise barrier. Finally, safety considerations would also prohibit the construction of noise barriers at many of these areas since the noise barriers would limit sight distance for motorists utilizing drives and side roads, creating potentially unsafe traffic conditions.

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4.11.7 Summary

The noise analysis (Table 4.11-7) demonstrated that approximately 9 receptor areas, representing approximately 36 residential and commercial buildings in the NH 125 corridor in Plaistow and Kingston, have existing sound levels that approach or exceed the NAC.

Under the No-Build condition in 2024, there will be 10 receptor areas with 37 structures where sound levels will approach, be at, or exceed NAC. In comparison, under the Build condition in 2024 (Proposed Action), there will be only 9 receptor areas representing 32 structures where sound levels will approach, be at, or exceed NAC.

Noise mitigation measures were evaluated for all the receptor areas that were found to approach, be at, or exceed the NAC under the 2024 Build Alternative to determine if noise levels could be reduced. No commercial receptor locations were impacted. Noise barriers were evaluated as the primary mitigation measure. The FHWA's and the NHDOT's noise abatement criteria and guidelines were used to evaluate each receptor area. Mitigation measures were not found to be reasonable and feasible for the receptor sites based upon acoustical, engineering, and economic considerations. The numerous driveways and cross streets along the existing NH 125 would result in gaps in potential noise barriers that would prevent the noise barriers from being effective at most of the receptor areas. Also, the location of homes with respect to the roadway does not provide adequate land to construct a noise barrier.

Table 4.11-7
Noise Impact Summary

Receptor Number	Receptor Area	Number of Receptor Sites	Land Use	Receptors Approaching, At, or Exceeding the Noise Abatement Criteria		
				2001 Existing	2024 No-Build	2024 Build
1	East Road	0	Res./Comm.	0	0	0
2	Joanne Drive	0	Res./Comm.	0	0	0
3	Access Road	0	Commercial	0	0	0
4	Rose Avenue	0	Res./Comm.	0	0	0
5	Old Road	1	Residential	0	1	1
6	Danville Road	0	Res./Comm.	0	0	0
7	NH 121A – East	0	Res./Comm.	0	0	0
8	Walton Road	0	Res./Comm.	0	0	0
9	Old County Rd - East	4	Res./Comm.	4	4	4
10	Old County Rd - West	2	Residential	2	2	2
11	Kingston Road	0	Res./Comm.	0	0	0
12	Dorre Road	5	Res./Comm.	5	5	5
13	Colonial Road	5	Res./Comm.	5	5	0[1]
14	Debra Road	0	Res./Comm.	0	0	0
15	Hunt Road	2	Residential	2	2	2
16	Newton Junction Road	2	Residential	2	2	2
17	Old Coach Road	7	Res./Comm.	7	7	7
18	West Shore Park Road	8	Res./Comm.	8	8	8
19	Meeks Road	1	Residential	1	1	1
20	Stoney Brook Road	0	Res./Comm.	0	0	0
21	Frontage Road	0	Res./Comm.	0	0	0
22	NH 111	0	Res./Comm.	0	0	0
	Totals	37		36	37	32

Source: VHB, Inc.
1 Sound levels will decrease in this receptor area under 2024 Build because of reduced vehicle speeds resulting from the coordinated signal system.

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4.11.8 Future Noise Levels for Planning Purpose

Data developed from the noise study may be useful to local officials in their planning efforts for future development along NH 125 corridor. To limit noise impacts to be something less than the FHWA Noise Abatement Criteria (i.e., less than 66 dBA for residential and 71 dBA for commercial) in the year 2024, the following parameters are suggested for the Town considerations:

Along the layout of the Build Alternative, the distance between development and the highway is dependent on the cuts and fills for the highway and the elevation difference between the development and the highway. Therefore a general rule of thumb (where the highway and the surrounding area are at similar elevation) is that residential development would ideally be no closer than 16 meters (50 feet) to the highway edge of pavement and that commercial development would ideally be no closer than 10 meters (30 feet) to the highway edge of pavement. Development occurring along the NH 125 corridor, should ideally abide by these distances.

4.12 Parks, Recreation and Conservation Lands

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4.12.1 Introduction

Information on public parks, recreation areas and conservation lands was obtained through field reconnaissance, interviews with the Towns of Plaistow and Kingston officials, NH Department of Resources and Economic Development (NHDRED), and the NHOEP. Potential impacts on public parks and recreation areas (as well as historic sites) must be addressed under the Section 4(f) provision of the National Transportation Act of 1966. In addition any properties which have received funding under the Land and Water Conservation Fund Act (LWCF), as administered by the US Department of Interior, require special evaluation including specific requirements for mitigation under Section 6(f) of that Act.

NH law under RSA 4:30-a requires that impacted municipally owned recreation or conservation lands be replaced. The RSA states that when the State of New Hampshire acquires any municipal conservation or recreation land, it shall transfer to the affected municipality other comparable land and facilities to the extent feasible, or shall grant to the municipality sufficient funds to acquire comparable lands.

All NHDOT projects are also required to identify during project planning any impacts to LCIP (Land Conservation Investment Program) properties. This program, under the auspices of NHOEP and now inactive, purchased properties specifically for conservation purposes.

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4.12.2 Description of Existing Resources

There are no publicly owned parks or recreational areas, i.e., non-historic 4(f) resources, in the project corridor. There are also no LWCF Section 6(f) properties in the project corridor (J. Roy, NHDRED letter dated September 23, 2002). The nearest LCIP property is north of the project area (Steve Walker, NHOEP, telecom., September 30, 2002). The locations of publicly-owned conservation lands as identified by GRANIT are shown in **Figure 4.12-1**.

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4.12.3 Summary of Impacts/Mitigation

There will be no impacts on any recreational 4(f) resources. There are also no impacts on 6(f) resources and LCIP properties, with the proposed NH 125 improvements.

Since there are no impacts on any significant public parks or recreational facilities, no mitigation is proposed.

4.13 Visual Resources

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4.13.1 Introduction

The State of New Hampshire takes great pride in the visual beauty of its communities, with its highways designed whenever practicable to fit within the character of the surrounding landscape. As such, the potential impacts of proposed highway improvements on visual resources are given careful consideration.

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4.13.2 Description of Existing Conditions

This section of NH 125 can be described as a mix of intensive commercial development with limited areas still reflecting its earlier rural/residential character. The corridor is primarily commercial in the Town of Plaistow, with mixed commercial and residential development as one proceeds northward into Kingston. Patches of wooded areas and undeveloped land become more common as one

approaches the terminus of the project. In contrast, land use just off the corridor (i.e., without frontage on NH 125) is largely rural residential.

■

4.13.3 Summary of Impacts/Mitigation

Although the improved highway will be wider than at present, the overall character of the project corridor with a major highway running through it will essentially remain the same as it is today. Widening the highway will require some tree and vegetation removal and will result in a more open highway effect.

To minimize the visual impact of tree removal associated with the Proposed Action, landscaping will be considered, where appropriate. Vegetative screening and miscellaneous landscaping have already been designed for the relocation of Hunt Road at the intersection of NH 125 and Newton Junction Road. Landscape treatments will also be applied to the proposed center median providing a boulevard effect for the corridor.

4.14 Cultural Resources

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4.14.1 Regulatory Background

Federal requirements

Historical properties and archaeological resources that are listed in or are eligible for listing in the National Register of Historic Places are afforded protection by Section 106 of the National Historic Preservation Act (NHPA) and Section 4(f) of the Department of Transportation Act of 1966 (see Section 5.0).

National Historic Preservation Act

Congress enacted the National Historic Preservation Act (NHPA), as amended, in 1966 to ensure that the effects of federal, federally funded, or federally permitted projects on historic buildings, neighborhoods, landscapes, and archaeological sites are considered. Through the NHPA, amended in 1976, 1980, and 1992, Congress sought to involve the federal government as an active participant in the Nation's preservation efforts.

Section 106 of the NHPA requires federal agencies to take into account the effects of their activities and programs on any historic district, site, building, structure, or object that is included, or eligible for inclusion, in the National Register of Historic Places. The resources and the effects on those resources are evaluated by the State Historic Preservation Office (SHPO) and the federal agencies having jurisdiction, in

this case the Federal Highway Administration (FHWA), the lead agency. In New Hampshire, the SHPO is the director of the New Hampshire Division of Historical Resources (NHDHR). Prior to the approval of the undertaking, the agency must afford the Advisory Council on Historic Preservation (ACHP), established under Title II of the NHPA, a reasonable opportunity to comment on the undertaking.

The procedures followed in the Section 106 review are referred to as the "Section 106 process" and are set forth in regulations issued by the ACHP. The ACHP's regulations, *Protection of Historic Properties* (36 CFR 800), govern the Section 106 process. The ACHP does not have the authority to halt or terminate projects that will affect historic properties; rather, its regulations emphasize consultation among the responsible federal agencies, the State Historic Preservation Officer (SHPO), and other interested, consulting parties, to identify, evaluate eligibility, determine the potential effect of the project on historic properties, and if possible, to agree upon ways to protect the affected properties.

Public Responsibilities Under Section 106

In addition to the participation of federal and state agencies in the Section 106 review process, the 1999 regulations at 36 CFR 800 require that the federal agencies consult with the public about federal projects and their effects on historic properties. The segment of the public specifically involved in the consultation process under these regulations generally includes immediately affected property owners; local and statewide historical, archaeological, preservation, heritage, and planning organizations; and the Native American community. It is the responsibility of the lead federal agency to provide adequate opportunity for these groups to receive information on the project and share their views. Typically, those individuals and organizations request consulting party status in writing from FHWA, and receive notification of their consulting party status. Consulting parties are notified of public meetings involving the project and meetings set to specifically discuss historical issues related to the project. Such parties are frequently provided minutes of these meetings. The comments involving historical properties are taken into account during the design stage.

In addition, the information on historical properties developed by state and federal agencies for this project is available to the community, citizens, and local officials, to enact ordinances protecting historic properties. The material can also be incorporated into the community master plan to identify historical resources and preserve them for future enrichment of the community.

State Requirements

The NHDHR is charged under RSA 227-C:9, Directive for Cooperation in the Protection of Historic Resources, to coordinate the identification and evaluation of cultural resources in the State of New Hampshire.

The NHDHR, in cooperation with NHDOT and FHWA, has established a method of identification and evaluation to meet the requirements of historic preservation

review, a responsibility established under RSA 227-C:9. The purposes of this process are to (1) locate and identify historical, architectural, archaeological, and historical archaeological resources within the project's impact area; (2) apply the criteria for evaluation of significance to a resource to determine possible eligibility to the National Register of Historic Places (National Register), if not already eligible or listed; (3) assess the probable effects of a project on resources listed on or eligible for, the National Register; and (4) develop appropriate mitigation methods to lessen the project' impact on affected historic properties.

The NHDHR prepared "Procedures for Identifying Cultural Resources That May Be Affected by State or Federal Transportation Projects in New Hampshire" in November 1992. These procedures were partially updated in 2001. This document offers specific guidance for cultural resource survey efforts undertaken as a component of transportation improvement projects.

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4.14.2 Archaeological Resources

4.14.2.1 Introduction

To fulfill requirements of Section 106 of the National Historic Preservation Act and its accompanying regulations, a preliminary archaeological reconnaissance level survey (Phase I-A) was conducted for the proposed project area. Research was initiated in 2001 and included background research, visual inspection of the project area, interpretation of data, preparation of a Phase 1A report, and preparation of this portion of the Environmental Assessment. The purpose of this study was to identify known archaeological resources and locations of archaeological resource sensitivity within the project area which would constitute constraints to project design. Assessment of archaeological sensitivity was based on known preferences for site location identified through a strategy of research and field inspection.

4.14.2.2 Definitions

Archaeological resources include cultural and culturally associated remains below the surface of the ground as well as ruins above it. Above ground remains may include standing buildings, structures, objects, and landscapes when these resources are examined primarily for the data they may contain.

For the purposes of this project, both Native American and Euro-American archaeological resources are considered.

Native American resources are those locations and resources once occupied by Native American or Indian peoples. They may both pre- and post-date the initial period of European settlement of the Americans, known as the period of contact between the two cultures. The data associated with these sites include oral tradition,

the archaeological record, primarily in the form of durable remains, as well as the associated landscape.

Historic period Euro-American archaeological resources are those sites and associated resources that typically date to and after the period of initial European contact with Native Americans. The age of these resources may continue to within 50 years of the present time. They include below-ground resources such as foundations or ruins, as well as culturally associated landscapes and standing buildings. The data associated with these sites includes the archaeological record as well as written, oral and pictorial documents. While these resources are examined primarily for the data they may contain, associated standing resources (see Section 4.14.3) may also gain significance through their associated archaeological components.

Based on general environmental parameters and specific site references for local watersheds, areas are identified as having archaeological sensitivity or likely to contain archaeological sites. However, the occurrence of sites is not known and further subsurface investigation is required to confirm site presence in these areas of sensitivity.

4.14.2.3 Methods

Various study methods were used to identify known archaeological resources and the locations of archaeological resource sensitivity within the proposed NH 125 project corridor. Studies included documentary research and non-intrusive field inspection. The initial study area was defined as 300 meters (1000 feet) on either side of the centerline. After the development of the preliminary design, the study area was narrowed to the probable impacts limits.

Background research and documentary review were conducted using both primary and secondary sources in order to define previously recorded archaeological resources and to complete a chronology of past human activity within the study area. This was intended to provide a research baseline for addressing sites, features or remains and their contexts. Data accumulated from archival sources were used to identify particular sites, features or past land use patterns. Research also permitted development of interpretive contexts, both chronological and thematic. These contexts were used in understanding known resources and developing expectations for resource presence in the study area.

The following research materials were reviewed: state-wide site inventory files, cultural resources management survey reports, town and area files, and nominations to the National Register of Historic Places maintained by the New Hampshire Division of Historical Resources; historic maps, photos and archives maintained by the Kingston Historical Society, the New Hampshire Historical Society, and on file with Preservation Company; project plans, historic and topographic maps for the

study area; local and regional histories available in libraries; and published and unpublished archaeological literature available at the Division of Historical Resources and the New Hampshire Archaeological Society. A review of data developed by architectural historians for the project and by interviews with individuals familiar with the archaeological context of the locale was also included. These combined sources provided a general sense of archaeological sensitivity in the project area as well as information on known and potential cultural resources.

Visual inspection was conducted in conjunction with background research and was the only component of field investigation for this project. Inspection involved driving the entire project area and adjacent roadways to gain an overall sense of terrain, landscape features, development and intactness. This was followed by walkover inspection of all potentially sensitive areas that were not obviously disturbed. During these visual inspections, particular attention was paid to areas of known or likely sites, expectations for site sensitivity developed from archival sources, pervasive conditions along the project route, and the nature of any disturbance or current preservation condition. Following the project's public hearing and identification of impacted areas, additional walk-over inspections of any areas added to the project will be completed as appropriate.

As a result of visual inspection, observations were made on the type of terrain, distance to water sources, disturbances or intrusions. All readily accessible previously recorded sites adjacent to the project area were inspected to confirm their existence, location, and status. When new sites, features or resources were discovered, preliminary, scaled field sketches were made, photographs taken, and information collected to compile a minimum-level site recording form. Observations on the likely occurrence of archaeological resource presence, i.e., archaeological sensitivity, were also made during visual inspection, based on such environmental qualities as visually intact landscape surfaces, topography, drainage, and overall setting.

No subsurface investigations of any type have been conducted to date.

Several levels of results were generated through this approach. First, background research resulted in development of a broad context to describe the general occupation history and culture chronology of the project locale. In turn, contextual information was used to generate expectations for the types and settings of archaeological sites or features. Then, the specific locations of known sites or archaeologically sensitive areas were plotted on project plans as were zones of landscape modification where any sites would have been severely impacted or destroyed (see Figure 4.14-2).

All portions of the project area were assessed for archaeological sensitivity, including known or likely Native American or Euro-American sites, artifacts, features, ruins or other elements. Sensitivity assignments were based on information available in documentary sources along with observations made in the field. Resource sensitivity

was defined as: no sensitivity; sensitivity for the occurrence of resources; and verified sites.

Areas exhibiting no sensitivity for the occurrence of archeological resources were defined by the existence of landscape variables in direct contrast to those which were believed to be favorable for site setting. These variables included: steep or irregular terrain, poor soil drainage; rocky and stony soil associations; and extensive subsurface ground disturbance from recent land use (such as gravel pits, roads and highways, industries, commercial use, thick residential development, etc.).

Areas exhibiting sensitivity for the occurrence of archeological resources were defined by analogy to the setting of previously recorded sites or by interpretation of ethnographic, historic or cartographic data. Variables considered sensitive for the occurrence of Native American site location included close proximity to surface water features, level terrain, well drained soils or outwash terraces or floodplains and stone free soils. Variables considered sensitive for the occurrence of Euro-American site location included presence of soils suitable for agriculture, stone walls, diagnostic vegetation (ornamental or domestic plants, and cultivated features such as rows of trees, etc.), and access to natural resources for industrial use (water power in streams to operate mills, clay for manufacture of brick, etc.) as well as foundations and surface artifact deposits.

Verified sites constitute site locations of both pre-contact Native American and Historic Euro-American age and affinity, which have been recorded in the state-wide site files of the NH Division of Historical Resources. Information on these sites is uneven, with many site forms containing little to no data aside from site location.

The standard method for investigation of identified archaeological resources and sensitive areas delineated during Phase I-A examination would entail completion of a Phase I-B Site Identification survey. This level of study typically involves systematic subsurface testing of areas identified during Phase I-A study. Prior to completing the systematic testing the areas of sensitivity will be re-examined by the principal investigator to assess accuracy and accommodate any changes in the plans resulting from changes requested during the public hearing process. This testing provides definition of horizontal and vertical context through excavation of 0.5 x 0.5 meter (1.6 x 1.6 feet) units at 8 meter (26.2 feet) intervals across archaeologically sensitive areas. This also permits definition of the presence of subsurface artifacts, features and deposits. In addition, further development of contexts associated with identified resources would be completed. Phase I-B entails research and synthesis of environmental and contextual data using a variety of primary and secondary sources including soils data, site files, photographs, manuscripts, directories, histories and site reports. Artifacts found during both Phase I-A and I-B investigations undergo cleaning, conservation, cataloguing, analysis, and curation.

Contextual and archeological site data collected during Phase I-A and I-B studies are evaluated with the NHDHR and FHWA, site recording forms completed, and

recommendations made for any continued survey levels, including Phase II Intensive Survey and Phase III Mitigation Survey. During Phase II, investigations determine whether sites, individually or collectively, are sufficiently significant to be eligible for listing on the National Register of Historic Places. A Phase II survey determines age, cultural affinity, boundaries, nature and extent of resources. A Phase III level effort generally occurs at impacted, eligible sites to recover information from them. This effort follows a research design developed to gather specific information of research value from the site.

Known areas with archaeological resources are shown in **Figure 4.14-1**. Detailed discussion of the individual sites and what they suggest about the potential for other sites in the present project corridor are presented in the archaeology technical report (Victoria Bunker, Inc. 2004) available at NHDOT. An overview of the findings of the Phase 1-A research follows.

4.14.2.4 Previously Recorded Pre-Contact Native American Archaeological Sites

The study area is situated within the lower region of the Merrimack River Valley. The Merrimack River and its watershed are known as an important settlement area for Native American peoples during the pre-Contact and Contact periods. Archaeological sites found throughout the valley reveal continuous human occupation beginning by 11,500 B.P. Archaeological evidence includes sites and individual artifact discoveries, with hundreds of sites recorded in the state-wide site inventories of both New Hampshire and Massachusetts.

The native people who lived here during the past made decisions on when and where to settle and on the types of activities best suited for each place. Evidence for a long cultural sequence comes from a variety of sources, such as artifact collections, excavated sites, and archaeological reports. The people who lived here were highly mobile, and not confined by the physiographic boundaries of the drainage. They probably traveled and traded along river trail systems, perhaps using canoes to navigate the main river and tributaries.

A number of pre-contact Native American sites have been recorded in the vicinity of the project area. In a survey to discover archeological sites on the Merrimack, Moorehead (1931) has indicated the presence of numerous sites along streams associated with the Little River as well as a site near the mouth of the Powwow River in nearby Massachusetts. Most of the site information that follows is drawn from the statewide site files at the NHDHR. Most of the sites on file were reported by collectors and members of the New Hampshire Archaeological Society. In general, reported information is minimal, and the summaries provided in the technical report (Victoria Bunker, Inc. 2004) constitute the majority of what is known about these sites. Some sites have received more detailed examination and analysis in reports

and bulletins. When this information was available, summaries of the research were provided in the Phase IA report.

Known sites provide insight into the types of sites that may be located in the project area. As well, known sites provide information on locations where sites are expected to be found. Pre-contact Native American sites recorded in the vicinity of the project area have been found near the margins of rivers and ponds, particularly along the Little River, Powwow Pond and Great Pond.

Review of available sources has indicated that Native Americans traveled through and settled in the immediate project vicinity during the prehistoric past. According to Price (1967), the Pentucket Trail served as an Indian travel way nearly following the direction of NH 125. This trail is believed to have connected the village site of "Pentucket", on the Merrimack River, near Haverhill, Massachusetts, with the village at "Massapaug," or Great Pond, near Kingston, and continued north to Pakwa-kek," "At the place of the arrows," at Pickpocket Falls on the Exeter River. Price (1967) has also noted that the Powwow River was used by the Indians and that "an Indian consultation was held on Powwow Hill." Similarly, in a survey to discover archaeological sites on the Merrimack, Moorehead has indicated the presence of numerous sites along streams associated with Little River as well as site near mouth of Powwow River in Amesbury (Moorehead 1931).

Sites Near The Little River

Seven pre-contact Native American sites are found in the drainage of the Little River, in the southern portion of the project area. These sites include: the Paul Holmes site (27 RK 245); Cafiso's Landing site (27 RK 268); the Plaistow Dump site (27 RK 262); the BROX/ Galloway site (27 RK 263); a site near Happy Hollow Cemetery (27 RK 248); the Lookout site (27 RK269); and the Newton Junction Fire Department site (27 RK 247). Information on these sites is given below.

The Paul Holmes site (27 RK 245) is located in the Little River drainage north of the town center of Plaistow, on the north side of the Boston and Maine Railroad tracks. It is located approximately 1.2 kilometers (0.75 miles) east of NH 125. Artifacts recovered from the site excavations included: a stone hearth, stone tool flakes; a piece of jasper from the Saugus, Massachusetts area; a flake knife; drill fragments; a drill tip; a stone knife; one Atlantic projectile point; a Stark point; and two other projectile points. The two non-typed projectile points had been re-worked into other tools: one a reamer, the other a spoke shave. The recovery of a Stark point and an Atlantic point each suggest a Middle Archaic occupation and a Late Archaic occupation, respectively.

The Cafiso's Landing site (27 RK 268) is located along the Little River, west of Kingston Road. It is located approximately 1.2 kilometers (0.75 miles) east of NH 125, from the junction with Old Danville Road. The site is situated on Windsor loamy sand, an excessively drained soil. Artifacts recovered include: a Neville point

made of hornfels; a milky quartz scraper; and biface projectile point. The recovery of a Neville point suggests a Middle Archaic period occupation.

The site near Happy Hollow Cemetery (27 RK 248) is located in the Little River drainage, in the southern end of Kingston. It is located approximately 0.3 kilometers (0.20 miles) east of NH 125, from the junction with Dorre Road. The site is situated on Windsor loamy sand, an excessively drained soil. Artifacts recovered include: a fully grooved 8-inch gouge; and an additional broken gouge. Information regarding diagnostic artifacts is insufficient to assign an age to this site.

The Lookout site (27 RK 269) is located on the upper slopes of the northwest face of Misery Hill in Kingston. The site is positioned on a small knoll on top of a level area. The USGS topographic map indicates wetlands immediately to the northeast of the site. The Little River is located approximately 0.4 kilometers (0.25 miles) down slope to the west of the site. The site is situated on Canton gravelly fine sandy loam, a well drained soil. Artifacts recovered include: a thumb scraper; a biface blank; a prepared core; and large chopper. Information regarding diagnostic artifacts is insufficient to assign an age to this site.

The Newton Junction Fire Department site (27 RK 247) is located southwest of the town center of Newton Junction near a primary tributary to the Little River. It is located approximately 2.0 kilometers (1.25 miles) east of NH 125. The site is situated on Udorthents smoothed soil, a human altered soil that has been excavated or filled and then graded. Artifacts recovered include: a grooved axe; a small triangular biface; a stone knife; and the basal section of a Neville point. The recovery of a Neville point base suggests a Middle Archaic period occupation.

Excavations at the Plaistow Dump site, (27 RK 262) were described by Hume (1990) and Hume and Holmes (1998). The site is located on a terrace overlooking the Little River, on the Plaistow/ Kingston town line. The site is situated on Hinckley fine sandy loam, an excessively drained soil found on terrace tops adjacent to streams. Many portions of the site have been commercially mined for gravel. The site was subsequently purchased by the town and used as a landfill. Artifacts were originally surface collected from the excavated slope of the landfill about fifty feet from the edge of the Little River. Artifacts and features recovered from the site include: a hearth; stone tool flakes, including some of rhyolite; a volcanic stone core; fire cracked rock; charcoal; a stone knife; a knife fragment; a large chopper; scattered burned stone; a bone fragment; a felsite Meadowwood point base; a Neville point; and two small pieces of pottery. One pottery sherd is a cord marked piece from 24 centimeters (9.4 inches) deep, the other is a plain piece recovered from the surface. The recovery of a Neville point suggests a Middle Archaic occupation. The recovery of a Meadowwood point base suggests an Early Woodland occupation. The recovery of pottery suggests Woodland occupation.

Across the Little River from the Plaistow Dump site is the BROX/ Galloway site, (27 RK 263) (Hume 1990; Hume and Holmes 1998). It is located on a terrace overlooking

the Little River. The site is situated on Windsor loamy sand, an excessively drained soil found on broad plains. Artifacts were originally surface collected on the edge of a 3.0 x 3.7 meter (10-12 foot) commercially excavated large pit, and around the bases of the undisturbed powerline poles. Artifacts and features recovered from the site include: a pestle; a hearth; 2 spokeshaves; numerous stone knives; stone tool flakes; a core; fire cracked rock; charcoal; a projectile point made of rhyolite; and a Neville, an Atlantic, a Squibnocket Triangle, a Small Stemmed, a Wading River and Brewerton projectile points. Stone tool material is mostly rhyolite and quartz, with felsites that come from Massachusetts. Projectile points recovered suggest that the site had been used from the Middle Archaic to the Middle Woodland periods.

Sites Near Powwow Pond and The Powwow River

Seven pre-contact Native American sites are located in the vicinity of Powwow Pond and the Powwow River, and along wetlands that drain into the Powwow River. These sites include: the Tucker site (27 RK 240); 27 RK 241; 27 RK 242; 27 RK 243; the Arrowhead Farm site (27 RK 252); 27 RK 253; and 27 RK 307.

Excavation at the Tucker site, (27 RK 240) was reported by Finch (1960). It is located on a flat glacial outwash plain above the edge of wetlands along the Powwow River. It is located approximately 2.0 kilometers (1.25 miles) east of NH Route 125. The site is situated on Windsor loamy sand, an excessively drained soil. Artifacts recovered at the site included: 5 pieces of pottery; 17 projectile points; 12 knives; 11 scrapers; 5 stone tools; 3 hammerstones; 1 piece of graphite; a stone blade; 1 chopper; 1 axe; 1 gouge; 1 core; 1 drill; and 1 pestle. At least two stratified levels of artifacts were noted at this site. Specific details regarding the types of diagnostic artifacts that were recovered and the two strata that were noted are lacking.

27 RK 241 is an unnamed pre-contact Native American site located on the southeast banks of Powwow Pond. The site is located approximately 3.6 kilometers (2.25 miles) east-northeast of the northern end of the project area. The site is situated on Windsor loamy sand, an excessively drained soil found on broad plains. There is no information in the state file on the types of artifacts recovered, or on the age of the site.

27 RK 242 is an unnamed pre-contact Native American site located on the east banks of Powwow Pond. The site is located approximately 3.6 kilometers (2.25 miles) east-northeast of the northern end of the project area. The site is situated on Windsor loamy sand, an excessively drained soil found on broad plains. There is no information given on the types of artifacts recovered, or on the age of the site.

At 27 RK 243 is an unnamed pre-contact Native American site located on the east banks of Powwow Pond. The site is located approximately 3.6 kilometers (2.25 miles) east-northeast of the northern end of the project area. The site is situated on Windsor loamy sand, found on broad plains. Artifacts recovered from the site include: crude stone knife; a stemmed projectile point; pottery sherds; and stone tool flaking debris. Information regarding diagnostic artifacts is insufficient to assign an age to this site.

The Arrowhead Farm site (27 RK 252) is located approximately 160 meters (525 feet) north of where Powwow Pond drains into the Powwow River. The site is located approximately 4.8 kilometers (3 miles) east-northeast of the northern end of the project area. The site is situated on Canton gravelly fine sandy loam, a well drained soil. There is no information given on the types of artifacts recovered, or on the age of the site.

27 RK 253 is an unnamed pre-contact Native American site located approximately 100 meters (328 feet) southeast of where Powwow Pond drains into the Powwow River. The site is located approximately 4.8 kilometers (3 miles) east of the northern end of the project area. The site is situated on Canton gravelly fine sandy loam, a well drained soil. Artifacts recovered include: some crude blades; and bone and stone tool flaking debris. Information regarding diagnostic artifacts is insufficient to assign an age to this site.

27 RK 307 is an unnamed pre-contact Native American site located approximately 200 meters (656 feet) east of the Powwow River, southeast of Powwow Pond. The site is located approximately 5.2 kilometers (3.25 miles) east of the northern end of the project area. The site is situated on Deerfield fine sandy loam, a moderately well drained soil found on low drainage rises. Artifacts recovered include: a small amount of fire-cracked rock; and stone flakes. Information regarding diagnostic artifacts is insufficient to assign an age to this site.

Sites Near Great Pond

Five pre-contact Native American sites have also been located in the vicinity of Great Pond. These sites include: 27 RK 159; 27 RK 244; 27 RK 246; 27 RK 254; and 27 RK 255.

27 RK 159 is an unnamed pre-contact Native American site located on the southwest shores of Great Pond. The site is located approximately 1.2 kilometers (0.75 miles) north-northeast of the northern end of the project area. The site is situated on Windsor loamy sand, an excessively drained soil found on low, flat hills. Artifacts recovered include: some soapstone vessel fragments; and possibly some pottery. Artifacts were discovered while digging for a gas tank. Information regarding diagnostic artifacts is insufficient to assign an age to this site. The presence of pottery suggests that at least a Woodland component is present at the site.

27 RK 244 is an unnamed pre-contact Native American site located on the south shores of Great Pond where an unnamed stream drains Great Pond. The site is located approximately 1.6 kilometer (1.0 mile) northeast of the northern end of the project area. The site was found in a gravel pit. The site is situated on Windsor loamy sand, an excessively drained soil found on low, flat hills. Artifacts and features recovered include: fire pits; pre-contact Native American pottery; and other artifacts. Information regarding diagnostic artifacts is insufficient to assign an age to this site. The presence of pottery suggests that at least a Woodland component is present at the site.

27 RK 246 is an unnamed pre-contact Native American site located on the south shores of Great Pond where an unnamed stream drains Great Pond. The site is located approximately 1.6 kilometers (1.0 miles) northeast of the northern end of the project area. The site is situated on Windsor loamy sand, an excessively drained soil found on low, flat hills. Artifacts were discovered along road cuts from which several surface collections were apparently made. Artifacts and features recovered include: some pre-contact Native American pottery; spear points; and fire pits and hearths. Information regarding diagnostic artifacts is insufficient to assign an age to this site. The presence of pottery suggests that at least a Woodland component is present at the site.

27 RK 254 is an unnamed pre-contact Native American site located approximately 300 meters from the northeast shores of Great Pond. The site is located approximately 3.2 kilometers (2.0 miles) northeast of the northern end of the project area. The site is situated on Windsor loamy sand, an excessively drained soil found on low, flat hills. Artifacts recovered include a triangular quartz projectile point. Information regarding diagnostic artifacts is insufficient to assign an age to this site. The triangular shape of the projectile point could be any one of a variety of point types: Madison, Beekman, Squibnocket or Levanna. It is also possible that this point cannot be categorized as any of these defined point types.

27 RK 255 is an unnamed pre-contact Native American site located approximately 500 meters (1,640 feet) north-northeast of the northern end of the project area. The site is situated on Canton gravelly fine sandy loam, a well drained soil. There is no information given on the types of artifacts recovered, or on the age of the site.

One Site In Newton Junction

In addition to the sites in Kingston and Plaistow, one site, the Harvey Mitchell site (27 RK 76) located in nearby Newton Junction was excavated by Holmes (1982). The site is located south of a primary drainage of the Little River. The site is a stratified, multi-component site that is located in the vicinity of the project area. The site is situated on the Chatfield-Hollis-Canton complex of soils, which are very stony well drained sandy loams. Erosion of the ground surface is evident, and up to 45.7 centimeters (18 inches) of top soil has washed down slope in some portions of the site. Originally, the site was surface collected on eroding areas, and stone tool flakes were recovered. Two distinct stratified archaeological deposits were defined during the excavations. There is evidence of occupation dated to 1720-1750 between 0 and 20.3 centimeters (0 and 8 inches) below the ground surface. Diagnostic artifacts recovered include early creamware, kaolin pipe stems and hand wrought square nails. A pre-contact Native American occupation was defined between 20.3 and 53.3 centimeters (8 and 21 inches) below the ground surface. At least two periods are represented in the lower strata. A Middle Archaic occupation is evident from a recovered Neville point. A Late Woodland occupation is evident from collared and incised pottery sherds. It is quite possible that additional occupations may have occurred, but additional information on

diagnostic artifacts is lacking. Features that were encountered include 3 fire pits, 6 post molds, a refuse pit and several charcoal concentrations. Artifacts recovered include: bifaces, cores, core tools, choppers and hammerstones.

Summary

Background documentary research has revealed that the setting of the entire proposed project route may be sensitive for pre-contact Native American archaeological resources. This is based on its position within a complex mosaic of streams, ponds and wetlands in the interior reaches of the southeastern Merrimack watershed. The locale would have been available for human occupation from early postglacial times, with attractive settings for habitation found on sandy and well drained glacial deposits overlooking a variety of surface water features, including lakes, ponds, streams, springs and wetlands. Evidence suggests that people used ridges and streams as travel routes between drainages and positioned themselves on heights of land to camp, hunt, fashion or repair tools and conduct other activities.

In all, there are twenty previously recorded pre-contact Native American sites in the vicinity of the project area (Table 4.14-1 and **Figure 4.14-2**). This includes sites in the towns of Kingston and Plaistow, plus one site in Newton Junction. No PaleoIndian or Early Archaic sites have been recorded. The sites range in age from the Middle Archaic to the late Woodland. The Middle Archaic is represented by at least six sites. The Late Archaic and Early Woodland are represented by at least two sites each. The Middle and Late Woodland are represented by at least one site each. Woodland components are present in at least six other sites, where pottery has been recovered. At least four of the sites are multi-component, representing multiple time periods and are incorporated into the above count. The majority of the sites are of unknown age, and could date to any period of pre-contact Native American occupation. Some of the larger, multi-component sites, such as the Paul Holmes, Plaistow Dump, BROX/ Galloway and Harvey Mitchell sites suggest either sedentary or frequently repeated occupancy in at least the Little River valley. The high density of artifacts at these large multi-component sites also suggests that larger populations were present, and that these populations may have stayed for prolonged periods of time. The diversity of artifacts and archeological features that are present suggest that a variety of activities took place at the site locations. These activities include stone tool manufacture and use, food preparation and cooking, and the processing of wood for various implements.

The environmental and topographic setting of the project route exhibits traits associated with the settings of Native American archaeological resources. Several sites have been previously recorded in close proximity to NH 125 and landforms associated with these sites extend into the project area. These known and recorded sites share a number of qualities. Many are located on flat to slightly sloping surfaces and soil associations range from loam, to gravel to fine sand. Most are very close to water with locations including the shores and outlets of ponds, terraces along streams, ridges above streams, or spits of land projecting into streams or wetlands.

Table 4.14-1
Summary of Archaeological Sites in the Vicinity of the Project Area[1]

Site # (27 RK ___)	Site Name	Pre-Contact Native American (NA) or Historic Euro-American (EA)	Time Period	Diagnostic Artifact(s)	General Location
245	Paul Holmes	NA	Middle-Late Archaic	Stark and Atlantic	Little River
267	Jaimee's Spring	NA	Middle-Late Archaic	Neville point	Little River
268	Cafiso's Landing	NA	Middle Archaic	Neville point	Little River
248	Near Happy Hollow Cem.	NA	Unknown	Unknown	Little River
269	Lookout	NA	Unknown	Unknown	Little River
247	Newton Junction FD	NA	Middle Archaic	Neville point	Little River
262	Plaistow Dump	NA	Middle Archaic, Early Woodland, Woodland, Neville and Meadowwood points,	Pottery	Little River
263	BROX/Galloway	NA	Middle Archaic- Middle Woodland, Neville, Atlantic, Squibnocket, Small Stemmed, Wading River and Brewerton points		Little River
240	Tucker	NA	Woodland	Pottery	Powwow River
241	None	NA	Unknown	Unknown	Powwow Pond
242	None	NA	Unknown	Unknown	Powwow Pond
243	None	NA	Woodland	Pottery	Powwow Pond
252	Arrowhead Farm	NA	Unknown	Unknown	Powwow River/ Pond
253	None	NA	Unknown	Unknown	Powwow River/ Pond
307	None	NA	Unknown	Unknown	Powwow River/ Pond
159	None	NA	Woodland	Pottery	Great Pond
244	None	NA	Woodland	Pottery	Great Pond
246	None	NA	Woodland	Pottery	Great Pond
254	None	NA	Unknown	Triangular point	Great Pond
255	None	NA	Unknown	Unknown	Great Pond
76	Harvey Mitchell	NA/EA	Middle Archaic, Late Woodland, historic 1720-1750, Neville point, collared and incised pottery, early historic creamware		Little River
324	Gideon Webster H.	EA	Late 1700s-early 1800s	Numerous	South Kingston
none	Bly-Cheney H.	EA	Mid 1800s-1900s	Maps	Westville
249	Kelley Homestead	EA	Late 1700s-1800s	Maps	NE Plaistow
389	P. Hunt Home.	EA	Mid-1800s-mid 1900s	Maps	South Kingston
259	NEARA #47 H.	EA	Unknown	Unknown	Newton
n/a	Happy Hollow Cem	EA	1792-1858	Headstones	Kingston
n/a	Mill Stream Cem.	EA	1835-present	Headstones	Kingston
256	Charcoal Manu.	EA	Unknown	Unknown	West Kingston
360	Stone Chamber	EA	Unknown	Unknown	Newton

1 See **Figure 4.14-1** for site locations.

Sites are expected to be found on well-drained level to slightly sloping surfaces along the margins of surface water features and in undeveloped or agricultural lands where there are fewer impacts from modern growth. Therefore, any open or undisturbed landscapes along the streams, wetlands, or other water features are assigned sensitivity for Native American archaeological resources.

4.14.2.5 Previously Recorded Historic Euro-American Archeological Sites

Evidence to document several hundred years of Euro-American historic period occupation in Kingston and Plaistow is available in archival sources. In addition, the position of roads, buildings, bridges, and railroad corridors reflect the historic settlement pattern, with many buildings and other elements still standing in place. Other evidence is found in the form of ruins or archaeological resources. Sites are known to exist in both Kingston and Plaistow, despite the effects on continuous human manipulation of the landscape.

There are ten documented historic Euro-American archaeological sites in the vicinity of the project area (Table 4.14-1; **Figure 4.14-1**). These include: the Gideon Webster Homestead (27 RK 324); The Bly- Cheney Homestead (no number); the Kelley Homestead (27 RK 249); the P. Hunt Homestead (27 RK 389); The NEARA #47 homestead site (27 RK 259); the Happy Hollow Cemetery; the Mill Hill (or Mill Stream) Cemetery; 27 RK 256, a charcoal manufacturing site about which little is known; 27 RK 360, a subterranean stone chamber; and the Harvey Mitchell Site (27 RK 76).

The Gideon Webster homestead archaeological site (27 RK 324) is located on the northeast quadrant of the intersection of the Hunt Road/Newton Junction Road intersection with NH 125. In conjunction with the proposed realignment of Hunt Road with Newton Junction Road, a series of archaeological examinations have been undertaken at this site. The house was determined to be no longer standing during the course of an architectural survey of NH 125 (Preservation Company 2003). Subsequent archeological investigation located stone house and barn foundations on the northeast side of Newton Junction Road and NH 125 (Bunker and Pinello 2003). A high-density subsurface historic artifact scatter surrounds the house and barn foundations. Artifacts recovered from the site date from the late 18th century through the early 20th century (Independent Archaeological Consulting 2003), the time period that members of the Webster family occupied the location. Site integrity has been disturbed in the ground area surrounding the foundations.

The Bly-Cheny site was first studied in 1980 when the University of New Hampshire evaluated a stone foundation for NHDOT (Chesley 1980). The foundation was located in Westville, in the corner of a triangle formed between East Road, Old Westville Road and NH 125. Information on the specific site location is lacking. In

Chesley's report, however, the 1892 map shows that the location of the structure that Chesley discussed is on the western corner of the road triangle. This location is outside of the current project area. An 1856 map indicates that J.K. and J.F. Bly resided here. The 1892 map indicates that an H. Cheney resided here. The site consisted of a mortared stone foundation with a doorstep and well. The site was determined to be of mid- to late- 19th century origin. Both of the Bly and Cheney families were associated with the extensive brick industry that used to be in Plaistow (Chesley 1980). This site was not recorded in the New Hampshire Division of Historical Resources Statewide site file inventory.

The historic Kelley Homestead, 27 RK 249 is located on the south side of Old County Road, about 0.5 kilometers (0.3 miles) west of the intersection of Old County Road and NH 125. Investigations of this site are described by Holmes)(1975c). A resident named Mrs. W. Kelly appears in this location on an 1857 map, but no residences appear in this location on an 1892 map. The Kelley Homestead site consists of a 2.4 x 4.6 meters (8 x 15 feet) house foundation constructed of stone and mortar, and an associated well and fruit trees. Information on this site comes from the state site form. No information is available on the types of artifacts that were recovered, but they are stated to be from the early 19th century. The land was deeded to John Kelley in 1810, whom may have been in Plaistow as early as 1775.

The P. Hunt Homestead (27 RK 389) was discovered during the course of field investigation for this project. The site is located in South Kingston, on the west side of NH 125 approximately 350 meters (1,148 feet) north of the intersection of Hunt Road and NH 125. This site is partially contained within the project area right-of-way. The house was occupied by P. Hunt as early as 1856, as the residence appears on an 1856 map. The P. Hunt residence also appears on the 1892 and 1893 maps. A structure is depicted on the 1935 and 1956 topographic maps that may likely be the same residence. The site consists of a cut-stone, dry laid house foundation, with a well and the remains of an associated barn. The house foundation walls are about 1.2 meters (4.0 feet) high and 45.7 centimeters (18 inches) thick. Southwest of the house foundation at a lower elevation are the remains of a barn foundation. A concrete capped well is located just south of the house foundation. Domestic and farming related historic artifacts are scattered around these surface features. Historic artifacts are likely found in subsurface contexts around the site. The site appears to have been occupied from the mid-19th century or before to the mid 20th century. Sometime in the 20th century, the upper structure of the house was removed and the house foundation, well and outbuilding were abandoned.

27 RK 259 (the NEARA #47 site) is located in the north end of the town of Newton. The site is located about 4.0 kilometers (2.5 miles) east of NH 125, east of Country Pond. Site information is from the State site files. The site consists of an unmortared stone structure with a foundation that measures 2 meters (6.6 feet) high and 5 meters (16.4 feet) in length. Artifacts reported at the site were identified as modern refuse. No information was given regarding the age or exact function of this stone structure.

The Harvey Mitchell site (27 RK 76) is located in Newton Junction. The site is located south of a primary drainage of the Little River. The site is a stratified, multi-component site that is located in the vicinity of the project area (Holmes 1982). Erosion of the ground surface is evident, and up to 45.7 centimeters (18 inches) of top soil has washed down slope in some portions of the site. Two distinct stratified archaeological deposits were defined by the excavation. A pre-contact Native American occupation was defined between 20.3 and 53.3 centimeters (8 and 21 inches) below the ground surface. There is evidence of occupation dated to 1720-1750 between 0 and 20.3 centimeters (0 and 8 inches) below the ground surface. Diagnostic artifacts recovered include early creamware, kaolin pipe stems and hand wrought square nails. No historic features, such as intact building foundations or stonewalls, were reported. The types of historic artifacts suggest that domestic activities associated with a residence were likely present at the site, but had been removed or destroyed by the time the site was investigated.

In addition, two cemeteries are located along the project area: the Happy Hollow and Mill Stream Cemeteries. No proposed modifications to the highway are currently planned for the Mill Stream Cemetery; however, proposed highway modifications within 8 meters (25 feet) of the Happy Hollow Cemetery have the potential to impact archaeological resources (e.g., unmarked graves).

The Happy Hollow Cemetery is located in Kingston, across NH Route 125 from Dorre Road, about 0.8 kilometers (0.5 miles) north of the Plaistow town line. It was a neighborhood cemetery, with approximately ten local families represented (Seavey 2002). The earliest marked burial is from 1792 (Issac Webster). Most of the marked burials date to the early- to mid- 19th century. The last marked burial dates to 1858. The cemetery is marked by a piled stone wall and a wooden gate. Headstones are mostly made of marble and slate.

The Mill Stream (also known as the Mill Hill) Cemetery is located in Kingston, south of the outlet of Mill Pond, about 400 meters (1,312 feet) south of the intersection of NH 125 and Old Mill Road. It was a neighborhood cemetery for the residents of South Kingston (Story 2003). The cemetery was first used by the Bartlett, Collins and Hunt families. The Bartletts ran a saw mill and tavern in South Kingston. The Collins intermarried with the Bartletts. Some of the Hunts lived along what is now called Hunt Road. The earliest marked burials date to 1835, and most of the burials date to the mid- to late-19th century. The cemetery continues to function as a public use cemetery today. There are approximately 175 marked burials. Most of the headstones are made of marble and slate. Many improvements were made in the 1960's and 1970's, including: adding a new section of land that doubles the cemetery size; a mortared stone wall along NH 125; a paved, horseshoe-shaped interior driveway; entrance posts with decorative urns; a bronze plaque; sections of chain-link fence along the back and side sections; and a caretakers shed and well.

27 RK 256 is an historic charcoal manufacture site. It is located on the south shore of Great Pond, in an area historically known as West Kingston. It is located 1.4

kilometers (0.9 miles) northeast of the northern end of the project area. Information on this site comes from the state site files. Little is known about the extent or nature of this site, including what types of evidence indicates that the site was used in the manufacture of charcoal. A Kingston history mentions that attempts were made to rake bog-iron ore from Great Pond for use in blacksmithing (Anonymous 1969). It is possible that this site represents such activity. Blacksmithing occurred throughout the historic period until the late 19th century when factories took over the work of the blacksmith. West Kingston is known for having developed an important charcoal producing industry (Monroe 2003a).

27 RK 360 is a small stone chamber found in a hillside. It is located in the northwest section of Newton. The chamber was discovered during domestic groundbreaking activity. Information on this site is from the State site files. The exact function and age of this stone chamber is unknown, but it is likely an historic root cellar for the storage of food.

Summary

Ten historic Euro-American sites have been recorded in the vicinity of the project area (Table 4.14-1). Six of these sites are homesteads in diverse locations throughout the project area. The homestead sites date from the early 18th century to the 20th century. Residential sites are a common and expected archeological resource. Residential development began in the late 17th century, and has continued to grow steadily into the 21st century. Historic homestead sites are likely to be found in locations that are relatively undisturbed by modern development, where historic documents such as maps indicate that residences once stood. Several locations were defined in the project area, which have the potential for the remains of historic houses. The P. Hunt Homestead (27 RK 389) in South Kingston is one such location, where an intact foundation and an associated surface artifact scatter are present.

Two of the historic Euro-American sites in the project area are cemeteries. They are included because the sites are adjacent to NH 125. Proposed highway construction will be within 8 meters (25 feet) of the Happy Hollow Cemetery, but will remain within the existing highway right-of-way. No construction will occur adjacent to the Mill Stream Cemetery.

A charcoal manufacturing site is another of the historic Euro-American sites in the vicinity of the project area. Charcoal manufacture is historically linked to West Kingston, approximately one and one-half miles to the north of and outside of the project area. No sites related to charcoal manufacture were discovered during the walkover portion of the archeological survey. No locations within the proposed right-of-way were determined to be sensitive for charcoal manufacturing sites.

A subterranean stone chamber of the historic Euro-American period is located in the vicinity of the project area. The exact function of this chamber is undetermined, but it is likely a root cellar for the storage of food. As such, root cellars are likely to be

found in close association with historic homestead sites. Thus, archeological concern for stone chambers in the project area is considered with locations that are sensitive for historic homesteads listed in Table 4.14-2.

Table 4.14-2
Archaeologically Sensitive Areas Requiring Further Phase I-B Investigation

Area #*	Resource	Location	Recommendations
1	Historic Euro-American (brick manufacture)	Connector road between Joanne Dr. & NH Route125	Subsurface investigation & poss. historic documentation
2	Pre-contact Native American (Little River)	Connector road between stations 100-108	Subsurface investigation
3	Pre-contact Native American (unnamed stream)	At intersection with NH Route 121A sta. 1303—1304	Subsurface investigation
4	Pre-contact Native American (Kelly Brook)	West side: 2060+20—2061+40 east side: 2060+20—2060+80	Subsurface investigation
5	Historic Euro-American (W. Walton Homestead)	Stations 2062+20—2062+40 and 1801—1802	Subsurface investigation, possible historic documentation
6	Pre-contact Native American (Little River)	Stations 706+20—707+00	Subsurface investigation
7	Historic Euro-American (D. Kelly & L Quimby Home.)	Stations 2076+80—2078+00 both east and west sides	Subsurface investigation, possible historic documentation
8	Pre-contact Native American & Historic Euro-American (Little River & cemetery)	Stations 2077+00—2078+40	Subsurface investigation
9	Happy Hollow Cemetery known historic site	Stations 2077+00—2078+40	Additional monitoring during construction required for excavation occurring within 8 meters (25 feet) of cemetery wall. Work will cease and recordation will occur if graves are encountered.
10	Gideon Webster Homestead known historic site	Newton Junction Road	No further investigation
11	Historic Euro- American (N.D. Webster Homestead)	Stations 2096+00—2100+00	Subsurface investigation, possible historic documentation
12	P. Hunt Homestead known historic site	Stations 2098+00—2099+00	Subsurface investigation, further historic documentation
13	Mill Hill Cemetery known historic site	Stations 2101+20—2102+00	No further investigation at this time
14	Pre-contact Native American & Historic Euro-American (Mill Pond/ Colby Brook)	Stations 2101+00—2103+00	Further historic documentation

Table 4.14-2 (continued)

Area #*	Resource	Location	Recommendations
15	Pre-contact Native American (Country Pond) (unnamed stream)	Stations 2105+60—2108+30	Subsurface investigation
16	Pre-contact Native American (unnamed stream)	Stations 2121+60—2122+10	Subsurface investigation

* Areas identified on **Figure 4.14-2**.

4.14.2.6 Summary of Impacts/Mitigation

Impacts on archaeological resources will be identified after additional field investigation in Phase I-B (see Section 4.14.2.3). During Phases I-B through II specific Native American and Historic context will be developed to interpret and evaluate identified sites. Areas requiring further study based on the design and extent of disturbance for the Proposed Action are listed in Table 4.14-2 (see **Figure 4.14-2**). If resources are confirmed as being present in these areas, Phase II and, if necessary, Phase III studies will be conducted in consultation with NHDHR and FHWA.

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4.14.3 Historic Architectural Resources

4.14.3.1 Methods and Procedures

Survey

All work was done in accordance with the method created to identify historical and architectural resources by NHDOT, NHDHR and FHWA in October 1991. The method used to identify archaeological resources was addressed in Section 4.14.2.3.

The architectural history survey began with the preparation of a reconnaissance level Project Area Form. Initial historical research was done to form a large-scale overview for understanding contexts in which to identify individual historic resources. A windshield survey was conducted using the project base maps. Every property over fifty years old was identified and photographed as part of this effort. The Project Area Form was prepared to provide context for the review of individual properties. In addition to the Project Area Form for the entire study corridor, Town-wide Survey Forms for both Plaistow and Kingston were prepared providing an overview of the history and extant resources in the two towns.

In-depth survey was then conducted for properties abutting NH 125 using either a reconnaissance- or intensive-level individual inventory form. Potential Historic Districts were recorded on NHDHR Area Forms. The level of survey was determined based on a judgment of integrity of the potential resources. Historic

properties located along both sides of NH 125 and intersecting streets were individually surveyed and shown on project base maps. A total of 37 properties in Plaistow and 44 in Kingston and 1 historic district containing 8 properties were also surveyed individually as part of this undertaking. Seven individual properties were determined eligible for the National Register of Historic Places (NRHP). Four properties would require more information to determine National Register eligibility if they were to be impacted by this project. All surveyed properties are listed in Table 4.14-3.

The material developed for this study is available at NHDHR, NHDOT, and FHWA, along with documentation and discussion of eligibility. There are no properties in the project area currently listed on the NRHP.

As part of the analysis for the separate Hunt Rd./Newton Junction Rd. Project (Kingston 10044C), a number of properties in that section of NH 125 were found to be eligible for NRHP listing. These properties, along with the project's impact on them, were fully evaluated as part of the Categorical Exclusion and 4(f) Evaluation for the above referenced Kingston interim project (NHDOT 2003). Those properties are not included in the present analysis.

Table 4.14-3
List of Properties over 50 years old along the Study Corridor

Survey #	Tax Map/ Parcel	Address	Type of Form	Notes	Acreage and Parcel Notes	Eligibility National Register Criterion
Plaistow						
Individual Forms						
PLI0015	27/ 43-00	65 Plaistow Road	Front	ca. 1940 Westville Market	1.1 acre	Not eligible
PLI0016	27/ 37	69 Plaistow Road	Full	ca. 1880 Greek Revival? Building removed by owner in 2004	0.85 acre	Eligible (A, D)
PLI0017	27/ 35	73 Plaistow Road	Full	ca. 1885 vernacular Greek Revival	0.41 acre	More Information[1]
PLI0018	27/ 30	85 Plaistow Road	Front	ca. 1920 dwelling	0.26 acre	Not eligible
PLI0019	28/ 2	122 Plaistow Road	Full	ca. 1950 drive-in theater	10.66 acres	Not eligible
PLI0020	29/ 58	127 Plaistow Road	Full	ca. 1954 diner/restaurant Eggie's/Mountainview Diner	(only diner foot-print eligible)	Eligible (C)
PLI0021	30/ 73	143 Plaistow Road	Full	ca. 1955 Sanborn's Candies specialty store	1.8 acre	Not eligible
PLI0022	44/ 76	181 Plaistow Road	Front	ca. 1954 Sawyer's restaurant	1.5 acre	Not eligible
PLI0023	44/ 2	192 Plaistow Road	Front	ca. 1955 ranch	0.89 acre	Not eligible
PLI0024	44/ 4	28 Old County Road	Full	ca. 1935 cottage	0.29 acre	Not eligible
PLI0025	44/ 22	19 Old County Road	Front	ca. 1950 Bungalow	0.7 acre	Not eligible
PLI0026	44/ 63	16 Old County Road	Full	ca. 1928 dwelling	0.16 acre	Not eligible
PLI0027	44/ 62	12 Old County Road	Full	ca. 1919 Bungalow	0.7 acre	Not eligible
PLI0028	30/ 40	209 Main Street	Full	ca. 1900 Square House	0.86 acre	Not eligible
PLI0029	30/ 41	10 Walton Road	Full	ca. 1920 Bungalow	0.86 acre	Not eligible

Table 4.14-3 (continued)

Survey #	Tax Map/ Parcel	Address	Type of Form	Notes	Acreage and Parcel Notes	Eligibility National Register Criterion
PLI0030	30/ 57	207 Main Street	Front	ca. 1910 Bungalow	1.25 acre	Not eligible
PLI0031	30/ 90	20 Danville Road	Front	ca. 1920 dwelling	1.1 acre	Not eligible
PLI0032	30/ 77	23 Danville Road	Full	ca. 1790 cape with barn	0.92 acre	More Information[1]
PLI0033	30/ 75	202 Main Street	Full	ca. 1930 cape	1.75 acre	Not eligible
PLI0034	30/ 74	200 Main Street	Full	ca. 1907 Bungalow Morey/Stegmaier House	1.04 acre	Eligible (A)
PLI0035	30/ 81	15 Danville Road	Front	ca. 1940 cape	0.69 acre	Not eligible
PLI0036	30/ 86	14 Danville Road	Full	ca. 1930 cape	1.46 acre	Not eligible
PLI0037	30/ 73	199 Main Street	Full	ca. 1940 Bungalow	1.8 acre	Not eligible
PLI0038	29/ 26	193 Main Street	Full	ca. 1900 dwelling; Tozier House	0.99 acre	Eligible (A)
PLI0039	29/ 27	191 Main Street	Front	ca. 1900 dwelling	1.12 acre	Not eligible
PLI0040	29/ 31	182 Main Street	Front	ca. 1900 dwelling; former Pollard Mill site	1.68 acre	Not eligible
PLI0041	29/ 43	11 Old Road	Full	ca. 1900 cape	1 acre	Not eligible
PLI0042	29/ 37	16 Old Road	Front	ca. 1950 Ranch	0.31 acre	Not eligible
PLI0043	29/ 38	18 Old Road	Front	ca. 1946 Ranch	0.29 acre	Not eligible
PLI0044	28/ 15	113 Plaistow Road	Front	ca. 1950 pizzeria	1.36 acre	Not eligible
PLI0045	29/ 11	6 Danville Road	Full	ca. 1925 Bungalow	5.65 acres	Not eligible
PLI0046	29/ 18	21 Jesse George Rd	Front	ca. 1909 dwelling and small barn	0.42 acre	Not eligible
PLI0047	29/ 13	10 Danville Road	Full	ca. 1912 dwelling Gale House	1.6 acres	Eligible (C)
PLI0048	26/ 35	61 Plaistow Road	Front	Suburban Gas Company	1.36 acres	Not eligible
PLI0049	27/ 25	100 Plaistow Road	Front	ca. 1890 house, now commercial	1.02 acres	Not eligible
PLI0050	28/ 13	24 Old Road	Front	ca. 1957 cape	0.44 acres	Not eligible
PLI0051	29/9	103 Plaistow Road	Front	Doc's Auto Body	0.36 acres	Not eligible
Kingston						
Individual Forms						
KIN0014	R-3/ 9	4 Granite Road	Full	cape	1.84 acres	Not eligible
KIN0015	R-3/ 15	6 Route 125	Front	Bob Leavitt Auto & Truck	1.3 acres	Not eligible
KIN0016	R-3/ 16	8 Route 125	Front	Little River Motel (burned out)	3 acres	Not eligible
KIN0017	R-3/ 19	14 Route 125	Full	ca. 1950 tiny cape	6.1 acres	Not eligible
KIN0018	R-3/ 3-1	17 Route 125	Front	ca. 1910 store and new house, barn	25.06 acres	Not eligible
KIN0019	R-3/-	Route 125	Full	Happy Hollow Cemetery	3.05 acres	More Information (D)[2]
KIN0020	R-3/ 28A	22 Route 125	Full	ca. 1951 Whitney's Garage	3.05 acres	Not eligible
KIN0021	R-3/ 28B	26 Route 125	Front	small house	1.85 acres	Not eligible
KIN0022	R-3/ 1	27 Route 125	Full	ca. 1953 house	0.6 acre	Not eligible
KIN0023	R-4/ 7	9 Colonial Road	Full	ca. 1950 house	4 acres	Not eligible
KIN0024	R-4/ 5	41 Route 125	Full	ca. 1950 house	0.75 acres	Not eligible

Table 4.14-3 (continued)

Survey #	Tax Map/ Parcel	Address	Type of Form	Notes	Acreage and Parcel Notes	Eligibility National Register Criterion
KIN0025	R4/ 4	43 Route 125	Full	ca. 1950 house/Bump & Grind Auto Body	0.8 acre	Not eligible
KIN0026	R-5/ 10	42 Route 125	Full	Heath House and Shop, 19th c. vernacular and shop	0.7 acre	Not eligible[3]
KIN0027	R-4/ 2A	51 Route 125	Full	ca. 1942-5 house	5.92 acres	Not eligible
KIN0028	R-10/ 6	93 Route 125	Front	ca. 1950 Kingston Memorial Post #1088 VFM	2.1 acres	Not eligible
Area OCR		Old Coach Road Historic Area	Area			Not eligible
KIN0029	R-8/ 41	4 Old Coach Road	Full	Bartlett House (1983–36)	1.7 acres	Not eligible
KIN0030	R-8/ 42	8 Old Coach Road	Full	Peaslee Tavern (1983–37)	92 acres	Eligible (A, C)
KIN0031	R-8/ 43	9 Old Coach Road	Full	Wadleigh House (1983–46)	1 acre	More Information[1]
KIN0032	R-11/ 23	12 Old Coach Road	Full	1983–47	1.5 acres	Not eligible
KIN0033	R-11/ 24	18 Old Coach Road	Full?	Ca. 1953 house	1 acre	Not eligible
KIN0034	R-11/ 5	21 Old Coach Road	Full	1983–49	0.5 acre	Not eligible
KIN0035	R-11/ 25-2	22 Old Coach Road	Full	1983–48 Crosby House	5.34 acres	Eligible (A, C)
KIN0036	R-11/ 26	26 Old Coach Road	Full	1983–50	10 acres	Not eligible
KIN0037	R-13/ 7	1 Meeks Road	Full	ca. 1949 small house	2.3 acres	Not eligible
KIN0038	R-13/ 11	14 Meeks Road	Front	ca. 1938 house	0.9 acre	Not eligible
KIN0039	R-13/ 12	16 Meeks Road	Front	ca. 1930 house	0.745 acre	Not eligible
KIN0040	R-20/ 22	5 Frontage Road	Front	ca. 1940 – access denied	0.5 acre	Not eligible
KIN0041	R-21/ 12	5 Main Street	Full	ca. 1929 house	1 acre	Not eligible
KIN0042	R-21/ 9	11 Main Street	Front	ca. 1900 house	1 acre	Not eligible
KIN0043	R-21/ 8	13 Main Street	Front	ca. 1930 seasonal cottage	1 acre	Not eligible
KIN0044	(This form number was not used)					
KIN0045	R-9/ 89	63 Route 125	Full	ca. 1950	4.16 acres	Not eligible

1 More information is needed to determine whether the property is eligible for the N.R. The project does not impact the property, or the potentially eligible portion, therefore no determination was required.

2 Although more information is needed to determine NR eligibility, state law requires that work within 25 feet of a cemetery be monitored by a qualified archaeologist

3 Some additional documentation of the barn will follow acquisition to verify its use as a shoe shop.

Determination of NRHP Eligibility

The intensive level survey information was deemed sufficient to determine significance and eligibility for the National Register of Historic Places. The Determination of Eligibility (DOE) Committee, comprised of representatives from NHDOT, NHDHR, and FHWA, met on December 11, 2003. All final determinations of National Register eligibility were made by consensus. The resulting

Determination of Eligibility forms for each eligible property within the project area are on file with each agency and included in Appendix E.

The criteria (36 CFR Part 60) by which National Register eligibility is determined are:

Criterion A: Resources that are associated with events or trends that have made a significant contribution to the broad patterns of our history.

Criterion B: Resources that are associated with the lives of persons significant in our past.

Criterion C: Resources that embody the distinctive characteristics of a type, period or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguished entity whose components may lack individual distinction.

Criterion D: Resources that have yielded, or may be likely to yield, information important in prehistory or history.

To be eligible for inclusion, resources must also retain integrity, defined as the quality of location, setting, design, materials, workmanship, feeling and association sufficient to clearly convey a property's history and significance.

4.14.3.2 Individual Properties and Historic Districts Eligible for the National Register of Historic Places

During this study a total of seven individual properties were determined eligible for listing on the National Register of Historic Places **(Figure 4.14-2)**. Several other properties may be potentially eligible, but were eliminated from any additional review or study once it was determined that they were outside the area of impact of the Proposed Action. Properties in the Hunt Road/Newton Junction Road Project Area (Kingston 10044C) were addressed in a separate report (VHB, June 2003 Revised).

Plaistow

Five individually eligible properties were identified within the project area in Plaistow as reported in the Draft EA . There were no eligible historic districts. Only four of these properties are extant in 2005. The eligible properties as presented in the Draft EA were:

Goodchild Tenement (PLI0016)

Located on the east side of NH 125 just north of the Joanne Drive and East Road intersection, this ca. 1880 property was eligible for the National Register under

Criteria A, C, and D. It qualified for Criterion D because of the association of the Tenement to the former brickyard, and its interior, which was not accessible to study, may have possessed integrity of design, materials and workmanship. Only the footprint of the structure was eligible. However, the tenement house was demolished by the landowner in 2004.

Eggie's/Mountainview Diner (PLI0020), 127 Plaistow Road

Mountain View Diner #317, now known as Eggie's, is eligible for the National Register under Criterion C as a well-preserved example of a prefabricated streamlined diner, a well-recognized and significant commercial building type. Fabricated in 1954 and installed on NH 125 in Plaistow in 1964, the diner features typical rounded corners and metal accents. Because it was moved, the boundary of the eligible property is the footprint of the diner itself.

Morey/Stegmaier House (PLI0034), 200 Main Street

Located on northern Main Street at the intersection of NH 125, this property is eligible for the National Register under Criterion A for its historic associations with the "backyard" poultry industry in Plaistow. Poultry farming was a successful and widespread agricultural development in southern New Hampshire during the early to mid-twentieth century, but only a handful of properties survive in Plaistow to illustrate this important trend. The property includes a 1½-story house built ca. 1907. Poultry farming began ca. 1919. Southwest of the house are a poultry house with monitor roof, and a smaller brooder house. The buildings and adjacent open land contribute to the eligible property which is defined to include approximately two acres, bounded on the northeast by Main Street (NH 121A) and extending east to NH 125. The eligible property encompasses the 0.42-hectare (1.04-acre) parcel on which the main buildings are located, and the northeastern portion of the adjacent parcel approximately 0.4 hectares (1.0 acre) with brooder house on it, extending to the intersection of NH 121A and NH 125.

Tozier House (PLI0038), 193 Main Street

Located on northern Main Street, east of NH 125, this property is also eligible under Criterion A for documenting small-scale backyard poultry farming which was an important early 20th century trend in farming. The 2 ½-story, gable front, sidehall residence was constructed in the early 1900s. An attached garage was built around 1920, and ca. 1930 chicken coop extends from the garage. A second smaller poultry house stands north of the house. Poultry farming was carried on as a secondary source of income, and later in retirement, by local mail carrier Alan Tozier. The eligible property encompasses the 0.40-hectare (0.99-acre) parcel currently associated with the property.

Gale House (PLI0047), 10 Danville Road

This 1½-story house on Danville Road, northwest of NH 125, dates from ca. 1912. It is eligible for the National Register under Criterion C for its architectural significance

as a well-preserved example of a turn-of-the-century, sidehall plan house in Plaistow. The vernacular house displays design elements of the Queen Anne, Colonial Revival and Craftsman details, illustrating the final evolution of the sidehall plan.

Kingston

Two individually eligible properties were identified within the Project Area in Kingston.

Peaslee Tavern (KIN 0030), 8 Old Coach Road

The Peaslee Tavern complex, extant by ca.1776, consists of a Federal style main block, a large ell which was the original main block, and a series of 1½-story sheds. The National Register eligible property includes the building and the surrounding forested land composed of a total of 37.2 hectares (92 acres) in the eligible parcel. The remainder of the large parcel (approximately 36.4 hectares [90 acres]) is mostly forested. The Peaslee Tavern is individually eligible for the National Register under Criterion A for its significance in the areas of transportation, commerce, and social history. The property is also eligible under Criterion C for its architectural significance.

Crosby House (KIN0035), 22 Old Coach Road

The well-preserved Crosby House on Old Coach Road is eligible under Criteria A and C. It is significant as a small farm for its historic associations with agriculture in Kingston and as an intact farm building complex. The 1½-story sidehall house, built ca. 1876, reflects the transition between the Greek Revival and Italianate styles. The 19th century barn, twentieth century chicken coop and surrounding open land contribute to the property. The 2.16-hectare (5.34-acre) parcel is the core of the historic farm, which formerly totaled about 4 hectares (10 acres).

4.14.3.3 Properties Requiring Additional Information

Additional information, needed to determine the eligibility of these properties in Plaistow and Kingston, was not collected because they, or their potentially eligible portion, will not be impacted by the project as designed.

Plaistow

Cape and Barn (PLI0032), 23 Danville Road

This ca. 1850 property, on Danville Road backing up to NH 121A (Main Street) is of interest for its relative age and vernacular cape form. Its eligibility would need to be determined through interior inspection and further research if project impacts change. A strip taking across the rear of the property is well away from the buildings which would be evaluated only in the area of the buildings, the property having lost its agricultural integrity.

Goodchild Tenement #2, (PLI0017), 73 Plaistow Road

As stated in the Draft EA, this historical structure would not have been impacted by the project and no additional information was collected prior to its demolition in 2004.

Kingston

Two other properties in Kingston are potentially eligible under Criterion D, for their ability to yield information. However, final determinations were not made as the known property boundaries are not impacted by current project footprint.

Happy Hollow Cemetery (KIN0019), NH 125

The Happy Hollow Cemetery is located in the southern part of Kingston near the Plaistow town line. The earliest marked grave dates from 1792 (see Section 4.14.1.5). The cemetery has high integrity, but further research is needed to determine its eligibility under Criterion D, such as the kinds of information the cemetery would disclose about family groupings and other cultural patterning. The potential boundary of the eligible property would presumably be defined by the surrounding stonewall. As designed, the project is within the current right-of-way, i.e., entirely outside the cemetery walls. State law directs that monitoring of construction shall occur when excavation takes place within 8 meters (25 feet) of the cemetery. Work will proceed with an archaeologist making certain that any burials outside the cemetery wall are identified. If graves are encountered, then work will cease until examination and disposition of the remains are determined by the State Archaeologist according to state law.

John Wadleigh House (KIN0031), 9 Old Coach Road

This 18th century, center chimney house is of interest for its banked construction. Its design includes 2½ stories on the front and 1½ in the rear. Whether the property has significance under Criterion D has not been determined since the structure is not impacted by the project as currently designed.

4.14.3.4 Summary of Impacts/Mitigation

Effects

Once the project design had advanced to a stage where a preferred design (Proposed Action) was developed, a Determination of Effects (DOE) meeting with NHDHR, FHWA, and NHDOT was held on December 11, 2003 to determine the effects of the project on all previously identified eligible properties.

The Criteria of Effect and Adverse Effect, based on the Section 106 review process established by the National Historic Preservation Act of 1966 and outlined in 36 CFR 800.9, are defined as follows:

No Effect: The undertaking will not affect any historic property.

Effect: The undertaking may alter National Register-qualifying characteristics and features of location, setting, or use.

Adverse Effect: The undertaking may diminish the integrity of design, setting, location, materials, workmanship, feeling or association. Adverse effects include but are not limited to:

- Physical destruction, damage, or alteration of all/part of the property;
- Isolation from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; or,
- Transfer, lease or sale of the property.

Otherwise adverse effects may be considered not adverse in the following circumstances:

- When the property is of value only for potential contribution to research, and when such value can be substantially preserved through appropriate research in accordance with professional standards and guidelines.
- When the undertaking is limited to rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of affected historic property though conforming with the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic buildings, or
- When the undertaking is limited to transfer, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

No Adverse Effect: The undertaking may affect one or more historic properties, but the effect will not be harmful to the National Register qualifying aspects of the property.

It was determined that the Proposed Action has adverse effects on three properties in Plaistow. They are:

Goodchild Tenement (PLI0016)

This property located in the northeastern quadrant of the East Road/Joanne Drive intersection with NH 125 will be affected by the truck turn-around (jug-handle) at the intersection. The adverse effect will occur only relative to Criterion D because of the association of the brickyard and the original tenement house that was located on the site. This effect only relates to the archaeological value of the site.

Morey/Stegmaier House (PLI0034), 200 Main Street

This property is located on Main Street (NH 121A), just northwest of NH 125, which borders the property on the east. Improvements to the intersection of NH 125 and NH 121A include widening the road in front of the parcel. A strip acquisition of about 210 square meters (2,260 square feet) will involve the removal of the Norway pines and construction of a sidewalk. There will be an adverse effect on the property's integrity of setting. A temporary construction easement will also be required for the grading of slopes at the front of the property.

Tozier House (PLI0038), 193 Main Street

This property is located at the southeastern end of work proposed along Main Street. The project widens the street in front of the house, requiring a strip acquisition of about 125 square meters 1,345 square feet). It will involve tree removal resulting in an adverse effect by diminishing the integrity of setting. A temporary construction easement will also be required for the grading of slopes at the front of the property.

Current project design has no effect on Eggie's/Mountainview Diner #317 (PLI0020) or the Gale House (PLI0032) in Plaistow.

In Kingston, the Proposed Alternative does not have Section 106 effects on the National Register eligible Peaslee Tavern or Crosby House, or on any of the potentially eligible properties for which determinations were not made.

Mitigation

Impacts to the Goodchild Tenement property have been minimized by reducing the footprint of the turn-around to the greatest extent practicable considering geometry and existing conditions. This minimization results only in potential archaeological impacts. Impacts to the two eligible historic properties on Main Street (Morey/Stegmaier House to the west of NH 125 and the Tozier House, east of NH 125) have been minimized by shifting the alignment of Main Street (NH 121A) so both properties are affected equally. The alternative of shifting each leg of Main Street separately would not allow the through lanes to line up opposite each other (the desired geometry) at the intersection of NH 125. No impacts to the Happy Hollow Cemetery property are expected as all project work will take place within the

current highway right-of –way.[26] However, archaeological monitoring during construction shall occur when excavation is within 8 meters (25 feet) of the cemetery wall.

The toes of slope in front of the eligible properties, the Morey-Stegmaier and Tozier Houses, cannot be further minimized since the elevation of the new roadway is slight and the topography flat. Further, the footprint of both legs of Main Street cannot be narrowed because of the required turn lanes and sidewalk accommodations. The western leg of Main Street is designed to accept two lanes of left-turning traffic from northbound NH 125. The eastern leg also needs widening to accommodate both left and right-turn lanes from Main Street onto NH 125. Space for sidewalks on both sides of Main Street is also the desire of town officials.[27]

The following additional mitigation measures are proposed for the properties adversely affected by the Proposed Action:

Goodchild Tenement (PLI0016)

Adverse effects will be mitigated through on-site investigation and documentation of any extant archaeological resources. The original building has been removed since circulation of the DEA.

Morey/Stegmaier House (PLI0034), 200 Main Street

Loss of natural landscaping and screening will be mitigated by replacement of trees. Owners will be consulted about their desires relative to tree species and size.

Tozier House (PLI0038), 193 Main Street

Loss of natural landscaping and screening will be mitigated by replacement of trees. Owners will be consulted about their desires relative to tree species and size.

Additional Investigations

In addition, the barn or shoe shop on the Heath Property (KIN0026) will be further examined to document visible evidence of its use as a shoe shop. Since none has been identified to date, the property is not currently viewed as being eligible.

The above mitigation measures have been included in the Memorandum of Agreement (MOA; see Appendix E), which has been signed by NHDOT, FHWA and the New Hampshire State Historic Preservation Office (NHSHPO). The Department of Interior (DOI) concurs that there are no feasible or prudent alternatives to the project. As requested, a copy of the executed MOA between NHSHPO, FHWA, and NHDOT was submitted to DOI (see letters in Appendix I).

▼

26 The roadway cross-section has been modified in this area since circulation of the Draft EA to ensure slopes do not extend beyond the existing highway's right-of-way in front of the cemetery.

27 The Proposed Action includes construction of sidewalks on both sides of the western leg of Main Street (NH 121A) as part of this project. A panel (space) has been included in the right-of-way acquisition for the eastern leg for sidewalks, but they will not be constructed part of this project.

4.15 Socio-Economic Resources

■

4.15.1 Introduction

Potential impacts of highway improvements on social and economic conditions in the project area were evaluated to determine whether there will be any substantial short or long-term effects on the community. The probability of secondary development due to any stimulation of growth was also considered.

■

4.15.2 Description of Existing Conditions

The project corridor passes through both the Towns of Kingston and Plaistow. Population characteristics as derived from the 2000 census are shown in Table 4.15-1.

Table 4.15-1
Demographic Data for Plaistow and Kingston as Compared to Rockingham County (US Census Bureau, Census 2000)

	Plaistow	Kingston	Rockingham County
Area (sq. mi.)	10.6	21.0	695
Households	2,871	2,122	104,586
Population	7,747	5,862	277,359
Density (persons/sq. mi.)	730.8	279.1	399.1
Minority Persons*	129	119	8,873
% Minority	1.6	2.0	3.2
Employable Persons ≥ 16 yrs.	5,908	4,522	211,780
Persons Employed	4,228	3,205	151,291
% Employed	71.6	70.9	71.4
Persons Unemployed	134	110	4,182
% Unemployed	2.3	2.4	2.0
Average Per Capita Income ($)	25,255	28,795	26,656
% Individuals Below Poverty	2.1	1.8	4.5

* Minority includes persons of Black or African American, American Indian, Asian, Hispanic or other non-white race.

Minority Makeup

The percent of each race in the two towns as compared to Rockingham County as a whole is shown in Table 4.15-2 (Census 2000).

Table 4.15-2
Racial Makeup (Percent) of Plaistow and Kingston as Compared to Entire County

Race	Plaistow	Kingston	Rockingham Co.
White	98.3	98.0	96.8
African American	0.2	0.2	0.6
Amer. Indian/Alaskan	0.1	0.1	0.2
Asian	0.5	0.4	1.1
Native Hawaiian/Pacific Is.	0.0	<0.1	<0.1
Other/Two or More	0.9	1.2	1.3

Growth

Plaistow's population grew 5.9 percent (7,316 to 7,747) from 1990 to 2000, while Kingston grew 4.8 percent from 5,591 to 5,862 in the same time period (U.S. Census). For comparison, Rockingham County as a whole grew 12.8 percent and the entire State 11.4 percent in the same time period (Economic Research Service, US Department of Agriculture web site).

Employment Mix/Incomes

Employment characteristics for the two towns are shown in Table 4.15-3.

Table 4.15-3
Occupation Mix (Percent) for Plaistow and Kingston as Compared to Entire County.

Occupation	Plaistow	Kingston.	Rockingham Co.
Management, Professional	35.6	36.3	38.4
Service Occupations	9.9	12.9	11.5
Sales & Office Occupations	30.5	26.3	27.4
Farming, Fishing, & Forestry	0.7	0.0	0.4
Construction, Extraction, Maintenance	9.3	10.3	9.3
Production, Transport, Material Moving	14.0	14.2	13.1

Per capita income levels for the two towns as compared to the county as a whole are given in Table 4.15-1. Median household income is $61,707 in Plaistow and $61,522 in Kingston; both slightly higher than the $58,150 for the entire county (Census 2000). The percentage of individuals in both towns who are below the poverty level is less than half the average for the entire county (i.e., 4.5 percent), see Table 4.15-1 (Census 2000).

Taxes

The Town of Plaistow has a 2002 property tax rate of $20.58 per thousand dollars of assessed property value (at 85 percent), as compared to $26.50 per thousand (at 80 percent) for Kingston. Total valuation for Plaistow is $699.3 million, while in Kingston it is $388.6 million (Tax Collector Offices, Kingston and Plaistow, January, 2003).

Land Use

The project corridor is primarily commercial in the Town of Plaistow with mixed commercial and residential as one proceeds northward into Kingston. Land use just off the corridor (i.e., without frontage on NH 125) is largely rural residential. Used car and RV sales, restaurants, gas stations, landscaping suppliers, storage facilities, small office buildings, and light industries are the primary businesses along the highway itself. Zoning districts for both towns are shown on **Figure 4.15-1**.

Public Facilities

There are no municipally owned facilities directly on NH 125. The South Kingston Fire Station is located 150 meters (500 feet) west of the highway on Hunt Road. A Town of Kingston Highway Garage is approximately 0.5 kilometers (.25 miles) east of the highway on Newton Junction Road. Both the Timberlane Regional High School and Middle School are located about 0.4 mi. east of NH 125 along Greenough Road. The principal access to both schools is by way of NH 125.

There are three cemeteries along the corridor, all in South Kingston: Happy Hollow (near the intersection of Dorre Road), Snow (just north of the Hunt Road/Newton Junction Road intersection), and Mill Hill (east side of highway near Mill Pond).

■

4.15.3 Summary of Impacts / Mitigation

The project will require the complete acquisition of seven residences (two in Plaistow and five in Kingston) and two businesses (both in Kingston) (Table 4.15-4). In general, economic characteristics of the majority of the residential displacees appears to place them in the middle-income bracket. There appears to be no special ethnic or racial makeup of the families displaced. Any individuals with disabilities or elderly displacees will be specifically identified prior to the acquisition stage and their special needs addressed accordingly.

Table 4.15-4
Business and Residential Acquisitions

Parcel	Res/ Bus[1]	Owner/Address	Tax Map #	Town	Acquisition		Comments
					Definite	Potential	
152	Res	LeBlanc, Virginia 192 Plaistow Road Plaistow, NH 03885	R-44/3	Plaistow	X		
346	Res	Cottage Plaza LLC 23A Wentworth Avenue Plaistow, NH 03865	R-27/30	Plaistow		X	Cannot match exist drive. Parcel being redeveloped. Possible joint access with P 348 via P 347.
1	Res	Leate/Varney, Shannon 42 NH 125 Kingston, NH 03848	R-5/10	Kingston	X		Cobbler/Shoe Maker House
2	Bus	Geoffroy, Robert 46 NH 125 Kingston, NH 03848	R-5/11	Kingston	X		Kingston Foreign Auto
173	Res	Brox Industries Inc. 1471 Methuen Street Dracut, MA 01826	R-3/19	Kingston	X		
178A	Bus	Whitney, Robert 1 Dorre Road Kingston, NH 03848	R-3/28A	Kingston	X		Whitney's Garage; Existing drive is 130 feet wide; Potentially move bldg. back.
179	Res	Whitney, Jason 26 NH 125 Kingston, NH 03848	R-3/38B	Kingston	X		House is within existing ROW.
181	Res	Fredrick, Kenneth 32 NH 125 Kingston, NH 03848	R-2/13A	Kingston	X		Underground House; ledge cut will impact.
56	Res	Prenaveau, Bertin 49 NH 125 Kingston, NH 03848	R-4/2	Kingston	X		Another Well Kept Secret; acquire house only.

1 All residences are single family.

The acquisition of the residential properties will result in the displacement of households occupying those dwellings. A survey was conducted by the NHDOT of available replacement housing in both communities (see Appendix H). In Plaistow, the survey found a limited number of functionally similar, decent, safe and sanitary residential houses for sale. The multiple-listing service for the Town of Plaistow shows a limited number of replacement homes for sale, ranging in value from $270,000 - $315,000. Due to the limited number of houses on the market in the Town of Plaistow, finding replacement houses for the two residential property owners

displaced by the project may be difficult. However, there is adequate housing in surrounding towns to meet these needs.

In Kingston, the survey found an adequate number of functionally similar, decent, safe and sanitary residential dwellings for sale. The multiple-listing service for the Town of Kingston shows adequate number of replacement homes for sale, ranging from $240,000 - $375,000.

There were no discernible impacts on the neighborhoods involved. It also appears that there is no need for special relocation considerations to resolve the needs of the displacees.

Should locating affordable housing for any resident displaced by the alignment within the housing inventory prove unfeasible, last resort housing will be made available if the need presents itself, in accordance with Chapter 10 of the NHDOT, Right-of-Way Relocation Policy and Procedures Manual.

The two businesses (Whitney Motors and Kingston Foreign Auto) that are displaced due to project implementation will be eligible for relocation benefits in addition to the fair market value for the acquired property, which will include Relocation Advisory Assistance Services.

There will be only a very minimal impact on property tax revenues with the Proposed Action since the majority of the construction will take place within existing State right-of-way. NHDOT has conducted extensive community coordination to obtain input on the project (see Section 6.3) and the Proposed Action is fully consistent with all local plans for growth in the future. The potential for secondary growth or development will continue to be regulated by local zoning. The proposed access management measures will also help ensure orderly growth by restricting access to and from the highway.

No community facilities, such as schools, libraries, or emergency facilities, will be impacted by the Proposed Action. Since this is a widening of an already busy highway corridor with relatively few residences along it, neighborhood character or cohesion is not an issue.

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4.15.4 Environmental Justice

Executive Order 12898 requires that federal agencies examine the potential environmental effects of proposed federal actions to determine if disproportionately high and adverse effects would result on minority or low-income populations. The Proposed Action exhibits environmental justice in that it does not affect singular areas or neighborhoods where populations of low income, or of specific races or color or national origin, live or work.

4.16 Hazardous Materials

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4.16.1 Introduction

An investigation of the study area to identify known and potentially contaminated sites was conducted in 1991-1992 and again in 1998. Information on possible junkyards, leaking underground storage tanks, known toxic waste spills, agricultural chemical products, contaminated lands, landfills, and Resource Conservation and Recovery Act (RCRA)-defined generators was obtained from the GRANIT GIS database and as well as a from a commercial database search service (FirstSearch). The files at NHDES were researched for updates to the database information. Finally, a windshield survey was used to confirm the information compiled from these searches.

The following FirstSearch environmental databases were reviewed: National Priorities List (NPL); Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS); Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSD) facilities list; RCRA generators; RCRA corrective action sites (COR); state list of hazardous waste sites; state list of spills sites; Active Solid Waste Landfill (SWL) facilities; Leaking Underground Storage Tanks (LUST); and registered underground storage tanks (USTs) and aboveground storage tanks (ASTs). Database search radii were chosen generally in accordance with the ASTM E 1527-00 Standard Practice for Environmental Site Assessments, as shown in Table 4.16-1.

Table 4.16-1
Results of Hazardous Material Database Search

Database	ASTM Search Radii	Number of Sites within Search Radii	
		Plaistow	Kingston
NPL sites	1 mile	1	1
CERCLIS sites	0.5 mile	1	2
RCRA TSD	1 mile	0	0
RCRA Generators	0.25 mile	22	10
RCRA COR	1 mile	0	0
State Hazardous Waste Sites	1 mile	3	2
State Spills	0.25 mile	2	1
Leaking USTs	0.25 mile	4	3
SWL facilities	0.5 mile	0	0
Registered UST/AST's	0.25 mile	18	11

No RCRA TSD, RCRA COR, or SWL facilities were identified within the specified ASTM search radii on any of the databases.

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4.16.2 Description of Existing Conditions

An Initial Site Assessment (ISA) was conducted of the project corridor from Joanne Drive in Plaistow north to the intersection of NH 111 in Kingston. The ISA was conducted to identify sites with potentially hazardous materials that abut the corridor. This ISA identified 27 sites in Plaistow and 19 sites in Kingston. Identified properties included known release sites, facilities with underground storage tanks, facilities which generate and store oil and/or hazardous materials, and areas of visible signs of contamination during a site reconnaissance.

Based on site history, environmental file reviews, and a field reconnaissance, the following potentially hazardous material sites were identified within each town and in the study area **(Figure 4.16-1)**. Complete details are available in the three ISA reports prepared for this project: ISA, NH 125, Kingston NH; ISA, NH 125, Plaistow, NH; and ISA, Hunt Road and Newton Junction Road, NH 125, Kingston, NH (VHB April 2002).

Plaistow

Beede Waste Oil/Cash Energy – NPL Site

The history of this NPL site indicates that contamination is extensive. Based on currently identified contamination, the site poses a significant environmental threat, including to Kelly Brook. Although the address for this property is 7 Kelly Road, 0.5 kilometers (.25 miles) from NH 125, contaminants from the property may extend to the highway according to the database reports.

Cumberland Farms, Beede Waste Oil, Senter Brothers Construction, Goodreault's RV – LUST Sites

These are all LUST sites. Groundwater contamination has been documented at Cumberland Farms and Senter Brothers Construction. See Table 4.16-2.

Table 4.16-2
LUST Sites Identified in the NHDES Databases for Plaistow

Database	Site and Address	Distance and Direction	Environmental Issue
LUST	Cumberland Farms NH 125 / Danville Rd. Plaistow, NH (Parcel # 129)	Abutting NH 125	DES# 199304011: This site was listed as a LUST site when soil and groundwater contamination was discovered during UST replacement activities. Groundwater sampling and analysis has been conducted from 1994 to present. As of September 2001, BTEX and MTBE remain above NHDES groundwater standards at the site. One monitoring well continues to contain Non-Aqueous Phase Liquid and is bailed on a bi-monthly basis. Because this site abuts NH 125, it poses an environmental threat to the project.
LUST	Goodreault's RV 96 Plaistow Rd. Plaistow, NH (Parcel # 110)	Abutting NH 125	DES# 199108007: An administrative order was issued by NHDES to the property owner in 1989 to identify and remediate areas suspected of containing solid and hazardous wastes. In March of 1990, three days of test pitting and excavation successfully removed the waste from the soil. NHDES requested additional work to assess the quality of the shallow and deep aquifers under the site. Monitoring wells were installed and the aquifers were not determined to be impacted. Due to the distance of the waste disposal area from NH 125 (>1,000 feet) and the remediation conducted, this site is not likely to pose an environmental threat to the project.
LUST	Senter Bros. Construction 10 Old Rd. Plaistow, NH (Parcel # 115)	0.15 Miles Southeast	DES# 199101005: Two USTs were removed from this site 1992 and soil and groundwater contamination was discovered. In 1994 approximately 1,877 tons of petroleum impacted soil was excavated and transported to a licensed disposal facility. Groundwater monitoring conducted in 1995 indicated residual concentrations of naphthalene in groundwater at one location slightly above NHDES groundwater standards. Due to the distance of this site from NH 125 and the remediation actions taken, this site is not likely to pose an environmental threat to the project.
LUST	Beede Waste Oil 7 Kelley Road Plaistow, NH (No Parcel #)	Abutting NH 125	DES# 198404068: In 1984, this site was identified as a LUST. Later in 1984, NHDES determined the USEPA should address this site as a National Priority List site. This site is a Superfund site.

Doc's Auto Body, Chunky's, Phillip's Express, 125 Subaru, Auto Sub Repair, National Hardware, Skip's Friendly Service, and the Plaistow Highway Department. – UST Sites

The FirstSearch report indicates that USTs were removed from these sites. No documentation was available at the Town of Plaistow Fire Department or at NHDES to verify the UST removals. See Table 4.16.3.

Plaistow Sunoco, Cumberland Farms, Petro-King, – UST Sites

These sites have active UST systems. See Table 4.16-3.

Table 4.16-3
UST Sites Identified in the NHDES Databases for Plaistow

Database	Site and Address	Distance and Direction	UST Status
UST	Doc's Auto Body 134 Plaistow Rd. Plaistow, NH (Parcel # 120)	Abutting NH 125	• Two 2,000-gallon gasoline USTs • One 4,000-gallon gasoline UST • Removed in 1986
UST	Plaistow Sunoco 93 Plaistow Rd. Plaistow, NH (Parcel # 342)	Abutting NH 125	• One 12,000-gallon gasoline UST • One 8,000-gallon gasoline UST • Installed in 1999
UST	William C. Senter 124 Plaistow Rd. Plaistow, NH (Parcel #1115)	Abutting NH 125	• One 10,000-gallon fuel oil UST • One 4,000-gallon fuel oil UST • Removed in 1992
UST	Chunky's 148 Plaistow Rd. Plaistow, NH (Parcel # 132)	Abutting NH 125	• One 2,000-gallon fuel oil UST • Removed in 1994
UST	Cumberland Farms NH 125 / Danville Rd. Plaistow, NH (Parcel # 129)	Abutting NH 125	• Three 8,000-gallon gasoline USTs • One 500-gallon fuel oil UST • Removed in 1993 • Three 8,000-gallon gasoline USTs • Double-wall fiberglass USTs installed in 1993
UST	Truck Sales & Service 2 Danville Rd. Plaistow, NH (Parcel # 121)	Abutting NH 125	• Two 5,000-gallon gasoline USTs • Two 4,000-gallon fuel oil USTs • Two 275-gallon waste oil USTs • Removed in 1995 and 1996
UST	Phillip's Express 7 Rose Ave Plaistow, NH (No Parcel #)	0.04 Miles Northwest	• One 8,000-gallon diesel UST • Two 4,000-gallon diesel USTs • Removed in 1991
UST	Goodreault's RV 96 Plaistow Rd. Plaistow, NH (Parcel # 110)	Abutting NH 125	• One 10,000-gallon gasoline UST • One 10,000-gallon diesel UST • Removed in 1992
UST	125 Subaru 103 Plaistow Rd. Plaistow, NH (Parcel # 337)	Abutting NH 125	• Three 1,000-gallon waste oil USTs • Removed in 1992
UST	Auto Sub Repair 137 Plaistow Rd. Plaistow, NH (Parcel # 323)	Abutting NH 125	• Three 4,000-gallon gasoline USTs • One 500-gallon waste oil UST • Removed in 1995

Table 4.16-3 (continued)

Database	Site and Address	Distance and Direction	UST Status
UST	Petro King 119 Plaistow Rd. Plaistow, NH (Parcel # 330)	Abutting NH 125	• One 28,000-gallon gasoline UST • One 15,000-gallon diesel UST • Installed in 1999
UST	National Hardware Co. 10 Old Rd. Plaistow, NH (No Parcel #)	0.15 Miles Southeast	• One 3,000-gallon gasoline UST • One 3,000-gallon diesel UST • One 4,000-gallon fuel oil UST • Removed in 1991
UST	Beede Waste Oil 7 Kelley Road Plaistow, NH (No Parcel #)	0.18 Miles Northeast	• Twelve USTs of various sizes containing various substances • Removed between 1989 and 1995
UST	Skip's Friendly Service 157 Plaistow Rd. Plaistow, NH (Parcel # 313A)	Abutting NH 125	• Two 4,000-gallon gasoline USTs • One 3,000-gallon gasoline UST • Removed in 1989
UST	Highway Department 37 Old County Rd. Plaistow, NH (No Parcel #)	0.18 Miles Northwest	• One 3,000-gallon diesel UST • Removed in 1999

77 Plaistow Rd., Auto Parts & Service, Auto Sales & Service, 97 Plaistow Rd., DBA Automobile Wholesalers, Bigart Marine, Interstate Used Cars, Used Car Corral, Tire & Truck Sales & Service, Mear's Tractor Sales, Camp America RV Sales & Service

Because no interior reconnaissance was performed as part of the ISA, there is no information available on the presence of hydraulic lifts, waste oil or hazardous waste storage, and general housekeeping practices at these sites.

Remaining Properties

The remainder of the properties along the corridor in Plaistow are residences, vacant land, or commercial properties that are not likely to pose an environmental threat.

Kingston

Ottati & Goss/Great Lakes Container Corp. – NPL Site

This site has been listed on the National Priority List, and a large-scale remediation was recently completed. This site is not likely to pose an environmental threat.

Kingston Mobil Mart, Kingston Foreign Auto, & Max's Quick Shop – LUST Sites

These are all LUST sites. Groundwater contamination has been documented at Kingston Mobil Mart and Kingston Foreign Auto. For the Max's Quick Shop property, limited documentation suggests that a leaking UST was reported on this site. Soil and groundwater sampling may be necessary depending on the extent of right-of-way acquisition. See Table 4.16-4.

Table 4.16-4
LUST Sites Identified in the NHDES Databases for Kingston

Database	Site and Address	Distance and Direction	Environmental Issue
LUST	Kingston Mobil Mart 126 Haverhill Rd. Kingston, NH (Parcel # 208)	Abutting NH 125	DES# 200011010: In September of 2000, Geologic Services Corporation conducted a Phase I Environmental Site Assessment at this site. Groundwater sampling conducted as part of the assessment indicated the presence of MTBE in one groundwater sample at a concentration of 312 parts per billion. This concentration exceeds the NH Method 1 Groundwater Standard for MTBE of 13 ppb. Because this site abuts NH 125, it poses an environmental threat to the project.
LUST	Kingston Foreign Auto NH 125 Kingston, NH (Parcel # 2)	Abutting NH 125	DES# 198712023: An 8,000-gallon gasoline UST was removed from the site in 1987. Due to the inadequate historical documentation at NHDES, we are unable to determine the extent of remediation conducted. The groundwater at this site is currently being monitored quarterly due to continued presence of BTEX and MTBE in groundwater. Because this site abuts NH 125, it poses an environmental threat to the project.
LUST	Max's Quick Shop 102 NH 125 Kingston, NH (Parcel # 191)	Abutting NH 125	DES# 198804007: This site was listed as a LUST site in 1988. Historical documentation was not available for review at NHDES. Field reconnaissance shows this site to be developed as a residence. Because this site abuts NH 125, it poses an environmental threat to the project.

Camper's Inn, Austin Powder Co., Bob's Auto Repair Shop, Bump & Grind Auto Body, & Roderick Wholesale Florist – UST Sites

The FirstSearch report indicates that USTs were removed from each of these sites. No documentation was available at the Town of Kingston Fire Department or at NHDES to verify the UST removals. See Table 4.16-5.

Kingston Mobil Mart, Kingston Town Garage, & Bayberry Variety[28] – UST Sites

These sites have active UST systems. See Table 4.16-5.

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28 The Bayberry Variety property was addressed as part of the Kingston Project (10044C). See CE (VHB June 2003 Revised) for details.

Table 4.16-5
UST Sites Identified in the NHDES Databases for Kingston

Database	Site and Address	Distance and Direction	UST Status
UST	Camper's Inn 146 NH 125 Kingston, NH (Parcel # 212)	Abutting NH 125	• Two 1,000-gallon gasoline USTs • Removed in 1983
UST	Kingston Shell Formerly Kingston Mobil 126 NH 125 Kingston, NH (Parcel # 208)	Abutting NH 125	• Two 12,000-gallon gasoline USTs • One 12,000-gallon diesel UST • All three are double-wall fiberglass tanks installed in 1993
UST	Austin Powder Co. NH 125 Kingston, NH (Parcel # 207)	Abutting NH 125	• One 4,000-gallon diesel UST • Removed in 1991
UST	Bob's Auto Repair Shop 4 Main Street Kingston, NH (Parcel # 223)	Abutting NH 125	• Two 3,000-gallon gasoline USTs • One 5,000-gallon gasoline UST • Removed in 1987
UST	Kingston Foreign Auto 44 NH 125 Kingston, NH (Parcel # 2)	Abutting NH 125	• Three 6,000-gallon gasoline USTs • Removed in 1999
UST	Max's Quick Shop 102 NH 125 Kingston, NH (Parcel # 228)	Abutting NH 125	• Two 6,000-gallon gasoline USTs • One 4,000-gallon gasoline UST • One 3,000-gallon gasoline UST • One 2,000-gallon gasoline UST • Removed in 1988 & 1992
UST	Kingston Town Garage Old Haverhill Road Kingston, NH (No Parcel #)	Abutting NH 125	• One 8,000-gallon gasoline UST • Installed in 1988
UST	Bayberry Variety NH 125 Kingston, NH (Parcel # 38)	Abutting NH 125	• One 8,000-gallon gasoline UST • One 6,000-gallon gasoline UST • Installed in 1989

Table 4.16-5 (continued)

Database	Site and Address	Distance and Direction	UST Status
UST	Bump & Grind Auto Body NH 125 Kingston, NH (Parcel # 59)	Abutting NH 125	• One 2,000-gallon fuel oil UST • Removed in 1989
UST	Ottati & Goss NH 125 Kingston, NH (Parcel # 206)	Abutting NH 125	• Seven USTs of various sizes containing gasoline, fuel oil, and hazardous materials. • All removed in 1993
UST	Roderick Wholesale Florist NH 125 Kingston, NH (Parcel # 285)	Abutting NH 125	• One 6,000-gallon fuel oil UST • One 3,000-gallon diesel UST • Removed in 1995 & 1998

Automobile Wholesalers North, Complete RV, Bob Leavitt Auto Sales & Service, Whitney's Garage, Kingston Collision Center, 1st Century Auto Sales & Service, & Reynolds RV Sales & Service

Because interior reconnaissance was not performed as part of the ISA, there is no information on the presence of hydraulic lifts, waste oil or hazardous waste storage, and general housekeeping practices at these sites.

Remaining Properties

The remainder of the properties along the corridor in Kingston are residences, vacant land, or commercial properties that are not likely to pose an environmental threat.

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4.16.3 Summary of Impacts/Mitigation

ISA research indicates that right-of-way acquisition for the Proposed Action may affect 3 properties (Parcel #'s 110, 115, and 129) in Plaistow and 3 properties (Parcel #'s 2, 191, and 208) in Kingston where hazardous materials issues (LUSTs) have been identified. Additional investigation of the Beede Waste Oil (NPL) site, located on Kelly Road in Plaistow outside the project corridor needs to be performed to determine the extent that this contaminated site poses an environmental issue to this project. The Ottati & Goss/Great Lakes Container Corporation (NPL) site (Parcel # 206) along NH 125 in Kingston has recently been remediated and should not be an issue with this project.

There are several properties along the corridor where USTs have been removed but no documentation could be readily found to confirm it. Prior to acquisition, on-site interviews with the property owners will be required to confirm UST status. Records at NHDES also indicate several properties in the corridor still contain USTs. These sites will also require on-site interviews and inspection prior to right-of-way acquisition.

Prior to right-of-way acquisition, on-site interviews will need to be conducted with property owners whose properties are still listed as having USTs or which there is no documentation substantiating their removal. In addition PSI (Preliminary Site Investigations) may be necessary to determine the extent of involvement with LUST sites. The objective of these PSIs would be to determine the current status of the historical contamination and its location relative to the right-of-way acquisition.

All properties with hazardous waste issues will be cataloged and entered into a project database using NHDOT's RASCAL protocol. This approach, involving a minicomputer with GPS capabilities for locating site features, allows an orderly compilation of all information on a particular property, including the findings of more in-depth hazardous material investigations. Right-of-way information is also entered into the RASCAL files. The resulting database provides a complete set of information so that informed decisions can be made relative to the need for remedial actions, future liability, and worker exposure during project construction.

4.17 Construction Impacts

Impacts caused by construction activities will be short-term. Construction activities may result in temporary adverse impacts, with the two primary pollutant sources being construction equipment and exposed soils in disturbed areas.

Air pollutants emitted from diesel and gasoline powered construction equipment will include oxides of nitrogen, carbon monoxide, hydrocarbons, and particulate matter. Emissions from construction equipment may result in elevated ambient concentrations within the immediate vicinity of construction operations for short periods of time, but are not expected to have a substantial impact.

Particulate matter (dust) will be emitted as a result of grubbing, grading, excavating, hauling, and blasting operations. Dust emitted during most construction activities will be controlled by wetting unpaved areas in the construction zone, covering loads on all open trucks, and seeding all unvegetated areas as soon as practicable.

Activities associated with construction will likely require blasting of bedrock material in some areas and extensive grading in others (primarily for service roads and roadway realignment at selected intersections). The grading will include the stripping of existing vegetation, followed by excavation and filling. This

construction will result in a nearly complete reworking and/or removal of surficial and subsoils along the sides of the highway. Exposure of previously vegetated soils could lead to erosion if not properly controlled.

To minimize potential sedimentation impacts associated with construction, an erosion and sedimentation control plan, including BMPs, will be developed and implemented. Construction schedules will require that areas stripped of vegetation be limited in size and either surfaced or vegetated as quickly as possible after initial exposure. During the construction period, temporary erosion dams will be installed in appropriate locations to control runoff. With proper diversions of flow, installation of silt retention basins, and construction carefully scheduled to limit soil exposure, erosion during construction should be minimized. BMPs for fertilizer application during construction will also be followed. In addition, mechanisms to avoid and control chemical leaks and spills from construction equipment will be instituted. NHDOT will ensure that all of these measures are properly installed and maintained throughout construction to guarantee their maximum functionality and effectiveness. Additional details can be found in *NHDOT's Standard Specifications for Road and Bridge Construction, Section 699, Temporary Project Water Pollution Control (Soil Erosion)*.

Human presence and associated construction noise at new location areas may repel some species of wildlife from the edge of the right-of-way. Animals tend to habituate to constant noise (Busnel 1978), but loud, sudden sounds will be commonplace during construction. The loud noises associated with construction also could mask territorial vocalizations of bird species near the construction, interfering at least temporarily with breeding. Amphibians, which breed more commonly at dusk or night, are less likely to be indirectly affected by the noise.

Construction activities will result in temporary noise impacts to sensitive receptors at various locations along the project's length. Noise levels in the vicinity of construction activities will vary widely depending on the type and number of pieces of construction equipment active at any one time (Table 4.11-6).

It is expected that noise levels exceeding 67 decibels could occur up to 500 feet away from construction activities. Construction noise will, in some areas, be occurring near residences presently experiencing lower noise levels. In general construction will be accomplished during daylight hours, although night-time construction should be expected given the traffic volumes during daylight hours and the need to maintain traffic at these times.

Construction will create increased truck traffic on secondary roads. Access to NH 125 will be maintained although unavoidable delays will occur. Temporary delays will be experienced while construction occurs along the highway, traffic is shifted temporarily from one side to the other, equipment is moved around, and materials are delivered to work sites. ITS technologies (e.g., sign boards) will be deployed to more efficiently manage traffic during construction. A detailed Traffic Control Plan

will be instituted to reduce these traffic-related, short-term impacts and minimize construction zone delays. The plan will include the requirement to maintain 2 lanes of traffic for normal construction activities and during high volume traffic periods. Businesses and their customers may experience some inconvenience due primarily to construction activities along their frontage. Construction activities will be coordinated with property owners to assure that reasonable access to properties is maintained. Temporary signing and other issues related to temporary relocation of access points necessitated by construction activities, will be appropriately addressed on an individual basis.

Some short-term visual impacts will also occur during construction as land clearing and earth-moving occurs. Additionally, some views will also be disrupted by the presence of temporary construction or access roads, marshalling yards, and stockpile areas that may be needed.

4.18 Summary of Project Impacts

The impacts associated with the Proposed Action are summarized in Table 4.18-1.

Table 4.18-1
Summary of Project Impacts

Resource/Issue	Proposed Action
Traffic	Additional lanes and access management with combined entrances and limited left turns will lead to a more efficient and safer traffic flow.
Wetlands	Loss: Open Water 0.01 ha (0.03 ac.) Emergent Marsh 0.27ha (0.67 ac) Scrub-Shrub 0.29 ha (0.71 ac.) Forested 1.15 ha (2.85 ac.) Riverine 0.09 ha (0.23) ac) Total 1.81 ha (4.49 ac.)
Surface Water Quality	Runoff to be treated by grassed swales and new detention basins. Improvement in water quality treatment is expected.
Groundwater Quality	Adds 13.9 ha (34.4 ac.) of impervious surface over stratified-drift aquifer. Crosses 15 active DWPAs and within 152 m (500 ft.) of 4 others.
Floodplains	Loss of 0.83 ha (2.1 ac) of 100-yr floodplain. Minor encroachment of 0.08ha (0.2 ac.) in floodway at Kelly Brook. Total volume of floodwater storage affected is 4,194 cu. m. (3.4 ac. ft.). The proposed larger culvert size at Kelly Brook will reduce backwater effect and flooding at this location.
Farmlands	Important Farmland Soil loss: Statewide 0.3 ha (0.7 ac.) Local 4.2 ha (10.3 ac.) Total 4.5 ha. (11.0 ac.)

Table 4.18-1 (continued)

Resource/Issue	Proposed Action
Wildlife Resources	Loss of approximately 25.9 ha (64 ac) of upland and 1.8 ha (4.5 ac) wetland habitat immediately adjacent to existing highway. Habitats are generally of low value.
Fisheries (Stream) Resources	Loss of 82.2 m (270 linear feet) of streambed at 3 streams for culvert lengthening. Some loss of bank vegetation providing shade.
Threatened and Endangered Species	No impacts to any threatened or endangered species or exemplary natural communities.
Air Quality	14 receptor areas with no violations of the State and NAAQS standards for CO.
Noise	32 residential receptors will approach, be at, or exceed NAC for the 2024 Build condition. (37 residential receptors would approach, be at, or exceed NAC for the 2024 No-Build condition.)
Public Parks and Recreational Land	No public parks, recreation areas, or waterfowl or wildlife refuges are affected.
Visual	Wider highway but character of area expected to change very little. Landscaped median will be a visual enhancement.
Archaeological	Archaeologically sensitive areas affected. Additional subsurface investigations necessary to resolve.
Historical	Three eligible properties (Goodchild Tenement, Morey/Stegmaier House, and Tozier House) were originally determined to have adverse effects under Section 106. Two of these properties (Morey/Stegmaier House and Tozier House) have 4(f) impacts. The Goodchild Tenement house was demolished by its owner in 2004 removing the eligible component of the property.
ROW Displacements	2 residences in Plaistow and 5 residences in Kingston displaced. 2 businesses in Kingston, but none in Plaistow displaced.
Property Tax Revenues	Minor loss in tax base to both communities.
Secondary Development/ Land Use	Some growth acceleration may occur along corridor, but will be controlled by access management measures and local regulations.
Community Character/ Cohesion	No substantial effect in Plaistow as corridor is already highly commercial where widening will be to 4 lanes. Some change in character in Kingston as highway will be wider and 4 lanes for a portion of its length.
Consistency with Local Plans	Consistent with town plans for future.
Hazardous Materials	1 NPL site and 3 LUST properties potentially involved in Plaistow . 3 properties with LUSTs potentially involved in Kingston. NPL site adjacent to NH 125 in Kingston recently remediated.
Construction	Reasonable access will be maintained. Erosion and sediment control plan will be prepared. Fugitive dust emissions will be controlled and noise limited to daylight hours.

5

Section 4(f) Evaluation

5.1 Introduction

Under Section 4(f) of the Department of Transportation Act of 1966 (49USC 3030) as amended by the Federal-Aid Highway Act of 1968 (Public Law 90-495, 49 USC 1653), the Secretary of Transportation shall not approve any program or project which "requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance as so determined by federal, state, or local officials having jurisdiction thereof, or any land from a historic site of national, state or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreation area, wildlife and waterfowl refuge, or historic site resulting from such use."

This Section 4(f) Evaluation provides the required documentation to demonstrate that there is no prudent and feasible alternative to avoiding an impact on 4(f) historic resources with the proposed project. There are no other types of 4(f) resources in the project area. This evaluation also outlines the coordination that has occurred and the measures proposed to minimize harm to the two National Register eligible properties with 4(f) impacts affected by the Proposed Action.

5.2 Description of Proposed Action

The Proposed Action will provide two through lanes in each direction along NH 125 from East Road in Plaistow to Hunt Road/Newton Junction Road in Kingston. North of Hunt Road/Newton Junction Road, the cross section will transition to a single lane in each direction. A raised center median will separate directional flow throughout the five-lane section with median openings provided to accommodate left-turn movements. Exclusive left-turn lanes, traffic signal control, and full access/egress will be provided at nine major intersections. In addition, a series of access management elements have been incorporated into the plan. These elements include connector or service roads, shared driveways, and directional median openings. Directional median openings allow motorists to turn left from the corridor onto a particular side street or driveway while prohibiting left-turn movements onto

the corridor. To enhance the character of the corridor and to provide a "traffic calming" effect, the center median is proposed to be landscaped. The access management measures will improve the efficient movement of traffic while enhancing the safe and efficient access to and from abutting properties. A plan view of the Proposed Action is shown in **Figures 2.2-1 through 2.2-15**.

The Proposed Action will widen NH 125 to a five-lane median-divided cross section **(Figure 2.2-16)** beginning at East Road in Plaistow through the Hunt Road/Newton Junction Road project in Kingston. In the southern portion of the corridor the roadway **(Figure 2.2-16)** will be comprised of two 3.6-meter (12 feet) travel lanes in each direction with a 6-meter (20 feet) median. A 1.5 meter (5 feet) paved shoulder would be provided on each side of the roadway resulting in a total cross-sectional width of 23.4 meters (78 feet). The widening will be constructed equally about the center of the existing roadway, except for the section of NH 125 between Dorre Road and Debra Road, and the area through the Hunt Road/Newton Junction Road intersection. Between Dorre Road and Debra Road the widening has been shifted entirely to the west side. This will provide an adequate grade for the northerly connection to Colonial Road, and avoid impacts to Happy Hollow Cemetery. The widening will shift to the east through the Hunt Road/Newton Junction Road intersection to avoid impacts to the Isaac Webster house, which is eligible for the National Register of Historic Places.

The Hunt Road/Newton Junction Road intersection improvements will match into the interim improvements constructed at the Old Coach Road intersection. A two-lane cross section (**Figure 2.2-16**) is proposed on NH 125 from the Old Coach Road intersection, northerly approximately 2.1 km (1.3 miles). In this area, NH 125 would be widened approximately 1.5 meters (5 feet) to each side to provide two 3.6 meter (12 feet) lanes with 3 meter (10 feet) shoulders for a total width of 13.2 meters (44 feet). A three-lane section will be provided along the segment of NH 125 that extends from 200 meters (± 650 feet) south of Meeks Road to 200 meters (± 650 feet) north of Stoney Brook Road. The proposed roadway width will be the same [13.2 meters (44 feet)] for both the two-lane and three-lane section. The shoulders will be narrowed to 1.2 meters (4 feet) wherever a center-turn-lane is provided.

5.3 Description of Section 4(f) Resources

There are eleven properties[29] in the project corridor determined to be eligible for the National Register of Historic Places (see Section 4.14.2). Their locations are shown on **Figure 4.14-2**. Of these properties, only two have Section 4(f) impacts due to this project. Both are located in Plaistow near the NH 125 and NH 121A/Main Street intersection. They are described below:

29 This total includes an eligible property and a district in the Kingston Project (#10044C) study area.

Morey/Stegmaier House (PLI0034), 200 Main Street

Located on northern Main Street immediately northwest of NH 125, this property is eligible for the National Register under Criterion A for its historic associations with the "backyard" poultry industry in Plaistow. Poultry farming was a successful and widespread agricultural development in southern New Hampshire during the early to mid-twentieth century, but only a handful of properties survive in Plaistow to illustrate this significant trend. The property includes a 1½-story house built ca. 1907. Poultry farming began ca. 1919. Southwest of the house are a poultry house with monitor roof, and a smaller brooder house. The buildings and adjacent open land contribute to the approximately 0.7-hectare (2-acre) eligible property, which is bounded on the northeast by Main Street (NH 121A) and extends east to NH 125. The eligible property encompasses the 0.42-hectare (1.04-acre) parcel on which the main buildings are located, and the 0.4- hectare (1-acre) northeastern portion of the adjacent parcel on which the brooder house is located, which extends to the intersection of NH 121A and NH 125.

Tozier House (PLI0038), 193 Main Street

Located on Main Street, east of NH 125, this property is also eligible under Criterion A for documenting small-scale backyard poultry farming which was an important early twentieth century trend in farming. The 2 ½-story, gable front, sidehall residence was constructed in the early 1900s. An attached garage was built around 1920, and the ca. 1930 chicken coop extends from the garage. A second smaller poultry house stands north of the house. Poultry farming was carried on as a secondary source of income, and later in retirement, by local mail carrier Alan Tozier. The eligible property encompasses the current 0.40-hectare (0.99-acre) parcel.

5.4 Impacts on Section 4(f) Properties

Morey/Stegmaier House (PLI0034), 200 Main Street

Tree removal and right-of-way acquisition of approximately 210 square meters (2,260 square feet) is necessary for slope work and sidewalk construction. Balancing of impacts on both sides of Main Street precludes shifting the alignment away from the property (see **Figure 5.4.1**).

The narrow strip of land to be acquired is slightly less than 3 percent of the historic property of over 0.8 hectares (2.0 acres), but includes trees that define the front of the lot. A temporary construction easement will also be required for the grading of slopes at the front of the property.

Tozier House (PLI0038), 193 Main Street

A small right-of-way acquisition of an approximately 125 square meters (1,345 square feet) strip of land and some tree removal is necessary. This strip is only 3 percent of the 0.40-hectares (0.99-acre) property, but mature trees contribute to the

historic setting. Balancing of impacts on both sides of Main Street precludes shifting the alignment away from the property. Space for a sidewalk will also be reserved along the front of the property (see **Figure 5.4.2**). A temporary construction easement will also be required for the grading of slopes at the front of the property.

5.5 Avoidance

The proposed project has been designed to preserve the integrity of, and minimize the impacts to properties that are eligible for the National Register of Historic Places. Early coordination among federal, state and local officials (see Section 6.0), as well as ground reconnaissance, identified important resources that were taken into consideration during the design of this project. Alternatives which would avoid impacts to these Section 4(f) properties were reviewed during the preliminary design process and were not recommended because of engineering or financial constraints, environmental impacts, property impacts, and/or failure of the alternatives to adequately address the area's transportation needs and/or safety problems. Nonetheless, the Proposed Action does avoid other Section 4(f) properties within the project corridor.

The reasons for rejecting each avoidance alternative are given below.

No-Build

This alternative is not considered prudent or feasible as it does not address current functional deficiencies or traffic safety concerns. It would perpetuate the existing unsafe conditions and the substandard travel lane layouts and shoulders. These deficiencies would become more severe as traffic volumes increase.

Narrower travel and shoulder lane widths

Travel lane and shoulder widths for both the mainline and intersecting streets are the minimum required for the traffic volumes and any further reduction would compromise safety. The width of Main Street in front of the two eligible properties is dictated by the need to provide turn lanes at its intersection with NH 125. The length of the transition from two lanes to three lanes, as well as the center island length, along both segments of Main Street was carefully examined and reduced as much as possible (see Section 5.6). The required right-of-way width is also the minimum needed to incorporate the travel lanes and any associated features such as a sidewalk, curbing and signs.

Shifts in alignment

Shifts to totally avoid impacts to Section 4(f) properties would entail additional impacts to wetlands and substantial right-of-way acquisition for the properties on the opposite side of Main Street. A more extreme change in the geometry of the

intersection of NH 125 and Main Street would also be required, necessitating even greater impacts to the businesses in that vicinity (see also Section 5.6).

5.6 Measures to Minimize Harm/Mitigation

Impacts to the two eligible historic properties (Morey/Stegmaier House to the west of NH 125 and the Tozier House, east of NH 125) have been minimized by shifting the alignment of Main Street (NH 121A) so both properties are affected equally. The alternative of shifting each leg of Main Street separately would not allow the through lanes to line up opposite each other (the desired geometry) at the intersection of NH 125. The alternatives of widening primarily to one side would allow a minor reduction of impacts to one property at the expense of substantial impacts to others.

The toes of slope in front of both eligible properties cannot be further minimized since the elevation of the new roadway above the existing ground is slight and the topography flat. Further, the footprint of both legs of Main Street cannot be narrowed because of the required turn lanes and sidewalk accommodations. The western leg of Main Street is designed to accept two lanes of left-turning traffic from northbound NH 125. The eastern leg also needs widening to accommodate both left and right-turn lanes from Main Street onto NH 125. Space for sidewalks on both sides of Main Street is also the desire of town officials.[30]

The following additional mitigation measures are proposed for the properties adversely affected by the Proposed Action:

Morey/Stegmaier House (PLI0034), 200 Main Street

Loss of natural landscaping and screening will be mitigated by replacement of trees. Owners will be consulted about their desires relative to tree species and size.

Tozier House (PLI0038), 193 Main Street

Loss of natural landscaping and screening will be mitigated by replacement of trees. Owners will be consulted about their desires relative to tree species and size.

5.7 Coordination

Meetings were held with NHDHR, NHDOT and FHWA throughout the course of the project. Determinations of National Register Eligibility were made at a meeting on September 24, 2003 and Determinations of Effect were made by consensus at a meeting on December 11, 2003 (see DOE forms in Appendix E). An Effect Memo was

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30 The Proposed Action includes construction of sidewalks on both sides of the western leg of Main Street (NH 121A) as part of this project. A panel (space) has been included in the right-of-way acquisition for the eastern leg of Main Street for sidewalks, but they will not be constructed as part of this project.

signed on May 13, 2004 that addressed the unavoidable impacts to the 4(f) resources (see Appendix E).

Mitigation measures to minimize harm to affected 4(f) resources have been included in the Memorandum of Agreement (MOA; see Appendix E) signed by NHDOT, FHWA and the NHSHPO. The Department of Interior (DOI) concurs that there are no feasible or prudent alternatives to the project. As requested, a copy of the executed MOA between NHSHPO, FHWA, and NHDOT was submitted to DOI (see letters in Appendix I).

See Agency Coordination/Public Participation (Section 6.0) for additional information.

5.8 Summary

The Selected Action will have an adverse effect on the Morey-Stegmaier House at 200 Main Street (PLI0034) and Tozier House (PL0038) at 193 Main Street, both in Plaistow, which are eligible for the NRHP. Impacts of the widening have been minimized on both properties by shifting the alignment to affect both properties equally and the reduction of slopes as much as possible to minimize property acquisition. Mitigation will also include the replacement of plantings with property-owner permission.

The Heath Property at 42 NH 125 in Kingston (KIN0026) was not determined eligible. However, after purchase and before demolition the interior of the barn will be inspected to determine its possible use for outwork in the shoe industry. If an association is made, the details of the barn will be appropriately recorded to document this use. Sensitive archaeology sites will also be investigated and if a significant site is located the appropriate level of study and data recovery will be performed.

No Native American burials are known to exist in the project corridor, but if human remains or grave-associated artifacts are found during construction, the NHSHPO will be immediately notified and the appropriate course of action determined. If excavation is made within 25 feet of Happy Hollow Cemetery as delineated by the existing stonewall, an archaeologist will monitor all work. If graves are encountered at that site, work will immediately cease until the appropriate treatment and recordation of the graves and their immediate setting are approved by the State Archaeologist.

Based upon the above considerations, there are no feasible and prudent alternatives to the use of land from Section 4(f) properties, and the proposed action includes all planning to minimize harm to these properties resulting from such use.

6

Agency Coordination/Public Participation

6.1 Natural Resource Agency Reviews

The current project was reviewed with the Natural Resource Agencies at a number of regularly scheduled monthly meetings with the NHDOT. Typically present at these meetings were NHDOT, FHWA, NHDES (Wetlands Bureau), NHF&GD, USEPA, USACOE, USFWS and NHDHR. At each of these meetings, issues were presented and comments received. A field inspection was also made jointly with the resource agencies as noted. The dates and topics of these meetings were as follows:

Date/Place	Topic
October 18, 2000/NHDOT	Access Management
January 16, 2002/NHDOT	Hunt Rd./Newton Jct. Rd.
August 21, 2002/NHDOT	Project Overview
July 16, 2003/NHDOT	Wetland Impacts and Mitigation
August 7, 2003/Project Corridor	Field Review of Mitigation Sites
September 17, 2003/NHDOT	Mitigation
April 12, 2005/Project Corridor	Field Review of Mitigation Sites with USACOE

6.2 Cultural Resources Meetings

The project was reviewed at a number of Cultural Resource Meetings regularly scheduled on a monthly basis to review NHDOT projects. These meetings were held at NHDOT. Typically present at these meetings were the NHDOT, NHDHR, and FHWA. At these meetings evaluations were considered relative to potential eligibility and effects on cultural resources. The dates and topics of these meetings were as follows:

Date	Topic
February 7, 2002	Hunt Road/Newton Jct. Road
August 1, 2002	Project Area Forms
August 8, 2002	Study Needs
May 1, 2003	Archaeological Phase I

September 24, 2003	Determination of Eligibility
December 11, 2003	Determination of Effects
May 6, 2004	Determination of Effects Memo

6.3 Other Meetings

A number of Public Informational Meetings as well as meetings with public officials and the Advisory Task Force (ATF) were held in both Plaistow and Kingston. These meetings were held to provide updates on the project and receive input from the affected communities on the proposed improvements. Details of the Proposed Action were formally presented to the public at Public Informational Meetings in Plaistow on October 22, 2003, and in Kingston on October 23, 2003.

A list of the meetings along with the date, locations and topics is given below:

Advisory Task Force	January 10, 2002 Plaistow Town Hall	Project Introduction
Advisory Task Force	February 14, 2002 Plaistow Town Hall	Project Status
Advisory Task Force/Public Officials Meeting	May 14, 2002 Kingston Town Hall	Project Purpose and Need, and Hunt Rd./Newton Jct. Rd.
Advisory Task Force	May 30, 2002 Plaistow Town Hall	Access Management
Public Information Meeting	June 13, 2002 Kingston Town Hall	Access Management
Public Information Meeting	June 27, 2002 Kingston Town Hall	Hunt Rd./Newton Jct. Rd.
Advisory Task Force	July 25, 2002 Kingston Town Hall	Conceptual Improvement and Hunt Road/Newton Jct. Road
Access Management Work Study	August 7, 2002 Kingston Town Hall	Access Management/Abutters Concerns and Input
Access Management Work Study	August 12, 2002 Plaistow Public Library	Access Management/Abutters Concerns and Input
Public Information Meeting	September 5, 2002 Kingston Town Hall	Hunt Road/Newton Jct. Road

Public Officials Meeting	September 9, 2002 Plaistow Public Library	Conceptual Improvements – Plaistow Segment
PACE/Chamber of Commerce Meeting	September 17, 2002 Plaistow Public Library	Access Management
Advisory Task Force	September 26, 2002 Timberlane Regional High School, Plaistow	Conceptual Improvements and Access Management
Public Hearing	November 7, 2002 Kingston Town Hall	Hunt Road/Newton Jct. Road
Access Management Meeting	December 4, 2002 Timberlane Regional High School, Plaistow	Access Management Concepts
Access Management Meeting	December 12, 2002 Kingston Town Hall	Access Management Concepts
Advisory Task Force	January 30, 2003 Kingston Town Hall	Project Status/Miscellaneous Issues
Advisory Task Force	March 13, 2003 Plaistow Public Library	Project Status/Miscellaneous Issues
Plaistow Planning Board	April 16, 2003 Plaistow Public Library	Access Management Plan
Advisory Task Force	June 12, 2003 Kingston Town Hall	Conceptual Design and Mitigation
Public Officials Meeting	July 21, 2003 Kingston Town Hall	Conceptual Design and Access Management–Kingston Segment
Advisory Task Force	August 28, 2003 Plaistow Public Library	Hunt Road/Newton Jct. Road and Access Management
Advisory Task Force	October 9, 2003 Plaistow Public Library	Miscellaneous Issues
Public Informational Meeting	October 22, 2003 Timberlane Regional High School, Plaistow	Proposed Action
Public Informational Meeting	October 23, 2003 Sanborn Regional High School, Kingston	Proposed Action
Advisory Task Force	November 13, 2003 Kingston Town Hall	Modification to Design

Advisory Task Force	February 26, 2004 Plaistow Town Hall	Construction Contract Limits and Funding Issues
Advisory Task Force	March 25, 2004 Kingston Town Hall	Construction Contract Limits
Advisory Task Force	June 10, 2004 Kingston Town Hall	Construction Contract Limits, Maintenance Issues and Access Management
Advisory Task Force	July 8, 2004 Kingston Police Station	Construction Contract Limits, Maintenance Issues and Access Management
Advisory Task Force	February 10, 2005 Kingston Town Hall	Public Hearing Issues and Possible Design Modifications

A Public Hearing for this project was held on November 3, 2004. Details of the hearing as well as NHDOT's findings are summarized in the Report of the Commissioner provided in Appendix J.

7

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