NHDOT 16188
NH Route 106 Interim Corridor Study

Environmental Study

Appendix A

Noise Report

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NOISE REPORT

NH ROUTE 106
INTERIM CORRIDOR STUDY
STATE PROJECT NO. 16188

NOISE REPORT

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1. INTRODUCTION

This memorandum documents the results of a traffic noise analysis conducted for the following project:

State Project No. 16188 is the evaluation of Interim Alternative and update of the 1995 Concord-Laconia 10672 Environmental Assessment (1995 EA) and preliminary plans. The noise study involves the proposed project for the segment of NH Route 106 beginning at Interstate 393 in Concord, NH and running northerly approximately 10 miles to the vicinity of the north entrance of the New Hampshire Motor Speedway (NHMS) in Loudon.

The purpose of the noise study was to determine the general likelihood of noise impacts along the major segments of the corridor, rather than quantifying noise impacts at specific receptors. This was accomplished by reviewing the 1995 EA noise study and conducting a new analysis using current methods, the FHWA Traffic Noise Model (TNM 2.5), and updated traffic data and geometry. The project area is shown on Figure 1.1-1.

This analysis was prepared according to federal noise regulations, 23 CFR 772 (*Procedures for Abatement of Highway Traffic and Construction Noise*), and the New Hampshire Department of Transportation's (NHDOT) *Policy and Procedural Guidelines for the Assessment and Abatement of Highway Traffic Noise for Type I Highway Projects.* Under the guidelines, Type I projects are defined as those involving the construction of new highways and/or the alteration of existing highways (e.g., realignment, addition of travel lanes). The alternative addressed in this report is considered Type 1.

The noise analysis included the following steps, in accordance with Federal Highway Administration (FHWA) and NHDOT policy:

1. Identification of existing activities and developed lands along the proposed alignment that may be impacted by highway noise.

2. Determination of existing and future traffic noise levels at certain locations within the project area, based on the FHWA Traffic Noise Prediction Model (TNM 2.5).

3. Determination of existing and future traffic noise impacts at these locations. Impacts occur when traffic noise levels approach, within 1 decibel, or exceed the FHWA Noise Abatement Criteria (67 dB for residential land use), or when the predicted future traffic noise levels exceed the existing noise levels by 15 decibels or more.

4. Determination of approximate noise contours along the major segments of NH Route 106 by extrapolating from modeled noise levels.

2. PROCEDURES AND ASSUMPTIONS

2.1 CRITERIA FOR DETERMINING IMPACTS

Traffic Noise Terminology - Traffic noise levels are expressed in terms of the A-weighted sound level in decibels (dBA). The A-weighting scale approximates the frequency response of the human ear. Generally, when sound levels exceed the mid-60 dBA range, an outdoor conversation with a person approximately one meter (three feet) away becomes difficult to hear. A 10-decibel increase in sound levels is typically judged by the listener to be twice as loud as the original sound. Conversely, a 10-decibel reduction is typically perceived as half as loud. A doubling of traffic volumes will increase the sound level by approximately 3 dB, which is considered to be the smallest change to the A-weighted sound level that people, without specifically listening for a change, can notice.

Because most environmental noise fluctuates from moment to moment, it is customary to condense sound-level data from measurement periods into a single level called the equivalent sound level (L_{eq}). The L_{eq} is the value of a steady sound level that contains the same amount of energy as the actual time-varying sound evaluated over the same period. Typically, the A-weighted L_{eq} for traffic-noise analysis is evaluated during a one-hour period when the traffic volume is at a daily high. The notation for this is L_{Aeq1h}.

The term insertion loss (IL) is used to describe the reduction in the L_{eq} at a location after the construction of a noise barrier. For example, if a new noise barrier reduced the L_{eq} at a residence from 75dBA to 65 dBA, the insertion loss would be 10 dBA.

Noise Abatement Criteria (NAC) and Determination of Impact - 23 CFR 772 identifies Noise Abatement Criteria (NAC) for various land uses (See Table 2.1). The NAC defines thresholds which, when approached or exceeded, indicate when noise abatement must be considered. By NHDOT policy, "approach" is defined as within 1 dBA of the NAC. Thus, impacts were determined to occur at properties where exterior sound levels were 66 dBA or higher for Activity Category B, and 71 dBA or higher for Activity Category C.

Noise impacts also occur, and consideration of abatement measures is also required, when the predicted future traffic noise is substantially higher than the existing noise levels. NHDOT policy defines "substantial" as an increase of 15 dB or more.

In determining traffic noise impacts and abatement measures, the primary consideration is given to exterior areas where a lowered noise level will be beneficial to "frequent human use" areas. Areas of "frequent human use" in residential areas are evidenced by the presence of patio furniture, picnic equipment, play equipment, gardens, etc. An entire residential lot is not necessarily defined as an area of "frequent human use"; only part of the property may be so defined. Locations where "lowered noise levels

will be beneficial" do not normally include areas such as parking lots, athletic fields, or farm property (other than the house lot). Field reviews are conducted to identify areas where frequent human use areas occur and a lowered noise level would be of benefit.

TABLE 2.1. NOISE ABATEMENT CRITERIA

Activity Category	L_{Aeq1h}*	Description of Activity
A	57 (Ext.)	Land 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 purpose.
B	67 (Ext.)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Ext.)	Developed lands, properties, or activities not included in Categories A and B above.
D	No Criteria (Ext.)	Undeveloped Lands
E	52 (Int.)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

* Hourly A-weighted sound level in decibels (dBA).
Note: Ext. = Exterior; Int. = Interior.

2.2 EXISTING LAND USE

Existing land use in the project area was identified by reviewing maps and aerial photography and conducting field investigations. Land use for the project area is mixed residential, commercial, and recreational.

2.3 TRAFFIC ANALYSIS

The noise analysis uses peak traffic volumes, when traffic volumes are at or near their highest levels, to determine noise levels in the project area. Traffic is broken down to autos/light trucks, medium trucks, and heavy trucks.

2.4 PREDICTION OF NOISE LEVELS

The Federal Highway Administration's (FHWA) traffic noise prediction model, TNM 2.5, was used to predict traffic noise levels expected to occur with implementation of the proposed project. Peak-hour traffic projections were developed for the 2015 Base Year and Design Year (2035) conditions, for both the No Build and Build Alternative, including vehicle-mix information.

The year 2015 peak hour traffic volumes were then used, with the existing roadway configuration, to establish a baseline L_{Aeq1h}. Year 2035 (Design Year) noise levels for the Build conditions were then predicted using the model. The predicted Year 2035 noise levels were compared to the Noise Abatement Criteria and the baseline L_{Aeq1h} to determine the noise impacts associated with the project.

2.5 NOISE IMPACT ANALYSIS

Noise levels in the project area were evaluated in accordance with the noise impact analysis methodology described above. The existing and predicted noise levels were then compared to the appropriate Noise Abatement Criteria. Noise contours were generated to determine typical noise levels along major segments of the roadway, and therefore which areas and receptors may be impacted (Figures 5.5-1 – 5.5-10, Noise Contour Lines). The regulatory 66dB noise level was used for contour lines. Because of the variable topography of NH Route 106, it was not possible within the scope of this study to generate accurate noise contours at each receptor. Instead, noise levels were averaged over long segments of roadway in order to indicate broad areas of potential impact or lack of impact. To determine noise impacts (or evaluate abatement measures) at specific locations it will be necessary to model topography at each location. Areas warranting further noise study are identified in the results below.

2.6 ABATEMENT ANALYSIS

The FHWA's regulations contained in 23 CFR 772 require the consideration of the following abatement measures for all areas where traffic noise impacts will occur.

1. Traffic management measures (e.g., traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations).

2. Alteration of horizontal and vertical alignments.

3. Construction of noise barriers.

4. Acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development which will be adversely impacted by traffic noise.

5. Noise insulation of publicly owned school buildings.

2.7 CONSIDERATION OF ABATEMENT ALTERNATIVES

If noise impacts are identified for a Noise Analysis Location, noise abatement measures are considered. 23 CFR Part 772 requires that after an impact has been identified: 1) every reasonable effort be made to obtain substantial noise reductions; 2) abatement measures be reasonable and feasible; and 3) views of impacted residents be a major consideration in reaching a decision on the abatement measures.

NHDOT defines a substantial noise reduction as 10 dBA, with 5 dBA being the minimum acceptable reduction allowed at the greatest benefited property for abatement to be considered acoustically effective. Reasonableness is based primarily on cost, and in New Hampshire it is evaluated based on a cost per protected residence. To be considered as a benefit, a residence must receive a minimum 5 dBA reduction in the future noise level with the noise abatement measure in place. Where noise barriers are investigated for providing noise abatement, the total construction cost of the most cost effective and acoustically effective barrier is divided by the number of residences that it protects. The cost per protected residence should be $30,000 or less in order to be considered as cost effective. Constructability and the compatibility of the abatement measures with other highway or environmental elements are also considered. Costs are calculated using an average cost of $20/sf. In the final stages, if abatement is found to be both feasible and reasonable, the views of the impacted residents will aid in determining whether or not abatement measures will be provided and/or what aesthetic qualities would be preferred. The appropriateness of abatement alternatives requiring consideration on this project is discussed below.

The general feasibility of abatement measures requiring consideration on this project is discussed below.

Traffic Management Measures - Potential Traffic Management Measures could include the following:

- Prohibiting noisier vehicle types, such as heavy trucks, from using certain roadways.
- Restricting noisier vehicle types from using certain roadways during noise-sensitive hours.
- Reducing speed limits.

The traffic management techniques listed above are not practical for this project, because Route 106 is a major state highway and truck route connecting the surrounding communities. Medium and heavy trucks are dependent on these routes for deliveries and shipments.

Alteration of horizontal and vertical alignments – The objective of the project is to make improvements to the existing highway corridor and intersections to improve traffic flow. The existing development along the highway corridor imposes constraints to the consideration of additional alternatives.

Therefore, any further alterations to the alignments are impractical.

Construction of Noise Barriers - Barrier construction is addressed in Section 3 below.

Acquisition of real property or interests therein to serve as a buffer zone to separate development that will be adversely impacted by traffic noise - No specific areas have been identified in the project limits where consideration of this mitigation measure will be effective or warranted.

Noise insulation of public-use or nonprofit institutional structures - Under NHDOT guidelines, the only structures in this category eligible for State funding are public schools. There are no schools located within the project area.

3. RESULTS

Noise receptors were modeled along the NH Route 106 highway corridor at first, second and third row locations. The existing 2015 projected sound levels produced a 66dB contour approximately 95 feet from the project horizontal control line (HCL) from Interstate 393 north to Route 129 (Figures 5.5-1 – 5.5-3). From Route 129 north to the NHMS the 66dB contour is approximately 100 feet from the HCL (Figures 5.5-4 – 5.5-10). The horizontal control line is an established survey line that more or less follows the centerline of the proposed highway plans.

The Proposed Action's 2035 projected sound levels produced a 66dB contour approximately 105 feet from the project horizontal control line (HCL) from Interstate 393 north to Route 129. From Route 129 north to the NHMS the 66dB contour is approximately 110 feet from the HCL.

There are relatively few receptors that fall within the 66dB contour due to topography and distance from the highway. Most receptors along Route 106 have driveway access directly onto the highway. This would make it very difficult to construct a barrier long enough to substantially reduce noise levels at impacted receptors. The low density of receptors within the project would also increase the cost of the barriers, so that the maximum $30,000 per benefited residence criterion would likely be exceeded. Therefore, it is unlikely that noise abatement would be feasible or reasonable for this project. Nevertheless, in order to conclusively determine which receptors are impacted by noise and whether noise abatement measures are feasible or reasonable, more detailed noise analysis will be necessary at receptors which are within or very near the 66dB noise contour line. Further analysis is recommended for the locations listed in Table 3.1.

Table 3.1. Recommended Future Noise Analysis Locations

Station	Description
1151+00 Left	Haines Road residence
1227+00 Left	NH Route 106 residence
1241+00 to 1256+00 Left	NH Route 106 residences
1414+00 to 1430+00 Left	North Village Road residences
1440+00 Left	Clough Pond Road residence
1447+00 to 1462+00 Right	NH Route 106 residences and business near Soucook Lane
1465+00 to 1480+00 Left and Right	Mobile home park, residences and businesses near Shaker Road
1525+00 to 1530+00 Left	NH Route 106 residences near Mudgett Hill Road
1535+00 Right	Apartment buildings on NH Route 106
1570+00 to 1586 Left and Right	Various buildings on NH Route 106
1606+00 Left	Residence on NH Route 106 across from main NHMS entrance
1694+50 Right	Residence on NH Route 106 near Shaw Road

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Appendix B

Stream Crossing Summary Report

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Stream Crossing Summary Report

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March 2012

Introduction

The corridor includes several stream crossings and cross culverts. The table below summarizes the stream crossings that would be regulated under the New Hampshire Stream Crossing Rules (Env-Wt 900). Other crossings along the corridor are not listed either because they are culverts carrying road drainage or equalization culverts between wetlands on either side of the road with no apparent stream channel. Culverts that had an apparent stream channel on one or both sides of the roadway are included in the list. Culverts listed are depicted on Figure 5.7-2.

Regulatory Review

The NH Wetland Rules (Env-Wt Chapter 900) have provisions for repairing and rehabilitating existing bridges and culverts. Under the rules, crossings are dividing into three tiers:

Tier 1 – under 200 acre watershed
Tier 2 – 200-640 acre watershed
Tier 3 – over 640 acres (or other criteria, as described below.

<u>Tier 1 crossings</u>
Any new, replacement, repair or extension must meet the General Design Considerations in the rules, which are as follows:

*Env-Wt 904.01 General Design Considerations**.***

All stream crossings shall be designed and constructed so as to:
- *(a) Not be a barrier to sediment transport;*
- *(b) Prevent the restriction of high flows and maintain existing low flows;*
- *(c) Not obstruct or otherwise substantially disrupt the movement of aquatic life indigenous to the waterbody beyond the actual duration of construction;*
- *(d) Not cause an increase in the frequency of flooding or overtopping of banks;*
- *(e) Preserve watercourse connectivity where it currently exists;*
- *(f) Restore watercourse connectivity where:*
  - *(1) Connectivity previously was disrupted as a result of human activity(ies); and*
  - *(2) Restoration of connectivity will benefit aquatic life upstream or downstream of the crossing,*
  - *or both;*
- *(g) Not cause erosion, aggradation, or scouring upstream or downstream of the crossing; and*
- *(h) Not cause water quality degradation.*

Stream Crossing Summary

Name	ID	Station	Landmark	Watershed Size (acres)	Tier	Substrate	Structure	Proposed Wetland/ Waterway Impacts (sq. feet)
Unnamed	1	1157	south of Bartlett Farm	65	1	cobble	18”RCP*	29
Unnamed	2	1160	south of Bartlett Farm	276	2	cobble - gravel	48" RCP	575
Unnamed	3	1193	at Concord/Loudon town line	357	2	cobble	18" RCP	8,574
Soucook River (south)	4	1267	north of Wales Bridge Road intersection	38,578	3	sand	Bridge #056/063	407
Soucook River (north)	5	1339	just north of NH Route 129 intersection	36,150	3	gravel	Bridge #074/086	18,144 (includes backwater north of crossing
Unnamed	6	1396	south of Currier Road intersection	524	2	gravel	42" RCP	1,274
Shaker Brook	7	1445	just north of Clough Pond Road intersection	9,720	3	cobble - gravel	Bridge #100/114	583
Unnamed	8	1506	north of country club entrance	25	1	boulders - cobble	12" RCP	3,475
Gues Meadow Brook (south)	9	1556	at south NHMS entrance	2,819	3	cobble	Bridge #137/132 (two 72"RCP)	14,271
Gues Meadow Brook (middle)	10	1568	north of south NHMS entrance	2,568	3	cobble	Two 72" RCP (no bridge no.)	7,394
Unnamed	11	1597	south of main NHMS entrance	311	2	gravel	18" RCP	1,965
Gues Meadow Brook (north)	12	1625	directly next to NHMS	1634	3	cobble	Bridge #227/122 (6' x 10' 3 sided box)	1,481
Unnamed	13	1687	north of north NHMS entrance	26	1	bedrock - cobble	24" RCP	274
Rocky Pond Outlet	14	1719	northern limit of project	5,106	3	bedrock - cobble	Bridge #236/156 (20’ wide slab bridge)	0

*RCP = Reinforced Concrete Pipe

Tier 1 structures must also:

(2) Be sized so as to accommodate the greater of:
a. The 50-year frequency flood; or
b. Applicable federal, state, or local requirements; and

(3) Be a span structure, pipe arch, open-bottom culvert, or closed-bottom culvert, with or without being embedded with stream simulation.

Mitigation is not required for Tier 1 crossings (unless required for some other reason in the rules).

Tier 2 Crossings - 200-640 acres

Repair or Rehabilitation
Existing legal Tier 2 crossings can be rehabilitated or repaired if there is no history of flooding. Culverts can be sliplined, but only once. To qualify as a minimum impact permit, the repair must

(1) Meet the general criteria specified in Env-Wt 904.01;
(2) Not diminish the hydraulic capacity of the crossing; and
(3) Not diminish the capacity of the crossing to accommodate aquatic life passage.

If these criteria can't be met, the crossing can be repaired as a minor impact permit if the repair will:

(1) Not adversely impact the stability of the stream banks or stream bed upstream or downstream of the crossing; and
(2) Not cause an increase in the frequency of flooding or overtopping of banks.

New Tier 2 Crossings (including culvert extensions)
New Tier 2 crossings must be designed and constructed under the following criteria:

Env-Wt 904.05 Design Criteria for Tier 2 and Tier 3 Stream Crossings

(a) In accordance with the NH Stream Crossing Guidelines, University of New Hampshire, May 2009, which can be downloaded for free at http://www.unh.edu/erg/stream_restoration/;
(b) With the bed forms and streambed characteristics necessary to cause water depths and velocities within the crossing structure at a variety of flows to be comparable to those found in the natural channel upstream and downstream of the stream crossing;
(c) To provide a vegetated bank on both sides of the watercourse to allow for wildlife passage;
(d) To preserve the natural alignment and gradient of the stream channel, so as to accommodate natural flow regimes and the functioning of the natural floodplain;

(e) To accommodate the 100-year frequency flood, to ensure that:
(1) There is no increase in flood stages on abutting properties; and
(2) Flow and sediment transport characteristics will not be affected in a manner which could adversely affect channel stability;
(f) To simulate a natural stream channel; and
(g) So as not to alter sediment transport competence.

The UNH stream crossing guidelines include general considerations for structure type, slope, embedding, and other characteristics. It also provides guidance for field survey data collection including measuring bankfull width, doing pebble counts to determine bedload capacity, and other data collection. Because most culvert extensions on Tier 2 streams will not be in compliance with the Stream Crossing Guidelines, they must be permitted under:

904.09 Alternative Designs.

To use the Alternative Design option, the applicant must submit the following:

A technical report prepared by an environmental scientist or professional engineer that clearly explains how the proposed alternative meets the criteria for approval specified in (c) or (d), below, as applicable.

The report must show that meeting all the requirements is not practicable, and that the design meets the General Design Considerations in Env-Wt 904.01, and meets the Specific Design Criteria in Env-Wt 904.05 as closely as possible.

Tier 3 Crossings > 640 acres

There are other criteria besides watershed size that elevate a crossing up to a Tier 3, as follows:

904.04 Tier 3 Stream Crossings
(1) On a watercourse where the contributing watershed is 640 acres or greater;
(2) Within a designated river corridor;
(3) On a watercourse that is listed on the surface water assessment 305(b) report in effect at the time of application as not attaining surface water quality standards for aquatic life based on one or more of the following:
a. Benthic macroinvertebrate index of biological integrity;
b. Fish assemblage index of biological integrity;
c. Habitat assessment; or
d. Stream channel stability;
(4) Within a 100-year flood plain or fluvial erosion hazard zone;
(5) In a jurisdictional area having any protected species or habitat; or

(6) In or within 100 feet of a wetland that has been designated by a municipality as a prime wetland pursuant to RSA 482-A:15, unless a waiver has been granted pursuant to RSA 482-A:11, IV(b).

There are no rules for repair or rehabilitation of Tier 3 crossings. Presently, DES's guidance to applicants has been to use the rules for replacement when repairing or rehabilitating tier 3 crossings. Tier 3 replacements (or repairs or extensions) must meet all the Tier 2 requirements, plus:

Env-Wt 904.08 Replacing Tier 3 Existing Legal Stream Crossings
(a) As part of an application for replacing an existing legal crossing that would be classified as a tier 3 stream crossing under Env-Wt 904.04(a), the applicant shall provide an assessment of the geomorphic compatibility of the existing stream crossing based on the NH Stream Crossing Guidelines.

(b) A replacement tier 3 stream crossing shall comply with the specific design criteria in Env-Wt 904.05, unless a request for an alternative design is submitted and approved as specified in Env-Wt 904.09.
The Alternative Design option is the same as described above under Tier 2 streams. As such, any modification or rehabilitation (e.g., sliplining) for a Tier 3 crossing requires a geomorphic compatibility assessment.

A discussion of each stream crossing within the study corridor follows.

Crossing 1 – Unnamed Stream

Crossing 1, Downstream End

ID	1
Name	Unnamed
Description	18" RCP
Station	1157
Landmark	south of Bartlett Farm
Substrate	gravel
Bankfull Width	10.8
Bankfull Depth	0.75
Width / Depth Ratio	14
Channel Slope	0.03
Flood Prone Area (width)	17
Watershed Size (Acres)	65
Tier	1
Rosgen	B1a
Stream Order	1
Impairment	none

Crossing 1 carries a stream channel west to east under Route 106. The stream has a 65 acre watershed, and is presumably intermittent. The stream is a Tier 1, so there is no requirement under the New Hampshire Stream Rules to adhere to the Stream Crossing Guidelines – however, to comply with the guidelines, a new crossing at this location would be 13 feet wide.

Crossing 1, View Downstream

Crossing 2 – Unnamed Stream

ID	2
Name	**Unnamed**
Description	48" RCP
Station	1160
Landmark	south of Bartlett Farm
Substrate	cobble - gravel
Bankfull Width	6’
Bankfull Depth	0. 5
Width / Depth Ratio	12
Channel Slope	0.04
Flood Prone Area (width)	17’
Watershed Size (Acres)	212
Tier	2
Rosgen	B1a
Stream Order	2
Impairment	None identified

Crossing 2 Outlet

Crossing 2, View Upstream at Outlet End

Crossing 2 carries an unnamed 2nd order stream channel, flowing west to east, with a 212 acre watershed. There are no impairments listed for this stream in the 2010 303(d) list. The culvert is undersized; under the NH Stream Crossing Rules, a new crossing at this location would require an 18-foot wide crossing. Additionally, the downstream end of the culvert is perched, inhibiting aquatic organism passage, and a scour pool has developed at the outlet. The upsteam end of the stream was realigned parallel to the highway. Brook trout were observed in this stream in September, in the scour pool. The stream flows into the Soucook River at a point approximately 650 feet downstream of the culvert. Under the New Hampshire Stream Rules, this is a Tier 2 stream, so any extension of this culvert would qualify as a new Tier 2 crossing, and would need to comply with the requirements of 904.01 and 904.05. Because it would not be in accordance with the stream crossing guidelines, a culvert extension would have to be permitted as an alternative design, and a technical report would have to be prepared.

Crossing 3 – Unnamed Stream

ID	3
Name	**Unnamed**
Description	48" RCP
Station	1193
Landmark	at Concord/Loudon town line
Substrate	cobble
Bankfull Width	8
Bankfull Depth	1
Width / Depth Ratio	8
Channel Slope	0.03
Flood Prone Area (width)	25
Watershed Size (Acres)	357
Tier	2
Rosgen	E3b
Stream Order	2
Impairment	None identified

Crossing 3, Outlet

Crossing 3 carries an unnamed Tier 2 stream, likely perennial, with a 357-acre watershed from west to east under NH Route 106. Under the New Hampshire Stream Crossing Rules, the crossing should be 10 feet wide. A large scour hole has developed at the outlet, measuring 20 feet long by 8 feet wide. The stream flows south into a forested wetland, and then east into the Soucook River approximately 2,200 feet from the crossing. The stream is not identified in the NHDES Assessment Unit mapping or in the New Hampshire hydrography mapping, so there are no impairments listed for this stream. As with Crossing 2, as a Tier 2 crossing, any culvert extension would have to be permitted as an alternative design.

Crossing 3 Downstream End, View Upstream

Crossing 4 – Soucook River (South)

Bridge #056/063, View East (Downstream)

ID	4
Name	**Soucook River (south)**
Description	Bridge #056/063 - 3 span structure
Station	1267
Landmark	North of Wales Bridge Road intersection
Substrate	sand
Bankfull Width	70’
Bankfull Depth	8
Width / Depth Ratio	9
Channel Slope	0.003
Flood Prone Area (width)	800’
Watershed Size (Acres)	38,578
Tier	3
Rosgen	E5
Stream Order	4
Impairment	None Identified

Crossing 4 is the southern Soucook River crossing in the project corridor. The river has a 38,578 acre watershed. The river is a 4th order perennial stream subject to both the NH Dredge and Fill Wetlands regulations and the Shoreland Water Quality Protection Act (SWQPA).

The river flows under another bridge (Wales Bridge) directly upstream of the Route 106 bridge. Between the two bridges the river meanders sharply to the north, and then meanders back to the east and under Route 106. The southeast bank of the river approaching the bridge has been armored, as has the western bank on the north side of the river.

Any extension or replacement of the bridge would have to comply with the Tier 3 Stream regulations. Using 1.2 times bankfull width as a guide, a replacement bridge at this location would have to span at least 84 feet to comply with the regulations. A smaller bridge extension would have to be permitted under alternative design.

Crossing 5 – Soucook River (North)

Crossing 5, View Northeast

ID	5
Name	**Soucook River (north)**
Description	bridge structure #074/086
Station	1339
Landmark	Just north of Fox Pond plaza and Route 129
Substrate	gravel
Bankfull Width	90
Bankfull Depth	8
Width / Depth Ratio	11
Channel Slope	0.003
Flood Prone Area (width)	700
Watershed Size (Acres)	36,150
Tier	3
Rosgen	E5
Stream Order	4
Impairment	None Identified

This bridge is the northern crossing of the Soucook River in the corridor. The river has a watershed measuring 36,150 acres and is a fourth order stream, subject to SWQPA.

A second inactive channel, or meander scar, lies just north of the bridge. Part of this channel was filled and a secondary channel was constructed on the east side of the bridge to provide an outlet for this channel. Widening of the roadway north of the bridge is proposed to affect this channel, unless sideslopes were steepened further.

Crossing 5, View Downstream

Any replacement or extension of this bridge would have to comply with the Tier 3 stream crossing rules, and a replacement bridge would have to span 108 feet (1.2 x 90 feet) to comply with the rules.

A footpath on the south side of the bridge provides recreational access as well as a path for terrestrial wildlife species. There is forested habitat on both sides of the bridge.

Crossing 6 - Unnamed Stream

ID	6
Name	**Unnamed**
Description	42" rcp
Station	1269
Landmark	south of Currier Road intersection
Substrate	gravel
Bankfull Width	15
Bankfull Depth	1.3
Width / Depth Ratio	12
Channel Slope	0.005
Flood Prone Area (width)	34
Watershed Size (Acres)	524
Tier	2
Rosgen	C4
Stream Order	1
Impairment	None Identified

Crossing 6 Outlet

Crossing 6 carries a first order stream west to east under US Route 106. The stream is not identified in the New Hampshire hydrography layer, so no impairments are identified. It is likely a perennial stream, although the upstream end flows from a forested wetland. The stream flows south and east to the Soucook River approximately 0.5 miles downstream. The culvert is undersized under the NH Stream regulations, and a replacement bridge at this location would span 18 feet to be in compliance.

Crossing 6, view downstream

Crossing 7 - Shaker Brook

Shaker Brook, looking downstream

The Shaker Brook is a 3rd order stream with a watershed of 9,720 acres, all to the west of Route 106. The existing bridge is undersized, and a replacement bridge at this location would have to be 35 feet wide to accommodate the Tier 3 stream rules. A sand bar has developed in the northerly chamber of the bridge, which provides access for terrestrial wildlife crossing under the bridge. The stream flows into the Soucook River directly downstream of the bridge. This stream segment is impaired by E. coli, aluminum, benthic macroinvertebrate bioassessment and habitat assessment.

ID	7
Name	**Shaker Brook**
Description	Bridge #100/114
Station	1445
Landmark	North of Clough Pond Road intersection
Substrate	cobble - gravel
Bankfull Width	29
Bankfull Depth	1.7
Width / Depth Ratio	17
Channel Slope	0.004
Flood Prone Area (width)	300
Watershed Size (Acres)	9,720
Tier	3
Rosgen	C4
Stream Order	3
Impairment	E. coli, Habitat Assessment, Benthic macro-invertebrates, Aluminum

Crossing 8 - Unnamed Stream

Crossing 8 outlet

ID	8
Name	**Unnamed**
Description	12" rcp
Station	1506
Landmark	north of country club entrance
Substrate	boulders - cobble
Bankfull Width	10.5
Bankfull Depth	0.9
Width / Depth Ratio	12
Channel Slope	0.03
Flood Prone Area (width)	16.5
Watershed Size (Acres)	25
Tier	1
Rosgen	B3
Stream Order	1
Impairment	None Identified

Crossing 8 carries a first order intermittent stream west to east under Route 106. The stream channel is undefined on the upstream end, but follows a defined channel on the downstream side. As a Tier 1 crossing, there is no requirement to adhere to the NH Stream Crossing Rules for replacements or extensions, but an appropriately sized crossing at this location would be 13 feet wide. The culvert is undersized, and a large scour hole has developed at the outlet. The outlet is perched, creating a barrier for aquatic organism passage.

Crossing 9 – Gues Meadow Brook (South)

Crossing 9 outlet

Crossing 9 is the southernmost of three Gues Meadow crossings. The brook is a 2nd order stream with a 2,819 acre watershed and the crossing is a Tier 3. Under the stream crossing rules, the crossing is undersized, and a replacement crossing would have to span 24 feet. A large scour hole has developed at the culvert outlet, measuring approximately 50' x 30', and at least 4' deep. The stream is impaired for E. coli, pH, habitat assessment, and macroinvertebrate bioassessments. An appropriately sized crossing at this location would be at least 22 feet wide.

ID	9
Name	**Gues Meadow Brook (south)**
Description	Two 72" rcps
Station	1556
Landmark	at south NHMS entrance
Substrate	cobble
Bankfull Width	18
Bankfull Depth	1.3
Width / Depth Ratio	14
Channel Slope	0.009
Flood Prone Area (width)	180
Watershed Size (Acres)	2,819
Tier	3
Rosgen	C3
Stream Order	2
Impairment	E. coli, pH, Habitat Assessment, Benthic macro-invertebrates bioassessments

Crossing 10 – Gues Meadow Brook (Middle)

Crossing 10, downstream

Crossing 10, upstream

ID	10
Name	**Gues Meadow Brook (middle)**
Description	Two 72" RCPs
Station	1568
Landmark	north of Chinese restaurant
Substrate	cobble
Bankfull Width	52
Bankfull Depth	2.5
Width / Depth Ratio	21
Channel Slope	0.009
Flood Prone Area (width)	69.5
Watershed Size (Acres)	2,568
Tier	3
Rosgen	F3
Stream Order	2
Impairment	E. coli, pH, Habitat Assessment, Benthic macro-invertebrates bioassessments

The middle crossing of Gues Meadow has two 72" pipes, and is a Tier 3, 2nd order stream. The crossing is undersized, and a replacement culvert would have to span 62 feet in order to accommodate the Stream Crossing Rules. The stream broadens on both the upstream and downstream sides to a scrub shrub swamp.

Crossing 11 – Unnamed Stream

Crossing 11, Downstream Side, East Side of 106

Crossing 11 carries a Tier 2 perennial stream under Route 106 from west to east. A replacement crossing at this location would be 9 feet wide. This stream is more narrow and confined on the upstream side, where it flows down a steep hillside.

ID	11
Name	**Unnamed**
Description	48" rcp
Station	1597
Landmark	south of main NHMS entrance
Substrate	gravel
Bankfull Width	6.6
Bankfull Depth	0.8
Width / Depth Ratio	8
Channel Slope	0.03
Flood Prone Area (width)	75
Watershed Size (Acres)	311
Tier	2
Rosgen	E3b
Stream Order	1
Impairment	None Identified

Crossing 12 – Gues Meadow Brook (North)

Crossing 12, west side Route 106 looking east

Culvert carrying Gues Meadow Brook under race track at New Hampshire Motor Speedway, downstream of Crossing 12.

ID	12
Name	**Gues Meadow Brook (north)**
Description	6' x 10' 3 sided box
Station	1625
Landmark	Directly next to NHMS
Substrate	cobble
Bankfull Width	11.5
Bankfull Depth	0.9
Width / Depth Ratio	13
Channel Slope	0.02
Flood Prone Area (width)	24.1
Watershed Size (Acres)	1,634
Tier	3
Rosgen	B3
Stream Order	2
Impairment	E. coli, pH, Benthic macroinvertebrates bioassessments

This is the northern of the three crossings of Gues Meadow Brook. Under the stream rules, this Tier 3 crossing should be 14' wide. Thirty-five feet downstream of the 106 crossing, the stream flows under the track for a distance of approximately a half mile before emerging at the south side of the track. The stream is impaired for E. coli, pH, and benthic macroinvertebrate bioassessments.

Crossing 13 – Unnamed Stream

Crossing 13, Upstream End

Wetland Downstream of Crossing 13

ID	13
Name	**Unnamed**
Description	24" rcp
Station	1687
Landmark	north of north NHMS entrance
Substrate	bedrock - cobble
Bankfull Width	4.5
Bankfull Depth	1.2
Width / Depth Ratio	4
Channel Slope	0.09
Flood Prone Area (width)	6.5
Watershed Size (Acres)	26
Tier	
Rosgen	A1 - A3
Stream Order	1
Impairment	None Identified

This stream is a steep incised channel on the upstream (western) side of 106, flowing into a broad wetland on the downstream side. While the culvert is undersized, his stream has a small watershed and likely flows intermittently.

Crossing 14 – Rocky Pond Outlet

This stream crossing, at the north end of the study corridor, forms the border between Canterbury and Loudon. This is a Tier 3 stream with a watershed of 5,106 acres. There are no impacts proposed for this crossing, but if it were to be replaced, the crossing would have to be 34 feet wide to meet the stream crossing requirements.

ID	14
Name	**Rocky Pond Outlet**
Description	20' wide concrete slab on abutments
Station	1719
Landmark	northern limit of project
Substrate	bedrock - cobble
Bankfull Width	28
Bankfull Depth	0.7
Width / Depth Ratio	40
Channel Slope	0.03
Flood Prone Area (width)	44.7
Watershed Size (Acres)	5,106
Tier	3
Rosgen	C1b
Stream Order	1
Impairment	None Identified

Crossing 14, Rocky Pond Outlet Stream, View Downstream

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NHDOT 16188
NH Route 106 Interim Corridor Study

Environmental Study

Appendix C

Resource Agency Correspondence and Minutes

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BUREAU OF ENVIRONMENT
CONFERENCE REPORT

SUBJECT: NHDOT Monthly Natural Resource Agency Coordination Meeting
DATE OF CONFERENCE: December 21, 2011
LOCATION OF CONFERENCE: John O. Morton Building
ATTENDED BY:

NHDOT
Kevin Nyhan
Christine Perron
Marc Laurin
Bob Landry
Mike Dugas
David Scott
Darrel Elliott
Bob Juliano
Bill Saffian
Tim Mallette
Kevin Russell
Wayne Roswell
Carol Niewola

FHWA
Jamie Sikora

EPA
Mark Kern

USFWS
Maria Tur

NHDES
Gino Infascelli
Lori Sommer

National Marine Fisheries Service
Mike Johnson
David Bean (via conf call)

NH Fish and Game
Carol Henderson

Central NH RPC
Mike Tardiff
Nik Coates

HNTB
Kevin Slattery
Jim Fisher

Archer Western
Brent Mawdsley
Stephen DelGrosso

McFarland-Johnson
Darren Benoit
Vicki Chase
Jeff Santacruce
Jed Merrow

FST
Steve Riesland
Dave McNamara

Smart Associates
Jennifer Riordan

Draft

(When viewing these minutes online, click on an attendee to send an e-mail)

PRESENTATIONS/ PROJECTS REVIEWED THIS MONTH:
(minutes on subsequent pages)

Finalization of November Meeting Minutes....2
Portsmouth-Kittery, A000(911), 13678F....2
Plymouth, X-A001(161), 15882A....4
Conway, X-A001(161), 15864....4
Loudon, 16188 (non-Federal)....5
Hampstead, 16420 (non-Federal)....7
Mt. Washington Regional Airport, SBG 17-08-2010....7

(When viewing these minutes online, click on a project to zoom to the minutes for that project)

absence of stream features such as riffles and pools. G. Infascelli asked what the toe-of-slope to toe-of-slope distance was under the bridge. It is approximately 45'.

Lori Sommer asked if there would be any work on the slope. Bill Saffian responded that there would be some disturbance. L. Sommer then asked if there would be a terrace for land based wildlife to cross under the roadway. K. Nyhan responded that the Department would look into it, but generally speaking it could be incorporated. Currently at low flows there is some dry ground under the bridge on either side of the watercourse.

G. Infascelli indicated that it appears that with the 105' long bridge, the structure may have room to move back or modify the embankment to meet the requirement for a structure to be 1.2 x bankfull width, plus 2'.

K. Nyhan indicated that the Department would present the project again once additional information is gathered on the proposed replacement structure.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

Loudon, 16188 (non-Federal)

The purpose of this presentation was to re-introduce resource agency staff to the project, update them on its status, describe the approach and likely impacts, and get agency feedback. McFarland Johnson staff gave a brief history of the project starting with the 1994 Public Hearing and 1995 Environmental Assessment and ending with the current corridor study. The 1995 EA, based on traffic growth trends and anticipated future growth, had proposed an ultimate typical section of four lanes with a wide median, resulting in a total paved width of 92'. A reevaluation of how traffic has actually grown in the intervening years has concluded that volumes are less than had been anticipated in the 1995 EA, and that the 1995 ultimate typical section is not warranted for the foreseeable future. An interim typical section that would retain the existing two through lanes and widen the highway for 12' shoulders and a 16' median lane is now proposed and would provide operational and safety benefits. The current footprint of the project was created by superimposing the proposed 3-lane cross section (64 foot width of pavement) onto the existing horizontal and vertical alignment of Route 106. McFarland Johnson (MJ) explained that there are three areas where the proposed alignment would deviate from the existing alignment in order to reduce the impacts to environmental or cultural resources. These resources are the Soucook River (near Wales Bridge Road), Shaker Brook and the Lovering Mill Site (near Clough Pond Road), and an unnamed pond adjacent to Clough Hill Road. The key resource issues associated with this project are wetlands, stream crossings, wildlife habitat, and water quality.

MJ indicated that the project would impact approximately 5 acres of wetlands of which 0.5 acre is stream and river areas and 0.4 acre is vernal pools. The total amount of impacts may change as the stream crossings and BMPs are further analyzed. The impacts to the vernal pools consist of two or three areas, with the biggest impact to one pool that is parallel to the roadway.

MJ indicated that as part of this project they are looking at the corridor to identify potential wetland mitigation sites, but that there will be neither final decisions on locations nor any design of the sites as part of the current phase of the design. This area has several gravel pits that could be potential mitigation sites; however, most of them are still in active use.

MJ gave an overview of the stream crossings, noting that there are six Tier 3 crossings, four Tier 2 crossings, and three Tier 1 crossings within the corridor. MJ went on to further discuss the Tier 3 crossings with photographs and plans and suggested that the improvement of some of these crossings could be part of the wetland mitigation for the project.

Draft

MJ presented a Habitat Connectivity Plan that was created from Wildlife Action Plan mapping. This plan depicts the existing habitats and identifies areas that have particular value for maintaining habitat connectivity. These findings may be combined with the stream crossing analysis to identify crossings that warrant improvement, possibly as part of wetland mitigation. Also, several rare species are on record within the corridor including Blanding's turtles, wood turtles, and brook floater mussels. In addition, MJ encountered one rare plant species within the corridor, small whorled pogonia, which is outside the expected project impact area. Although the project will probably not impact these rare species or their habitats, some special considerations may be required in areas where ponds (Blanding's turtle habitat) are adjacent to the roadway.

MJ explained that there are several impaired waterways within the corridor, including impairments for pH, E. coli, and aluminum, but of these only aluminum is normally associated with roadway runoff.

MJ explained that the corridor contains a number of existing closed drainage systems and ditches or swales to convey runoff, but that there are no existing water quality treatment BMPs within the corridor. The proposed improvements would result in the creation of approximately 22 acres of new impervious area, and the current recommendation is to treat a minimum of 22 acres of impervious area using BMPs (most likely gravel wetlands), preferably at the existing closed system outlets.

MJ explained that waterways were tested for chloride concentrations in the late summer, and the results indicate chloride levels are well below water quality criteria and unlikely to be a problem. The low chloride concentrations in the waterways are also an indication that the groundwater does not have a high concentration of chloride either. Therefore it is not anticipated that any of the public wells along the corridor would be negatively affected by the project. MJ will reach out to Phil Trowbridge to further discuss the implications of the chloride issue.

Draft

The meeting was opened to questions:

Q- Jamie Sikora – Will the study recommend breaking the project up into phases?
A- Mike Dugas – The project is shown in the draft Ten Year Plan, however no funding has been identified for the project. It is expected that any construction along this corridor would be broken up into smaller projects. Some projects may even be completed as part of a public/private partnership with New Hampshire Motor Speedway or using Safety Improvement funds at some of the intersections.

Q- Carol Henderson – Will this project be going out for public comment?
A- M. Dugas- This project was presented to Town of Loudon officials on November 12, 2011, and there was some attendance by additional members of the public. It is anticipated that there would be a follow-up public informational meeting at the completion of the study.

Q- J. Sikora – Would mitigation for this project be constructed in advance of the construction project?
A- M. Dugas – Not likely.

Q- Mark Kern – How much detail will be put into the mitigation plan (for the corridor study)?
A- Jed Merrow – The mitigation will include general concepts and potential locations only.

Comment - Lori Sommer recommended reaching out to the Five Rivers Conservation Trust to let them know about the project and the potential mitigation locations in case they come across an interested landowner or know of other potential mitigation locations.

This project has not been previously discussed at a Monthly Natural Resource Agency Coordination Meeting.

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Vicki Chase - RE: Unique Farmland question

From: Vicki Chase
To: Luke, Stacy - NRCS-CD Concord NH
Date: 12/2/2011 10:22 AM
Subject: RE: Unique Farmland question
Attachments: 106 Unique farmland.pdf

Hi Stacy,

I am looking specifically for input on identifying the unique farmland soils in the corridor (100' from the centerline) from the intersection of Route 393 and Route 106 in Concord to the New Hampshire Motor Speedway in Loudon. My understanding is that NRCS identifies Unique Farmland soils, so I called Karen Dudley at NRCS who referred me to you. The previous study identified the maple sugar operations in the corridor as Unique Farmlands, so I assume that these would still qualify, but it would be helpful to have a letter signed by the chair, as you suggested. I went through the list of maple producers that are members of the New Hampshire Maple Producers Association http://www.nhmapleproducers.com/house.html in the area, and I think the only producer that actually abuts 106 on the list is Sunnyside Maples in Loudon, directly across from the track. (The previous study had a longer corridor and identified another producer, which perhaps was further north - in any case I can't find it - "Sweet Wood Sugar Bush", in Loudon.)

The attached map shows where Sunnyside Maples is.

Thanks for your help.

Vicki Chase• Environmental Analyst• Environmental
53 Regional Drive • Concord, NH 03301
Office: 603-225-2978 •

>>> "Luke, Stacy - NRCS-CD, Concord, NH" <stacy.luke@nh.nacdnet.net> 12/1/2011 3:43 PM >>>

Hi Vicki,

What is the deadline for a specific answer to your question? Also, what is the specific question that you have? My guess is that we will probably issue another letter to you clarifying unique farmland soils. We probably will have to go out to the site again. But, maple sugar operations should be considered as active farmland and a usage based on the unique farmland soil definition. I think the basic answer is unique farmland soils are based more on usage than soil typing. We do not have a data layer for unique farmland soils as the usage is site specific. Therefore, a maple sugar operation's soils would be considered unique farmland soils. But, we should probably get a letter to you as we did back in 1995 signed by the Chair.

A definition of unique farmland soils can be found at http://www.nh.nrcs.usda.gov/Soil_Data/soil_data_documents/datadict.pdf but maple sugar operations have been historically considered a usage on unique farmland soils, as stated in the previous letters.

Thanks,

Stacy

From: Vicki Chase [mailto:vchase@mjinc.com]
Sent: Wednesday, November 30, 2011 11:56 AM
To: info@merrimackccd.org
Subject: Unique Farmland question

Stacey,

Thanks for your help in identifying Unique Farmlands along the Route 106 corridor. As I mentioned on the phone, McFarland Johnson is updating a 1995 study of the Route 106 corridor, with a smaller study area, from the intersection of Route 393 and Route 106 in Concord to the New Hampshire Motor Speedway in Loudon. I have used available GIS data to create a map depicting Prime, Statewide, and Locally Important soils, attached here. Also attached are two pages from the 1995 Document "New Hampshire Route 106 Concord to Laconia Environmental Assessment", and a letter from the MCCD to NHDOT that discusses unique farmlands in the corridor. Unfortunately, I don't have the map that is referred to in the 1977 letter.

The "Active Farmland" outlined in green on the farmland Figure does not include maple sugar operations, I will either include them on the figure or note that they are not included.

Vicki Chase• Environmental Analyst• Environmental
53 Regional Drive • Concord, NH 03301
Office: 603-225-2978 •

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Farmland Soil Classification

- All areas are prime farmland
- Farmland of statewide importance
- Farmland of local importance
- Prime farmland if protected from flooding or not frequently flooded during the growing season
- Active Agricultural Land

NEW HAMPSHIRE DOT
CONCORD-LOUDON, NH

ROUTE 106 CORRIDOR
FARMLAND

APPROXIMATE SCALE :	DATE :	FIGURE :
	DECEMBER 2011	4.4-1

McFarland Johnson

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MERRIMACK COUNTY CONSERVATION DISTRICT

The Concord Center, Suite 211
10 Ferry Street, Box 312
Concord, New Hampshire 03301-5081
(603) 223-6023

January 29, 2011

Ms. Vicki Chase
Environmental Analyst
McFarland Johnson
53 Regional Drive
Concord, NH 03301

Dear Ms. Chase:

Thank you for contacting the Merrimack County Conservation District (MCCD's)about unique farmland soils along Route 106 in Loudon. According to the USDA Natural Resources Conservation Service Data Dictionary (found at http://www.nh.nrcs.usda.gov/Soil_Data/soil_data_documents/datadict.pdf) , the abbreviated definition of Unique Farmland Soils is as follows:

> "This is farmland other than prime that is used for the production of specific high-value food and fiber crops in New Hampshire. Sites represent a special combination of soil quality, location, growing season and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. In order to qualify as unique farmland, a high-value food or fiber crop must be actively grown. In New Hampshire, unique farmland crops include, but are not necessarily limited to apples, peaches, pears, plums, strawberries, raspberries, cranberries, blueberries, pumpkins, squash, and tomatoes. Areas of unique farmland are site specific and not cannot be related to soil map units, therefore they are not identified in the NASIS database."

A more detailed definition of Unique Farmland Soils was included in the NRCS's (formerly Soil Conservation Service) letter dated December 5, 1977, which includes additional examples of unique farmland as "maple sugar bushes."

Because areas of unique farmland are site specific and cannot be related to soil map units, I met with Richard and Elaine Moore, owners of Sunnyside Maples, and have included on the attached map the unique farmland soils identified on Sunnyside Maple's Route 106, Loudon, operation. Any road improvement should have minimal impacts on this working farm.

Thank you for the opportunity to comment on these agricultural concerns.

Sincerely,

Stacy Luke, District Manager

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

January 10, 2012

Vicki Chase
McFarland Johnson
53 Regional Drive
Concord NH 02201

Subject: Route 106 Widening in Concord and Loudon

Dear Ms. Chase:

Thank you for consulting with the Drinking Water Source Protection Program regarding the subject project. As we discussed, applicable regulatory requirements for public water system (PWS) wells in the vicinity of this project are generally as follows:

- If the right of way will encroach on the sanitary protective radius (SPR) for a community system (CWS), a waiver would be needed from Env-Ws 372.14, and Env-Dw 301.06 for small CWSs or Env-Ws 379.06 for large CWSs. Flintlock Apartments (PWS ID 1402010), a small CWS, appears to be the only CWS with a well in the project area. The SPR for this system's well is 125 feet. I understand that the project will encroach further on the SPR; therefore, a waiver would be required, or a new well would be required, for the project to go forward.

- With respect to non-transient, non-community (P) and transient (N) systems, our rules (Env-Ws 373.12 and 373.11(c)) would not allow the water system to have a roadway, parking lot, or even a right of way, within 50 feet of their wells. If the project would encroach on this setback, the system would have to obtain a waiver from the Drinking Water and Groundwater Bureau. If denied a waiver, the well would probably have to be replaced.

In addition to meeting the regulatory requirements as outlined above, our recommendations to NHDOT are as follows:

- With respect to the Flintlock Apartments well, follow "New Hampshire Department of Environmental Services Recommendations for Implementing Groundwater Protection Measures When Siting or Improving Roadways," November 1995.
- Follow best management practices for blasting as described in "Rock Blasting and Water Quality Measures That Can Be Taken To Protect Water Quality and Mitigate Impacts," NHDES Report WD-10-12.
- With respect to other PWS wells:

- Verify the locations of all potentially affected PWS wells on the ground. Potentially affected wells can be identified by using DES GIS information to identify wells that appear to be within 700 feet of the project area. This would account for the maximum SPR (400 feet) plus the maximum positional error (300 feet).
- Narrow the focus to include only those wells that are actually within 400 feet of the project area.
- Avoid encroaching on their 50-ft setbacks if possible.
- For those whose 50-ft setbacks would be affected, consult with NHDES's Drinking Water and Groundwater Bureau regarding the possibility of obtaining waivers.
- Determine the SPRs of the affected wells and implement measures to ensure that hazardous materials will not be stored within the SPRs for the affected wells. A simpler approach would be to keep hazardous materials storage 400 feet away from all PWS wells.

Please feel free to contact me at paul.susca@des.nh.gov or 271-7061 if I can be of further assistance.

Sincerely,

Paul Susca
Drinking Water Source Protection Program
Drinking Water and Groundwater Bureau

cc.: Brandon Kernen, DWGB
Cynthia Klevens, DWGB
Susan Willoughby, DWGB

Memo

NH Natural Heritage Bureau

To: Vicki Chase, McFarland Johnson, Inc.
10 Ferry Street, Unit 11, Suite 210
Concord, NH 03301-5022

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 8/19/2011 (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB11-1698 Town: Concord, Loudon, Canterbury Location: Route 106
Description: Corridor study of Route 106 for potential expansion / widening
cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments: This site is within an area flagged for possible impacts on the state-listed *Alasmidonta varicosa* (brook floater) in the Soucook River.

Invertebrate Species	State[1]	Federal	Notes
Brook Floater (*Alasmidonta varicosa*)	E	--	Contact the NH Fish & Game Dept (see below).

Natural Community	State[1]	Federal	Notes
Red maple floodplain forest	--	--	Threats are primarily changes to the hydrology of the river, land conversion and fragmentation, introduction of invasive species, and increased input of nutrients and pollutants.

Vertebrate species	State[1]	Federal	Notes
Blanding's Turtle (*Emydoidea blandingii*)	E	--	Contact the NH Fish & Game Dept (see below).
Wood Turtle (*Glyptemys insculpta*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Department of Resources and Economic Development
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

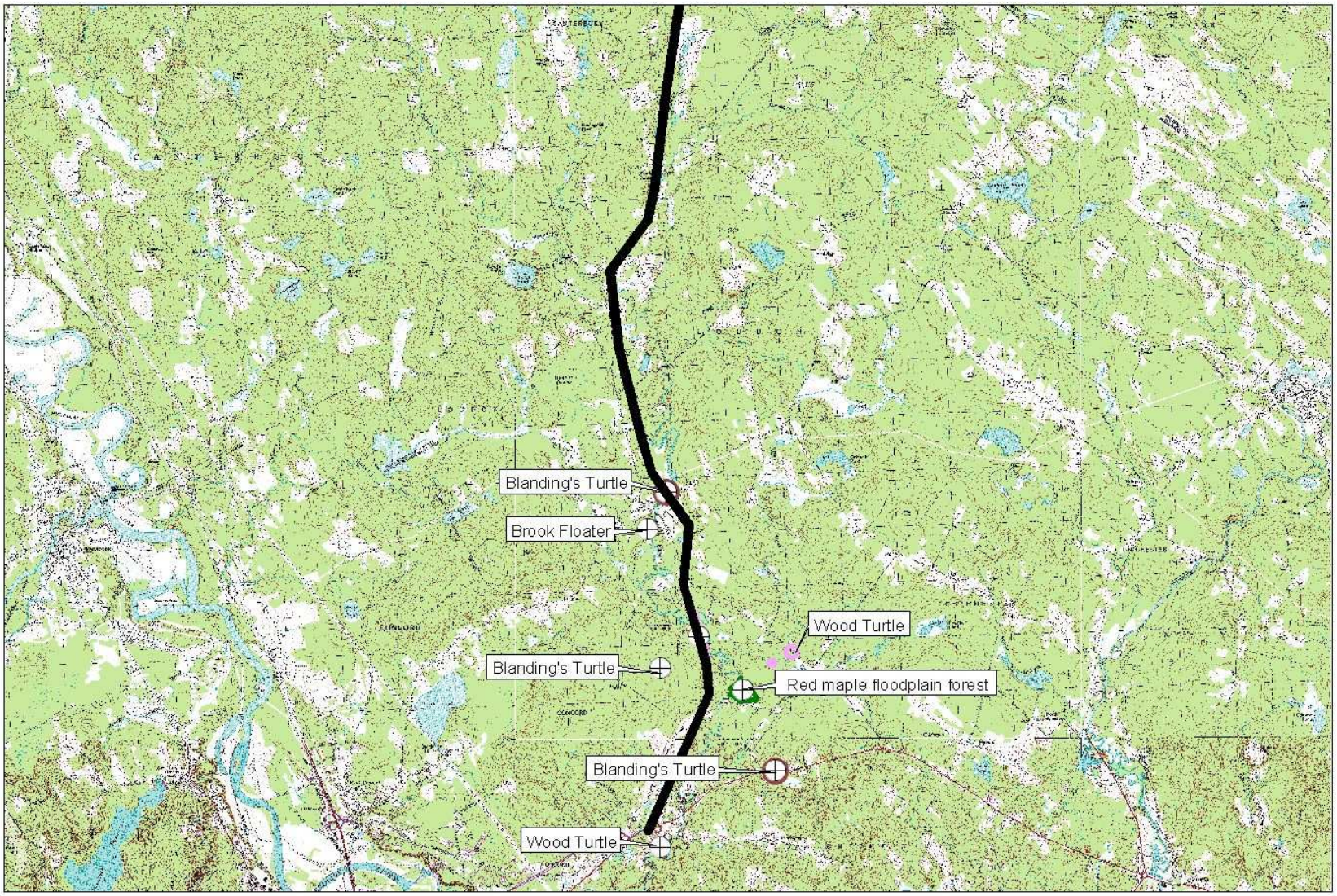
DRED/NHB
PO Box 1856
Concord NH 03302-1856

NHB11-1698

NH NATURAL HERITAGE BUREAU

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



*Historical record

0.25 0 0.25 0.5 0.75 1 Miles

1:100000

Valid for one year from this date: 19 Aug 2011

New Hampshire Natural Heritage Bureau - Animal Record

Brook Floater (*Alasmidonta varicosa*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Rare or uncommon
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).

Comments on Rank: The Loudon Center sub-population was very abundant, especially juveniles.

Detailed Description: 1995: 3 timed searches conducted. 45 minute search at Loop Road (Currier Road) bridge found 1 mussel. 1 hour search at Loudon Center bridge found 13 mussels. 30 minute search at fisherman's access of Rte 106 found 3 mussels. 1993: plot established at Louden Center site (a few 100 feet downstream of bridge). 32 A. varicosa found in 34 minutes searching (56.5 mussels/person-hour), including several juveniles. None found in shaker brook and none found at Clough Mill Road east of Route 106. 1992: 4 sub-populations identified: fisherman's pullout, ? Road bridge, Loudon Center, and Goshen Road. Total of 57 A. varicosa were found in 3.5 person-hour searching. At Loudon Center 16 were found in 10 minutes searching.

General Area: Mixed cobble, gravel, and sand. Clarity of substrate varies with water flow. Where flow is fast, substrate is clean and mussels are more abundant. In slower waters and/or beaver impacted areas sediment/algae is abundant and mussels are not.

General Comments:

Management Comments:

Location

Survey Site Name: Soucook River

Managed By:

County:	Merrimack	USGS quad(s):	Loudon (4307134)
Town(s):	Loudon	Lat, Long:	431702N, 0712812W
Size:	2.8 acres	Elevation:	320 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Soucook River. Population extends from fishing access point adjacent to Rte 106 in Concord north a few miles past Loudon Center to loop road (Currier Road). Best access are at fishing access (Rte 106), Goshen Road, and Loudon Center.

Dates documented

First reported: 1992-09-10 Last reported: 1995-08-24

Cutko, Andy. 1993. Field survey to Soucook River on August 31.

Craig, Cory. 1996. 1995 inventory and monitoring of brook floater mussel (Alasmidonta varicosa) in New Hampshire. Unpublished report from NH Heritage Program and The Nature Conservancy to NH Fish & Game Department, Concord, NH.

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Community Record

Red maple floodplain forest

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Not ranked (need more information)
State:	Not listed	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).
Comments on Rank:

Detailed Description: 1998: A low/medium variant of ***red maple floodplain forest*** occurs at this site. It is a good example of a high terrace floodplain forest of sandy soils. *Acer rubrum* (red maple), *Pinus strobus* (white pine), and *Prunus serotina* (black cherry) are dominant in the canopy, with *Viburnum dentatum* var. *lucidum* (northern arrow-wood), *Viburnum nudum* var. *cassinoides* (witherod), and *Alnus incana* var. *americana* (speckled alder) common in the sub-canopy layer. *Onoclea sensibilis* (sensitive fern), *Solidago rugosa* (rough goldenrod) and various graminoids are common in the diverse herb layer. Soils were farily acidic (pH=5.0), with the coarse sand component increasing with depth from a very fine sandy loam texture at the surface. Distinct orange mottles were present at 11-19 cm, and became more abundant and darker red with depth. A distinct, sandy cutbank at the river's edge rose 1-3 meters above the floodplain terrace, with more pine and upland species in the higher terraces. Low slough channels were present throughout.

General Area: 1998: This floodplain terrace is tucked within an old U-shaped meander in the river that cut into the steep sandy bluff to the east. The current straight river coarse defines the floodplain's western edge, while the eastern border is the broadly curved old river channel at the base of the bluff. The highest terrace, at the southewestern corner may have been planted in white pine, but there was little evidence of recent management.

General Comments: 2005: Red maple floodplain is much more extensive downstream into Concord nearly to Merrimack - need more survey work.

Management Comments:

Location

Survey Site Name: Soucook River, north of Staniels Road
Managed By:

County:	Merrimack	USGS quad(s):	Loudon (4307134)
Town(s):	Loudon	Lat, Long:	431529N, 0712657W
Size:	25.9 acres	Elevation:	310 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: From Rte. 4/202 or Rte. 393, take Rte. 106 north ca. 1.5 miles. Take a right on Staniels Road in Loudon. Go up hill and park on flat before school fields (ca. 0.25 mile from Rte. 106). Hike down slope to floodplain site east of the Soucook River.

Dates documented

First reported: 1998-08-14 Last reported: 1998-08-14

Bechtel, Doug. 1998. Field survey to Soucook River - Staniels Rd on August 14.

Nichols, William F., Daniel D. Sperduto, Douglas A. Bechtel, and Katherine F. Crowley. 2000. Floodplain Forest Natural Communities along Minor Rivers and Large Streams in New Hampshire. Prepared by NH Natural Heritage. Concord, NH.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:

Detailed Description: 2006: Area 11704: 1 adult seen.
General Area: 2006: Area 11704: Roadside.
General Comments:
Management Comments:

Location

Survey Site Name: Giddis Brook
Managed By:

County: Merrimack
Town(s): Chichester
Size: 30.8 acres

USGS quad(s): Suncook (4307124)
Lat, Long:
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2006: Area 11704: On Route 4 going east from Concord, starting up hill near tattoo parlor.

Dates documented

First reported: 2006-06-15
Last reported: 2006-06-15

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status		Conservation Status	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:

Detailed Description: 2008: Area 11582: 1 adult seen.
General Area: 2008: Area 11582: Attempting to cross Route 106.
General Comments: 2008: Area 11582: Turtle was released at Hunting Swamp off of Lovejoy Road.
Management Comments:

Location

Survey Site Name: Clark Brook
Managed By:

County: Merrimack
Town(s): Loudon
Size: 30.8 acres

USGS quad(s): Loudon (4307134)
Lat, Long:
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2008: Area 11582: Route 106 just north of Route 129.

Dates documented

First reported: 2008-07-09 Last reported: 2008-07-09

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Blanding's Turtle (*Emydoidea blandingii*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Apparently secure but with cause for concern
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2009: Area 12289: 1 observed.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Soucook River State Forest
Managed By:

County: Merrimack
Town(s): Loudon
Size: 1.9 acres

USGS quad(s): Loudon (4307134)
Lat, Long:
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: Area 12289: (43 15 41.40 / 71 28 3.00).

Dates documented

First reported: 2009-06-17
Last reported: 2009-06-17

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Apparently secure but with cause for concern
State:	SC	State:	Rare or uncommon

Description at this Location

Conservation Rank: Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:

Detailed Description: 2010: Area 12808: 1 adult male observed.2009: Area 12310: 1 female observed. Area 12374: 1 female observed, nesting.2008: Area 12144: 1 observed.

General Area: 2010: Area 12808: Stream corridor with wide emergent marshes, shrub swamps, deeper pools, some small riffles. Cobble-sand-silt substrate.2009: Area 12310: Crossing road near Soucook River. Area 12374: Nesting in driveway.2008: Area 12144: Residential yard near stream.

General Comments:
Management Comments:

Location

Survey Site Name: Route 106, Loudon
Managed By:

County:	Merrimack	USGS quad(s):	Loudon (4307134)
Town(s):	Loudon	Lat, Long:	
Size:	31.8 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2010: Area 12808: Along Giddis Brook west of Chichester Road.2009: Area 12310: Route 106 just south of crossing of Soucook River. Area 12374: 320 Chichester Road, Loudon.2008: Area 12144: 458 Route 106 N, Loudon.

Dates documented

First reported: 2008-07-27 Last reported: 2010-07-19

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Wood Turtle (*Glyptemys insculpta*)

Legal Status

Federal: Not listed
State: SC

Conservation Status

Global: Apparently secure but with cause for concern
State: Rare or uncommon

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Area 12825: 1 adult observed.
General Area: 2010: Area 12825: Steep riverbank.
General Comments:
Management Comments:

Location

Survey Site Name: Soucook River WMA, Ladd Tract
Managed By: Ladd Tract

County: Merrimack
Town(s): Concord
Size: 1.9 acres

USGS quad(s): Suncook (4307124)
Lat, Long:
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2010: Area 12825: Ladd Tract of Soucook River WMA.

Dates documented

First reported: 2010-04-26
Last reported: 2010-04-26

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

Vicki Chase - Fwd: RE: Project Review

From: Vicki Chase
To: vchase@mjinc.com
Date: 1/16/2012 1:53 PM
Subject: Fwd: RE: Project Review

>>> "Walker, Steve" <Steve.Walker@nh.gov> 10/26/2011 4:07 PM >>>
Hi Vicki, There are no LCIP properties in the project area. We DO monitor the Smith Grady tract S of the track and the Mitigation tract N of the track on the E side for NHF&G. We would appreciate it if you kept us in the loop on those. Thanks Stephen

-----Original Message-----
From: Vicki Chase [mailto:vchase@mjinc.com]
Sent: Wednesday, October 26, 2011 3:13 PM
To: Walker, Steve
Subject: Project Review

Steve Walker
Conservation Land Stewardship Program

Re: NH Route 106 through Concord - Loudon - Canterbury -- State Project No. 16188

Dear Steve:

McFarland Johnson is performing engineering and environmental consulting services for NHDOT for planned improvements to NH Route 106 in Concord, Loudon, and Canterbury. The project involves widening approximately eleven miles of NH 106 between the intersection of 106 and I-393 and the northern Canterbury town line. Because the project may involve federal funding, the NH DOT is required to comply with the National Environmental Policy Act. As such, we must document if there have been LCIP investments made on properties in the area.

Attached is a map depicting known conserved lands along the corridor. Thank you for your time and consideration of this request. If you have any questions, please contact me at (603) 225-2978.

Sincerely,

Vicki Chase• Environmental Analyst• Environmental
53 Regional Drive • Concord, NH 03301
Office: 603-225-2978 •

CONFIDENTIALITY STATEMENT This message is intended only for the use of the individual or entity to which it is addressed and may contain information that is privileged, confidential and exempt from disclosure under applicable law. If the reader of this message is not the intended recipient or the employee or agent responsible for delivering the message to the intended recipient, YOU ARE HEREBY NOTIFIED that any dissemination, distribution or copying of this communication is strictly prohibited. If you are not the intended recipient of this message, please destroy any printed version and delete this email.

NHDOT 16188
NH Route 106 Interim Corridor Study

Environmental Study

Appendix D

NHDOT Environmental Justice Memo

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION
INTER-OFFICE COMMUNICATION

DATE: December 23, 2011

FROM: Jay Ankenbrock, Chief of Labor Compliance, Executive Office

TO: Michael Dugas, Chief of Preliminary Design, Bureau of Highway Design

RE: Environmental Justice Population Analysis, Project: Loudon 16188

The attached analysis and recommendations are provided pursuant to Title VI of the Civil Rights Act of 1964 and Executive Orders 12898 & 13166. The intent of these statutes is to ensure fair and full participation and the equal receipt of benefits under Federally-assisted programs. Your efforts to accommodate and encourage participation by traditionally underserved groups, where significant, will ensure program access and minimize the potential for disproportionate project impacts on protected groups.

The table entitled "EJ Population Analysis" shows the presence of protected groups that might be impacted by the project. Personnel responsible for project planning/design and the coordination of public meetings/hearings should use this analysis to guide their outreach efforts under Title VI and in support of developing a context sensitive solution. Based on the availability of information and where appropriate, we have included specific outreach recommendations to facilitate public comment from underrepresented groups.

Please note 2000 Census data was used for this analysis, as the 2010 data has not been loaded into the database.

If you have questions regarding this analysis, please contact me @ 271-2467.

Encls: EJ Population Analysis

Cc: Peter Crouch, Traffic Systems Engineer, Bureau of Traffic
Charlie Hood, Administrator, Bureau of Environment
Bill Oldenburg, Administrator of Highway Design

EJ Population Analysis for Project: Loudon 16188

STUDY AREA	AVG% Elderly Population (P8)	AVG % Minority Population (P6)	AVG % Low-income Population (P87)	AVG% Disabled Population (P41) Sensory	Physical	AVG% LEP (P19)
Impacted Area – Merrimack County US Census Tract # 32, Block Group 1, Census Tract # 328, Block Group 1, Census Tract # 370, Block Group 1, Census Tract # 360, Block Groups 1, 2, &3,	**10.88%**	1.62%	3.86%	3.15%	6.82%	0.28%
Surrounding Area Merrimack County, Census Tract #32, Block Groups 2 & 3; Census Tract #328, Block Group 2; Census Tract #330, Block Groups 1 & 2, Census Tract #329, Block Groups 2 & 3, Census Tract #350, Block Group 1, Census Tract #440, Block Group 2, Belknap County, Census Tract #9656, Block Group 1, Census Tract #9658, Block Group 3,	**10.30%**	2.30%	5.52%	3.41%	6.85%	0.53%

REMARKS:
* The population percentage identified is meaningfully greater than the surrounding area and constitutes an EJ population. Characteristics o this particular study area indicate that targeted outreach efforts to solicit public participation should be taken.

LEP Definition: Where there is a population of people who speak English as a second language less than well ("not well" or "not at all" as indicated by the U.S. Census data). When a particular LEP language group constitutes 5% of the impacted population, the Department is required to translate public information meeting notices and take appropriate measures to ensure language access. If this requirement exists the Project Manager should contact the Title VI Coordinator for further assistance.

Impacted Area: The impacted area was defined by the project limits and the area in the immediate vicinity that most closely corresponds to the boundaries of Census Tracts and Block Groups

Surrounding Area: All Census Tracts and Block Groups outside of, and immediately adjacent to, the impacted area

Special Considerations: Special consideration should be given to any project features that affect pedestrian accessibility. This project constitutes an alteration in accordance with Title II of the Americans with Disabilities Act. As such, minimum ADAAG accessibility requirements apply, unless deemed technically infeasible. For more information, I have provided a link to the Draft Public Rights-of-Way Guidelines (PROWAG). Although these guidelines will not be enforceable until they have been adopted by the US DOJ and US DOT, the FHWA considers them to be the most current recommended best practices in pedestrian facility design: http://www.access-board.gov/rowdraft.htm#Text.

Outreach Recommendations:

Resident/Agency Address	Org/Housing Type	Contact Name/Number
Betty Barton's Home 304 North Village Road Loudon, NH 03307	Senior	603-783-4722
Loudon Voanne Senior Housing 142 South Village Road Loudon NH	Senior	603-798-3190
Young Home 142 South Village Road Loudon, NH	Senior	603-267-1748
Horseshoe Pond Place-CAP* 26 Commercial Street Concord, NH 03301	Seniors	Polly Mills 603-228-6956

Belmont Senior Center PO Box 214 14 Mill Street Belmont, NH 03220	Seniors	Brenda Fortier 603-267-9867
CAP Belmont-Merrimack Counties PO Box 1016 Concord, NH 03302	Seniors- Low Income	603-225-3295