

New Hampshire Department of Transportation

Jaffrey NH 202 - #16307

Scope of Services

January 12, 2016

1.0 Preliminary Engineering

1.1 Data Collection

1.1.1 Previous Studies and Plans

VHB will assemble and review available previous study efforts including those conducted by the NHDOT, the Southwest Regional Planning Commission (SWRPC), and the Town of Jaffrey, as well as the private sector. The purpose of the review is to not only become familiar with the findings of these studies, but also to compile and utilize data provided in these studies. VHB intends to use available data to the greatest extent possible. VHB will also assemble available as-built roadway and bridge plans (from NHDOT and the Town of Jaffrey).

1.1.2 Field Reconnaissance

VHB will conduct a comprehensive field reconnaissance to observe existing traffic flow patterns, traffic operational issues, pedestrian and bicycle activity, physical roadway characteristics, land use, environmental issues, and other issues that could affect the outcome of the project. The field visits will be conducted to ensure that the existing conditions are consistent with the mapping for the level of design that is being performed. Significant features (utilities, drainage culverts, bridges, walls, transmission lines, landfill, etc.) that must be considered in advancing the preliminary designs, will be identified.

1.1.3 Traffic Volume Counts

VHB will retain a traffic counting vendor (Accurate Counts) to conduct a series of 48-hour automatic traffic recorder (ATR) counts and a series of weekday AM and PM peak period manual turning movement counts (TMC), which will be conducted during the school year (while the high school is in session) and during summer conditions. The intersection TMCs will record automobile, truck, and pedestrian movements.

The locations include:

ATRs (48-hour to be conducted midweek at 7 locations during high school and non-high school season)

- River St, south of Charlonne St
- Main St, east of Charlonne St

- Peterborough St, north of Main St, south of Cross St
- Stratton Rd, north of Aetna St
- Turnpike St, east of Peterborough St and west of Ellison St
- Hillcrest Rd
- North St, south of Nutting St

TMCs (7 to 9 AM and 4 to 6 PM to be conducted midweek at 9 locations)

- Main St/ Charlonne St
- Main St/ School St/ Goodnow St
- Main Street/ River St/ North St
- River St/ Charlonne St
- River St/ School St
- Main St/ Peterborough St/ Turnpike St/ Stratton Rd/ Blake St
- Turnpike St/ Ellison St
- Turnpike St/ Hillcrest Rd
- Hillcrest Rd/ Peterborough St
- North St/ Goodnow St
- North St/ Nutting St
- Peterborough St/ Cross St
- Peterborough St/ Webster St
- Turnpike Rd/ Oak St
- Turnpike Rd/ Knight Rd

1.1.4 Transit Research

VHB will coordinate with the Town of Jaffrey, the Contocook Valley Transportation Company, and the SWRPC regarding the status of any existing or planned transit services within the area. Information, including routes, ridership, etc. regarding any existing or planned services will be collected and documented.

1.1.5 Vehicle Crash Research

VHB will compile crash data from the DEPARTMENT for the study area for the most recent 10-year period available. The data will be reviewed and summarized to determine the nature, frequency, severity, and location of crash experience.

1.1.6 O/ D Survey

VHB will conduct an origin/destination survey to determine automobile, truck, and bus traveling routes through the NH 202 dog-leg intersection.. Specifically, VHB will monitor and record travel routes during the weekday AM and weekday PM peak periods from video recordings provided by AIRSHARK (a video drone service).

1.1.7 Coordinate with AIRSHARK (a video drone service)

VHB will retain and coordinate with AIRSHARK (a video drone service) who will record weekday morning and evening peak period video of the NH 202 dog-leg intersection through the use of a video drone.

1.2 Base Plan Preparation

The goal of the base mapping effort will be to develop up-to-date topographic and environmental resources and constraints appropriate for the conceptual design and alternatives evaluation. This work will be conducted in two phases.

VHB will first coordinate with GIS staff from the NHDOT, SWRPC, and the Town of Jaffrey to obtain available base mapping resources to support the study effort. This information will be combined with existing resource information, previous studies, plans and additional GIS information available from other sources to develop an initial base map for use in the development of conceptual level alternatives. This mapping information will be supplemented by reconnaissance level fieldwork to generally confirm the existing topography and identify possible design constraints and issues that may not be readily identifiable from a review of the base plans or GIS database. The enhanced study area map will serve as the foundation for the macro-scale feasibility screening and evaluation of the proposed alternatives under consideration. The base plan will also be updated by incorporating approved or planned local developments within the study area (assume three locations). Horizontal and vertical alignments will be developed along existing NH 202 corridor and important side roads to aid in the evaluation of these existing roadways.

The DEPARTMENT will conduct a ground survey including the collection of 1' contours and ground features within R.O.W. and building fronts along the following roadways:

- Main St. from School St. to Peterborough St. (approx. 800')
- Turnpike Rd. from Peterborough St. to Ellison St. (approx. 1,000')
- River St. from Tyler Hill Rd. to Main St. (approx. 1,400')
- North St. from Main St. for approximately 500' (approx. 500')
- Peterborough St. from Main St. to Cross St. (approx. 1,000')
- Stratton Rd. from Main St. to Union St (approx. (600')
- Blake St. (approx. 500')

For areas outside these initial ground survey limits, the DEPARTMENT will have their 2010 aerial imagery processed to produce a photogrammetric model with 2' contours. VHB will incorporate the ground survey (provided by the DEPARTMENT) and the 2' contour photogrammetric model (provide by the DEPARTMENT) into the aerial base map.

As a second phase, and once the conceptual level alternative alignments have been narrowed to a proposed alignment, the DEPARTMENT will conduct, and provide to VHB, supplemental ground survey

to complete the coverage needed to evaluate the impacted area. VHB will incorporate this supplemental ground survey into the aerial base map.

1.3 Right-of-Way Boundary Preparation

The land surveying task will be conducted under the direct supervision of a New Hampshire Licensed Land Surveyor and in accordance with the minimum standards for an Urban Boundary Survey as detailed in New Hampshire Code of Administrative Rules Lan 500. The boundary survey will be completed for US 202, NH 124, NH 137, and intersecting Town roads for either Alternative 1 or Alternative 2. The specific tasks are as follows:

1.3.1 Data Collection

Property Abstract Review - VHB will coordinate with the DEPARTMENT's Bureau of Right-of-Way to review the property abstract provided to VHB. Record deeds and plans will be evaluated and plotted to assist with the field reconnaissance of existing right-of-way and boundary evidence.

Boundary Evidence Reconnaissance and Measurement - VHB will search and recover existing evidence of the boundary lines and right-of-way. Evidence such as stone bounds, iron pipes, drill holes, stone walls, etc., will be recovered, and processed to establish a base plan depicting boundary line evidence.

Legacy Alignment - VHB will coordinate with the DEPARTMENT's Bureau of Right-of-Way so that VHB can reestablish the legacy alignments upon which the highway layout is based.

1.3.2 Right-of-Way Boundary Preparation

Boundary Line Evaluation - VHB will evaluate the results from the field boundary evidence and the record data contained in the property abstract to determine the existing right-of-way and the boundary lines of affected project parcels.

Existing Conditions Boundary/ Right-of-Way Plan - Based on the tasks defined above, VHB will prepare a boundary plan depicting the existing property lines of the affected parcels along US 202, NH 124, NH 137, and intersecting Town road's right-of-way. This plan will be prepared in accordance with the plan requirements of the Cheshire County Registry of Deeds and recorded prior to Public Hearing.

1.4 Base Year and Future Year No Build Traffic Volumes

Using data collected under Task 1.1 including the traffic volume counts, truck and bus O/ D survey and the wireless signal extraction (WiSE) origin-destination data, VHB will establish 2020 base year weekday morning and evening peak hour traffic volume networks for the study area. Data will be seasonally adjusted and grown to reflect average annual peak hour conditions using factors derived from nearby NHDOT permanent count stations (regional growth), and an assessment of potential development growth within Jaffrey's downtown. VHB will work with town and SWRPC staff to develop realistic growth scenarios for the study area including regional growth expectations as well as identifying specific parcels and opportunities for development and redevelopment within the downtown. Based on this assessment, VHB will develop the 2040 weekday morning and evening peak hour traffic volume networks.

1.5 Base Year and Future Year No Build Traffic Operational Analysis

Traffic operational analyses for study area intersections will be performed using Synchro/ SimTraffic version 8 for ease of developing the traffic simulations. A total of fifteen signalized and unsignalized intersections have been identified for the existing (no build) condition.

1.6 Establish Design and Operational Criteria

The first step of the alternatives development process will be to establish the engineering design criteria, such as design year, design speeds, lane and shoulder widths and bridge clearances. During this task, the project team will also review and confirm the basic study purpose, goals, and objectives.

1.7 Brainstorm Preliminary Alternatives

The next step in the development of the alternatives will include brainstorming session to identify potential tissue paper alternatives and variations to these alternatives as well as review of previously developed concepts. The brainstorming effort will include a daylong session at VHB with NHDOT, SWRPC, and Town of Jaffrey staff. The purpose of the brainstorming session will be for all parties to, in an informal setting, discuss and vet potential alternatives and to come to consensus as to which alternatives should be developed and evaluated.

1.8 Alternatives Development and Evaluation

Having reached consensus through the initial brainstorming effort on the reasonableness of the alternatives from a sketch engineering, traffic, and resource impact overview, more detailed conceptual engineering, traffic and resource impact evaluations will be completed.

It envisioned that up to four intersection configuration alternatives will be developed for the Peterborough Street/ Main Street intersection and up to four new NH 202 roadway alignment alternatives will be developed. The specific tasks involved in the development of the intersection and new roadway alternatives are described as follows.

1.8.1 Develop Peterborough St. / Main St. Intersection Alternatives

The intersection alternatives will be developed to a preliminary design level that includes horizontal and vertical alignments, pavement layout, cross sections and other design elements to support a multi-modal environment. The proposed intersection alternatives to be developed include the following:

- Signalized intersection
- 4 legged roundabout
- 5 legged roundabout
- Alternative to be determine during brainstorming session

MTJ Roundabout Engineering will work with VHB in the development and layout of the two roundabout alternatives. The proposed intersection alternatives will be developed based on the following:

- The design developed for these connections will be based on typical NHDOT Design Manual, AASHTO standards, the NCHRP Report 672 – Roundabouts: An Informational Guide and,

NCHRP Report 674 – Crossing Solutions at Roundabouts and Channelized Turn Lanes for Pedestrians with Vision Disabilities.

- The roadway typicals are assumed to be curbed to collect and direct the storm water to proposed Best Management Practices (BMP).
- The roadways will be developed based on a Context Sensitive Solutions and include sidewalks, bicycle shoulders/ lanes, rail trail, and on-street parking as appropriate. Consideration for local, regional, and state plans for these types of roadway elements will be provided.
- It is assumed that the design of each intersecting roadway will match into the existing roadway within 500' of the intersection.
- The re-alignment of NH 202 to avoid the downtown “dog-leg” will create opportunities to re-purpose the roadway, parking, business, bicycle, and pedestrian uses in the immediate area between the two intersections and on the approach legs of the westerly intersection. It is assumed that a two-dimensional layout of these alternatives will be adequate for design and presentation purposes.
- The alternatives will be developed with the purpose of advancing the Propose Action alternative for 3D simulations for public presentations and public outreach.
- Following the selection of the Proposed Action alternative, the design, storm water, and Right-of-Way requirements will be advanced to a level suitable for Public Hearing.

1.8.2 Develop New Roadway Alignment Alternatives

The NH 202 alternatives will be developed to a preliminary design level that includes horizontal and vertical alignments, pavement layout, cross sections and other design elements to support a multi-modal environment. The proposed roadway alternatives are anticipated to include three build alternatives with the no-build.

The proposed roadway alternatives will be developed based on the following:

- The design developed for these connections will be based on typical NHDOT Design Manual and AASHTO standards
- The roadway typicals are assumed to be curbed to collect and direct the storm water to the proposed Best Management Practices (BMP)
- The roadways will be developed based on a Context Sensitive Solutions and will include sidewalks, bicycle shoulders/ lanes, and the consideration of the rail trail. Consideration for local, regional, and state plans for these types of roadway design elements will be provided.
- The NH 202 alignments will be developed as the through route, with the existing roadways being re-aligned to intersect with the proposed NH 202 alignment.
- The re-alignment of the existing roadways is assumed to match into the existing intersection within 500' of the proposed intersection.

- The close proximity of NH 202 and the Monadnock Recreational Rail Trail requires consideration to develop several typicals where the two elements are separated or combined.
- The municipal parking lot on Blake Street impacts will be evaluated and replacement parking locations considered during alternative development.
- The proposed BMP locations will be included for each alternative with approximated slope impacts.
- The pavement only pollutant loading analysis is an iterative process that could result in modifications to proposed action to direct the appropriate amount of storm water to the proposed BMP's.
- The alternatives will be developed with the purpose of advancing the Proposed Action alternative for 3D simulations for public presentations and public outreach.
- Following the selection of the Proposed Action alternative, the design, storm water, and Right-of-Way requirements will be advanced to a level suitable for Public Hearing.
- It is assumed that no interim improvements will be designed based on any TDM and TSM alternatives.
- Preliminary traffic control phasing will be developed for the alternatives to identify permanent and temporary impacts to environmental resources and right-of-way. Details regarding traffic control are as follows:
 - Tissue level phasing development plans and critical cross sections will be developed for review with the DEPARTMENT
 - Identification of alternative modifications to improve the constructability of the alternative
 - Development of a draft construction contract schedule for each alternative
 - It is assumed that this project will be constructed as a single project and use the design-bid-build project delivery method
- The proposed bridge over the Contoocook River will be evaluated and conceptually designed for type, span and location analysis with all alternatives.
- Alternatives that affect the existing Monadnock Recreational Rail Trail will be evaluated for continued recreational use of the rail trail system.
- The visual aesthetics of the bridge crossings will be considered during the development of the alternatives.

1.8.3 Develop Build Traffic Volumes for Each Alternative

Using the results of the wireless signal extraction origin-destination data, VHB will reassign traffic volumes as needed to develop 2040 weekday AM and PM peak hour traffic volume networks for each of the Build alternatives.

1.8.4 Build Alternatives Traffic Operational Analysis

Traffic operational analyses at each of the study area intersections, similar to that conducted for the base year and future year No Build, will be conducted for each alternative. Capacity, level of service, queuing, and turn and signal warrant analyses will be conducted where appropriate. The results of the analyses will be summarized in tabular form.

In addition, traffic micro simulation and 3D models will be developed to depict the operational conditions under each of the alternatives. The 3D simulations will be used at public meeting to compare potential alternative solutions.

1.8.5 Transportation Demand Management (TDM)

VHB will develop a range of TDM strategies, and conduct a comprehensive evaluation to determine the benefits (in terms of reduced travel demand) and costs. Traffic volume networks similar to the 2040 Build conditions will be developed to define the reduced travel demand associated with each strategy. Traffic operational analyses, similar to those conducted for the Build alternatives will be conducted at each of the study area intersections.

1.8.6 Transportation System Management (TSM)

In addition to the Build alternatives and the TDM strategies, VHB will define, develop and evaluate TSM actions aimed at optimizing the performance of the existing transportation system. The evaluation will include an operational analyses to determine the benefits and costs.

1.8.7 Cost Estimates

VHB will prepare cost estimates for each alternative. The estimates will be based on the latest NHDOT published average weighted unit prices. The inclusion of BMP's, utility relocations, ITS, and other large project elements will be included in the estimates provided that the information is available.

1.9 Technical Reports

VHB will prepare and submit to the NHDOT for review a draft Engineering Report. The report will document existing conditions within the study area, and summarize the design and operational aspects and engineering details of the proposed alternative. In addition, the reasons why other examined alternatives were rejected will be fully documented. Upon review and receipt of comments on the draft report, a final Engineering Report will be prepared and submitted to the NHDOT.

1.10 Project Team Meetings

VHB will attend informal project team meetings with the DEPARTMENT on an as needed basis to discuss project-related matters including but not limited to, resource constraints, the evaluation of alternatives, and costs. These meetings may also include Town of Jaffrey staff, SWRPC staff, state or federal agency staff, and/ or others as appropriate. For budgeting purposes we have assumed attendance at 8 project team meetings.

2.0 NEPA Documentation

VHB understands that the project will receive federal funds and therefore is subject to review under the National Environmental Policy Act (NEPA). NHDOT has determined that the project would qualify for an individual Categorical Exclusion (“CE”) under FHWA regulations [23 CFR 771.117(d)]. To support the CE determination, VHB will compile an Environmental Study (ES) to document environmental resources in the project area and to evaluate the potential environmental impacts resulting from the “Proposed Action” i.e., the build alternative selected for advancement based on preliminary engineering and environmental screening. Generally speaking, unless otherwise specified in this scope, environmental data that is available in GIS or other electronic or published sources will be collected for the entire Study Area, whereas field studies will be limited to the area directly impacted by the Proposed Action.

2.1 Initial Data Collection

As part of the data collection task, VHB will prepare and submit scoping letters to a set of local, state and federal agencies. The letters will provide notice to receiving agencies that the DEPARTMENT and FHWA are entering a NEPA study phase and will request relevant environmental data. Letters will be provided to the following agencies:

- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- National Oceanic and Atmospheric Administration - National Marine Fisheries Service
- Federal Emergency Management Agency
- NH Division of Historical Resources
- NH Department of Environmental Services
- NH Fish and Game Department
- NH Natural Heritage Bureau
- NH Department of Resources and Economic Development
- NH Department of Agriculture, Food and Markets
- NH Land and Community Heritage Investment Program (LCHIP)
- The NH Office of Energy and Planning
- Southwest Regional Planning Commission; and
- Town of Jaffrey officials, including Planning Department and Conservation Commission

Additional environmental data collection efforts are described below.

2.1.1 Water-Based Resources

- a) Groundwater: VHB will collect available data on aquifers and public water supplies within the study area based on the GRANIT GIS database, NHDES mapping, and town mapping. VHB will describe these resources and display them on project mapping.

- b) Surface Waters: Existing surface waters will be identified and described, including existing water quality data. Data will be collected primarily from GIS and online or published sources. Surface waters directly impacted by the Proposed Action will be inspected in the field during the wetland delineation task (see below). The watershed of each stream crossing will be identified and the stream categorized as a Tier 1, Tier 2 or Tier 3 crossing according to NHDES Stream Crossing Rules (Env-Wt Chapter 900.)
- c) Floodplains: FEMA floodplain and floodway lines will be identified and mapped based on available FEMA mapping.
- d) Wetlands: Wetlands will be identified using GIS-based NWI for the entire Study Area. Wetland delineation will be performed on a portion of the Study Area corresponding to the Proposed Action. This field work will also collect data on the functions and values of wetlands potentially impacted by the Proposed Action. Landowners will be notified by the DEPARTMENT. VHB will survey wetland boundaries using a GPS unit with sub-meter accuracy. Delineations will be conducted using the technical criteria contained in the 2012 USACE Northeast Regional Delineation Supplement to the 1987 Corps Wetland Delineation Manual. A NH Certified Wetland Scientist (“NHCWS”) will oversee the delineations.

The top of bank of streams and surface waters will be delineated in accordance with the definitions in NH Administrative Rule Env-Wt 101.07 for all perennial streams. For intermittent streams less than 10 feet in width, only channel centerline will be flagged and located, notes on their widths will be documented. Additionally, for perennial streams to be crossed by the proposed alignment, bankfull indicators and preliminary geomorphological data will be collected as defined in Rule Env-Wt 902.04 and related rules. Bankfull width will be provided to structural engineers responsible for conceptual design of bridge crossings to allow for preliminary sizing. VHB will complete a Stream Crossing Assessment Report on the Contoocook River at the proposed crossing and at its reference reach to determine the Rosgen Stream Classification and design elements of the bridge.

To document and describe the wetlands a Wetland Delineation Report will be provided to the DEPARTMENT, and will include the completion of the following subtasks:

- Photographs of the delineated wetlands.
- Up to ten (10) USACE routine method data sheets will be completed, to document up to five (5) wetland/ upland boundaries (i.e., up to five transects, each comprising one wetland data plot and one upland data plot).
- Wetland cover types will be classified using the methods of Cowardin et al. (1979) at a scale of approximately 1-2 acres. Cover typing will be based on interpretation of aerial photography with field verification.
- Wetland functional evaluation data sheets will be completed at up to five (5) representative wetlands using the methods contained in the USACE Highway Methodology Workbook Supplement (1995).

VHB will note any unusual features such as invasive species, disturbed areas, or uncommon wetland types such as bogs or vernal pools. Delineations of vernal pools in NH shall be based on the

characteristics listed in the definition of “vernal pool” in NH Administrative Rule Env-Wt 100. If present, vernal pool limits will be flagged and GPS-located, and the pertinent data collected to describe biotic and abiotic features of the pool and surrounding area according to NH guidance. (Completion of this task assumes that delineation work will occur at the appropriate survey window for conducting vernal pool assessments.)

2.1.2 Land-Based Resources

- a) Soils: VHB will obtain GRANIT soil series within the study area for use in environmental and drainage analysis.
- b) Active Farmlands: Because the entire Study Area is defined as Urbanized Area (UA) according to the US Census Bureau, and because such urbanized areas are excluded from the Farmland Protection Policy Act (FPPA), it is assumed that no further data collection or analysis of farmlands will be needed.
- c) Public and Conserved Lands: Publicly owned lands, bicycle and pedestrian trails, and privately conserved lands will be identified based on GRANIT GIS data.
- d) Section 4(f) Resources: Parks, historic sites, or other areas subject to Section 4(f) will be identified. This will be accomplished using the results of cultural resource surveys (see Task 2.1.4), review of GRANIT GIS and coordination with the Town of Jaffrey and the NH Division of Parks and Recreation.
- e) Section 6(f) Resources: VHB will coordinate with the NH Department of Resources and Economic Development (NHDRED) to identify whether there are any properties purchased or improved using Land and Water Conservation Funds (i.e., “Section 6(f) resources”) within the Study Area.
- f) Land Conservation Investment Program/ Land and Community Heritage Investment Program: Review to identify whether funding from the LCIP/ LCHIP program has occurred within the Study Area.

2.1.3 Wildlife and Habitat

- a) Wildlife Habitat: VHB will conduct a planning-level wildlife habitat evaluation. To complete this assessment, the VHB will:
 - Review existing mapped wildlife and published habitat information relevant to the Study Area.
 - Collect data from the NH Wildlife Action Plan (WAP) from the NH Department of Fish and Game.
 - In conjunction with the wetland delineation, perform a limited field review of the Study Area to verify mapped information and to make general observations on wildlife presence/ absence and habitat quality.
 - Conduct a preliminary Phase I Summer Habitat Assessment for the northern long-eared bat (if flagged by the USFWS IPaC system) following Appendix A of the *USFWS Range-wide Indiana Bat Summer Survey Guidelines*, April 2015. (No acoustic survey or other detailed survey methods are included at this time.)

Given its location within a relatively urbanized area, extensive impacts to wildlife are not anticipated. The goal of the assessment will be to verify the habitat types mapped by the WAP. The wildlife habitat evaluations will be aided by using data derived from New Hampshire Fish and Game Non-game

Program and New Hampshire Natural Heritage Bureau as well as supplementary data derived from academic institutions and federal agencies.

- b) Fisheries: Fisheries resource information will be collected from the NH Fish and Game and the National Marine Fisheries Service. VHB assumes that there would be no requirement to conduct an Essential Fish Habitat Assessment, but will consult with the National Marine Fisheries Service to confirm this understanding and to document the consultation for purposes of complying with the Magnuson-Stevens Act.
- c) Threatened and Endangered Species: Threatened and endangered species information will be collected based on coordination with the NH Department of Resources and Economic Development, NH Fish and Game and the US Fish and Wildlife Service. Specifically, VHB will:
- Verify that no federally-listed species are present in the project study area using the US Fish & Wildlife Service's (USFWS) Information, Planning, and Conservation System (IPaC). If any federally-listed species are present, VHB will further coordinate the Regional USFWS field office. If field surveys or other extensive work is required, an amendment to this agreement may be needed to specify the scope and fee for this task.
 - Coordinate with the NHNHBB and the NHFGD (and the USFWS if necessary) to obtain a GIS database of any known populations for use in screening and evaluating project alternatives in Task 2.6. If any state-listed species are present, VHB will further coordinate the Non-game Program. If field surveys or other extensive work is required, an amendment to this agreement may be needed to specify the scope and fee for this task.
 - Collect data on the potential occurrence of state-listed plant species as follows:
 - Contact the NH Natural Heritage Bureau using standard online data check procedures to identify whether protected plant populations are present in the Study Area.
 - While it is not yet known whether threatened or endangered species are in fact present, for purposes of this scope and fee, it is assumed that up to three such species may occur within the Study Area. Plant surveys will be focused in the areas indicated in NHNHBB correspondence and conducted at the appropriate typical flowering time for target species.
 - VHB will attempt to determine presence or absence of state-listed plant species and exemplary natural communities based on information supplied by NHNHBB using GPS mapping and typical diagnostic field and reference guides. VHB will coordinate with the DEPARTMENT and the NHNHBB on the scope and methods of the field survey.
 - The study area for plant surveys will include the area directly impacted by the Proposed Action, plus a buffer of approximately 100 ft. from the limit of disturbance.
 - If plants are found in the footprint of the Proposed Action or suspected but cannot be confirmed due to timing of the survey (for example, due to lack of flowers which is a key diagnostic), VHB will field locate the plant populations using GPS and will revisit these locations during the appropriate time for flowering. VHB will conduct up to two (2) visits to the project area for this purpose. If such populations are found within the project area, VHB will prepare a NHNHBB Rare Species and Occurrence Record and

attachments (photographs, figures, etc.) for submittal to the DEPARTMENT. Once reviewed by the DEPARTMENT, the documents will be submitted to NHDHR.

2.1.4 Cultural Resources

The Section 106 review of this Project will require preparation of several forms and studies, beginning with a Request for Project Review form, which will be submitted to the DEPARTMENT's Cultural Resources Program for review and revisions prior to the DEPARTMENT providing these documents to the FHWA and NHDHR as necessary.

- a) Request for Project Review: VHB will prepare a Request for Project Review form, which provides NHDHR with a project description and description of the Area of Potential Effects (APE), existing conditions photographs, list and description of properties in the Area of Potential Effects, and graphics that show the extent of the project site, location of properties and existing condition photographs within the APE, and extent of ground disturbance.
- b) Historic Architecture - Historic District Inventory Forms: The boundaries of the National Register-listed East Jaffrey Historic District encompass a large portion of the Project Area. The district nomination, prepared in 2002, may need to be updated to document significant changes to the district, such as intervening demolitions of contributing resources. VHB will prepare Historic District Area Form continuation sheets that address such changes. Preparation of the information that would be contained in the continuation sheets will include fieldwork and photography to document the significant changes to the district and a narrative that documents and explains these changes
- c) Historic Architecture – Individual Inventory Forms: VHB will prepare individual inventory forms per NHDHR survey manual for individual forms for up to eight (8) properties that are over 50 years old within the Project Area. Even more properties that are over 50 years old may be subject to potential indirect impacts. Thus, the exact number of individual inventory forms that will need to be prepared may exceed eight. If so, a separate scope and fee for these additional inventory forms will be provided after consultation with NHDHR, FHWA and the DEPARTMENT.
- d) Combined Archaeological Phase IA/ IB Investigation: VHB will subcontract with Independent Archaeology Consultants of Portsmouth, NH (the “Archaeologist”) to undertake a Combined Phase IA/ IB investigation of areas of archeological sensitivity for the selected alternative.
 - Archaeological Phase IA Investigation: To complete the Phase IA assessment, the archaeologist will review the site files at the New Hampshire Division of Historical Resources (NHDHR) to learn about the location, distribution, and type of archaeological resources present within 5 km of the project area. The archaeologist will also examine primary and secondary sources (soil maps, historic maps, local histories of Jaffrey) to review whether resources are likely to be present in the project area. Finally, the archaeologists will conduct an inspection of the project area to visually confirm whether settings are likely to have supported Pre-Contact (Native American) or Post-Contact (Euro American) settlement. During the Phase IA inspection, archaeologists may excavate several small test holes to see if intact soils are present. The deliverable for the Phase IA assessment is an end-of field letter report that articulates the results of background research and fieldwork and provides recommendations for follow-up (Phase IB) archaeological investigation. In spite of the high degree of development in the project area, it is anticipated that several portions of the Study

Area contain buried archaeological resources along the Contoocook River, along which ancient peoples camped, hunted, and fished.

- Archaeological Phase IB Investigation: Following acceptance of the Phase IA findings by DEPARTMENT and NHDHR, and following the completion of conceptual engineering of the Proposed Action, the Archaeologist will complete a Phase IB intensive archaeological investigation to confirm the presence or absence of archaeological resources within areas subject to direct impact. Because the project area will cross the Contoocook River, we anticipate that a portion of the Study Area will be found sensitive for both Pre-Contact and Post-Contact archaeological resources. The archaeologist estimates we will need to excavate approximately 100 shovel test pits to adequately cover all sensitive areas along a corridor we assume will measure no longer than 500 m (1600 ft.). The Phase IB fieldwork will require 10 work days to complete. Test holes will be hand-excavated 50-cm-by-50-cm shovel test pits, with 20% of these expanded to 1-m-by-0.5-m trenches to reach more deeply buried deposits to a depth of 1.5 m below ground surface. If cultural resources are discovered throughout the excavated profile and are suspected to continue below 1.5 m below ground surface, the archeologist will selectively excavate larger excavation units (2-m-x-0.5-m trenches) to ascertain the presence of resources in deeply buried contexts in the floodplain of the Contoocook River.

The archaeologists will excavate test pits with shovels and trowels in arbitrary 10-cm levels within cultural layers or natural soil horizons. When necessary, crews may utilize a bucket auger to identify more deeply buried soil strata. Archaeologists pass all displaced soil through ¼-inch screen to separate artifacts for collection. In the field, archaeologists will analyze and record soil characteristics such as color, compaction and composition, and record this information with digital photographs and detailed notes. They draw a profile of each shovel test pit on standardized forms, using the Munsell Soil Color Chart to record soil colors and recording the degree of compaction and soil texture for all natural and cultural strata. Crews will take digital photographs of each test hole, focusing on the wall that is profiled. Once recordation is complete, archaeologists will backfill each test hole.

Where artifacts are present, archaeologists will note their provenience, material type, and quantity. Crews place cultural material into re-sealable polypropylene bags accompanied by their provenience information (transect and STP number, stratum, level, depth, feature, date, and initials of excavator) written on archival-quality tags. IAC will separate fragile cultural materials such as bone or very small artifacts like needles or pins by placing them in sturdy protective containers within the artifact bag.

The Archaeologist will draft a scaled site map depicting the locations of STPs in the project area in relation to extant architectural or landmark features and records the locations of both test holes and features using a handheld Trimble® Juno 3B data collector and Pro 6H GPS receiver. The Archaeologist will also keep a daily log recording information about work progress, visitors to the site, safety issues, notations on the project area, weather conditions and/ or impediments to work, and general observations and results.

The archaeologists return all artifacts and documentation to IAC's archaeology laboratory for processing and analysis. Lab personnel clean, identify, and catalog artifacts using a Microsoft Access® Database and prepared them for permanent curation in polyethylene bags and acid-free boxes. For this project, IAC anticipates recovery of Pre-Contact and Post-Contact artifacts, ranging from lithic debris, stone tools,

Native American pottery to 19th-century ceramics, bottle glass, nails, brick, and more modern (20th-century) materials. Following analysis of the material culture, IAC will prepare a comprehensive report of findings along with recommendations for additional work, if warranted. The report will analyze the number, distribution, and location of artifacts to indicate whether the resources are potentially eligible for the National Register of Historic Places and would therefore require a Phase II Determination of Eligibility study. Because the size and number of these potentially eligible sites is unknown, additional Phase II investigations cannot be adequately scoped at this time. Therefore, if any such areas are found, IAC will provide a supplemental scope and fee estimate for this work at a later date.

2.1.5 Social and Economic Resources

VHB will work with sub-consultant RKG to provide an overview socio-economic analysis. RKG will identify the socio-economic relationship between the study area transportation/ circulation pattern, regional and local municipalities' Master Plans, and the businesses and residents within its immediate influence. In order to complete this analysis, RKG will:

- Review past studies and reports including previous project-related files and documents, as well as secondary source reports regarding the general economy of Jaffrey and the region. This includes master plans, economic strategies and related information available from the Town, Southwest Regional Planning Commission (SWRPC), state and other sources.
- Collect and analyze demographic and economic trend data for Jaffrey and the region. Much of this data exists within existing reports or sources, such as SWRPC or state agencies, which will be used to the greatest extent possible.
- Collect and analyze property data for downtown Jaffrey utilizing existing assessment data as well as real estate transaction data from public records. Estimate total sales of business establishments utilizing industry standards (sales per square foot), tax data (if available), and/ or proprietary forecasting data (e.g. ESRI, STDB, Claritas).
- Interview town and regional officials involved with planning and economic development as well as selected business and property owners in the downtown to solicit views on the potential impacts.
- Estimate the direct, indirect and induced socioeconomic impacts, including but not limited to cost of takings (using assessment data augmented with current market information), impact on business incomes, fiscal impacts (loss of property taxes), employment, etc. for the proposed alternative.
- Prepare a Technical Memorandum summarizing the findings and conclusions of the analysis.

2.1.6 Visual Resources

In accordance with FHWA guidance, VHB will develop a brief description of the existing visual character within the Study Area. The inventory will address the following:

- Visually Sensitive Resources: Visually sensitive resources will be identified including locations that are visually important for historic, scientific, or recreational reasons. Similarly, certain landscapes and resources may be important only to the local community.
- Visual Simulations: As part of this task, VHB shall prepare a suite of visualizations to simulate how the project area will look if the project is constructed. Visual simulations that will help portray the visual effects of the project using photomontages (i.e., the layering of other images

onto a background photograph), and illustrative 2-D rendering with limited 3-D rendering of project area based on the preliminary design alternatives. VHB will develop the visualizations from engineering plans, photographs of the existing project area, existing CAD and GIS information. Various computer imaging software including Autodesk Infravorks, 3D Studio Max, Bentley Microstation, Adobe Photoshop, ArcGIS, and Sketchup, will be used to digitally superimpose a depiction of the proposed project from each of chosen vantage points.

- VHB will work with the DEPARTMENT to choose up to four (4) points from which to create visual photomontages of the proposed project. Once chosen, VHB will acquire digital images of the project site from each of the four locations with a 50-52mm (film) equivalent focal length (34mm digital). GPS points will be recorded for each viewpoint. The digital image will be brought into Bentley Microstation or another platform as appropriate. These photomontages will be provided as pdf files as well as color images.

2.1.7 Noise

VHB shall perform, as necessary, tasks required to assess the project's potential for adverse noise impacts. The effects on noise levels at receptors adjacent to the project will be determined following the FHWA's Procedures for Abatement of Highway Traffic Noise and Construction Noise (23 CFR 772) and the DEPARTMENT'S *Policy and Procedural Guidelines for the Assessment and Abatement of Highway Traffic Noise for Type I Highway Projects*, effective April, 2011 (the Noise Policy). (See also Task 2.6.4.) If noise impacts are identified, noise mitigation measures will be recommended.

VHB will evaluate available documents, such as design plans, functional design report, aerial photography, CAD files, and traffic data to determine the site and project characteristics. A site visit will be conducted. VHB will conduct a noise monitoring program at up to four locations. The goal of the noise monitoring will be to validate the noise model prepared in Task 2.6.4. The loudest hour will be identified using peak hour traffic volumes. Traffic volumes and speeds will also be collected.

2.1.8 Air Quality

VHB shall perform, as necessary, tasks required to assess the project's potential for adverse air quality impacts. The results of the air quality study will be used to determine compliance with the State of New Hampshire Air Quality Implementation Plan, and the provisions set forth in the Clean Air Act Amendments (CAAA) and the National Environmental Policy Act (NEPA). The air quality study will be conducted following the guidance of the DEPARTMENT, the Federal Highway Administration (FHWA), and the Environmental Protection Agency's (EPA's) modeling procedures.

During the data collection phase, VHB will evaluate available documents, such as design plans, functional design report, aerial photography, CAD files, and traffic data to determine the intersections to be modeled. A site visit will be conducted. Based on this information, the traffic data from the design plans and function design report, VHB will organize and prepare the data in the appropriate format necessary for input into the air quality models. VHB will contact the DEPARTMENT to discuss the modeling approach. Additional modeling/ analytical tasks are described under Task 2.6.3 below.

2.1.9 Invasive Species

Invasive species mapping is not included in this phase; detailed mapping will be produced during final design.

2.1.10 Contaminated Properties Initial Corridor-Level Review.

This task includes preliminary activities related to defining the nature and approximate extent of soil or groundwater contamination that may be present on properties to be acquired or adjacent properties in situations where contamination from such properties has the potential to impact the project. The task will begin with collection of data through the GRANIT GIS Database, EDR Data Report, and NHDES One-Stop Online Databases. Results of the Study Area search will be provided to designers for environmental screening purposes. Because the Proposed Action will likely require partial or full acquisitions, and given the relatively urbanized nature of portions of the Study Area, all parcels within the project corridor will be subject to further initial site screening reviews for their potential for contamination. VHB will complete the following:

- NHDES Site File Research in Concord, NH.
- Field inspection of all parcels within the project corridor and locating any monitoring wells that may be impacted.
- Entry of initial site screening review results for all parcels within the project corridor into NHDOT's RASCAL database. This will include monitoring well locations, entering comments and recommendations in the Site Screening Results link, uploading parcel photos in the Parcel Photo link and entering Master ID into the DES File link, if applicable.
- Summary Reporting of Results in the ES document.

VHB will coordinate with the DEPARTMENT's Contamination Program to confirm findings, and will assess measures required to conduct geotechnical investigations within areas of potential contamination.

The following tasks are not currently included as part of this scope of services. If any of these services are required, additional scope and fee would be developed in consultation with the Town and the NHDOT Contamination Program Manager as requested.

- Phase I Environmental Site Assessments
- Completion of Preliminary Site Investigations, if warranted.
- Design services relation to remediation.
- Bidding and construction phase services.
- Construction oversight during remediation, including sampling and analyses.
- Preparation of DES closure reports and tank closure reports.
Building audits to inventory hazardous and special wastes for buildings that may require demolition.

2.2 Agency Coordination

VHB will attend up to three (3) DEPARTMENT monthly Natural Resource Agency Coordination meetings and will coordinate and attend one field meeting with the agencies to review resource impacts. It is anticipated that the VHB project manager and environmental task manager would attend these meetings. One additional technical staff member would attend up to two of these meetings. The resource agencies will be invited to appropriate Technical Advisory Committee meetings to allow conversation regarding impacts and findings.

VHB will also attend up to six (6) DEPARTMENT monthly Cultural Resource Coordination meetings with the NH Division of Historical Resources and Federal Highway Administration to discuss the recommendation and results of the individual and updated historic district forms; and the National Register recommendations of eligibility regarding these properties. Up to three of these meetings are anticipated to address effects, alternatives, and mitigation, including proposed language of the Memorandum of Agreement. It is assumed that the VHB project manager and up to two additional technical staff would attend these meetings.

2.3 Project Purpose and Need

VHB will develop a Purpose and Need Statement for the project consistent with FHWA NEPA guidelines. The Technical Advisory Committee will assist in the development of the draft and final versions of this statement. It is assumed that up to two revisions of the Purpose and Need statement will be provided prior to finalization. Because permitting will occur in a later phase of the work, review of the Purpose and Need statement by the Corps of Engineers will occur, but would not necessarily be adopted.

2.4 Alternatives – Summary of Development and Evaluation

VHB will develop a preliminary environmental screening Summary Matrix of the impacts and effects of the Reasonable Alternatives for use by the Technical Advisory Committee to assist in the selection and refinement of a Proposed Action. This screening-level analysis will be limited to preliminary assessment of resources which can be mapped based on published sources of data. The alternatives screening and selection process will be summarized in the Environmental Study. This will include initial alternatives concepts, screening criteria and results, and the basis for eliminating alternatives or options. It is understood that detailed environmental analysis will not be completed prior to the selection of the Proposed Action, but that screening-level environmental impacts would be used during the alternatives evaluation process.

2.5 Description of Proposed Action

VHB will describe the Proposed Action in detail, including location, dimensions, traffic patterns, amenities or facilities such as pedestrian crossings, construction issues, and estimated costs. Conceptual plan views, profiles and cross-sections will be included.

2.6 Environmental Impacts

VHB will identify resource impacts, potential measures to minimize or mitigate impacts, and possible resource enhancements that could be accommodated by the Proposed Action. VHB understands that detailed analysis of impacts will be limited only to the Proposed Action, unless otherwise specified in this scope.

As appropriate, resource information collected in Task 2.1 will be plotted for use in the analysis of impacts and for presentation in the Environmental Study. VHB will calculate impacts to mapped resources (areas, volumes and counts, as appropriate). This task involves conversion of GIS data into a CAD format as needed. CAD will then be used to assess impacts to mapped environmental/ infrastructure constraints such as wetlands, floodplains, surface and groundwater resources, wildlife and fisheries, endangered species, and hazardous materials. The mapping approach will be a four-step process. First, each data layer collected or created within the bounds of the project will

be clipped to the limits of the study area. Next, analysis will be performed to produce counts, areas and/ or volume of each impact. The results of the analysis will be put through quality control review. Finally, the analysis will be organized into tables and narrative form as appropriate to be published in the Environmental Study.

More detail on the methods used to analyze various impacts are described below.

2.6.1 Land Use and Social and Economic Resources

The economic sub-consultant RKG will estimate direct, indirect and induced socioeconomic impacts, including but not limited to cost of takings (using assessment data augmented with current market information), impact on business incomes, fiscal impacts (loss of property taxes), and employment. The findings and conclusions of the analysis will be summarized in a narrative Technical Memorandum and incorporated into the ES documentation.

2.6.2 Farmlands

Because the Study Area is defined as Urbanized Area (UA) according to the US Census Bureau, and because such urbanized areas are excluded from the Farmland Protection Policy Act (FPPA), it is assumed that no further data collection or analysis of farmlands will be needed. A brief narrative explaining this issue will be provided for inclusion in the ES.

2.6.3 Air Quality

VHB will complete the following air quality analyses:

MOVES Modeling: Traffic and Emission Data: The VHB will develop the traffic data for air quality analysis, including peak hour data and years of analysis. If necessary, VHB will prepare input files for the latest version of the EPA's MOVES emission factor model incorporating New Hampshire specific emission reduction programs. Emission factor modeling will be conducted to generate carbon monoxide (CO) emission factors.

Hotspot Modeling: The micro-scale analysis that will calculate the worst case CO concentrations at up to two intersections. The intersections to be modeled will be selected following the EPA's ranking procedures using level-of-service (LOS) and total traffic volumes. The micro-scale analysis will calculate maximum 1- and 8-hour CO concentrations at sensitive receptor locations that will be compared to the NAAQS. The EPA's CAL3QHC Version 2 computer model will be used to predict CO concentrations for the Existing and future year (No-Build and Build) alternatives. If any CO violations are predicted, mitigation measures will be developed and tested to meet the Clean Air Act Amendment (CAAA) criteria.

Mobile Source Air Toxics (MSAT): VHB will evaluate the project traffic and, as appropriate, provide a summary of the mobile source air toxics following the FHWA's *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA*.

Documentation: VHB will prepare a draft air quality report and a summary for the ES that documents the methodology, assumptions, results, potential noise barrier evaluations, and an appendix. This report will include appropriate visual aids, such as aerial photos or project plans, to clearly identify the locations and results of each modeled air receptor location. Once the DEPARTMENT provides comments, VHB will

prepare a final report and summary for the ES that address the DEPARTMENT'S comments. VHB will provide electronic copies of all model (CAL3QHC, MOVES, etc.) input and output files.

2.6.4 Noise

VHB will develop an abbreviated traffic noise model for both the Existing Condition and Build Condition roadway layouts using FHWA's Traffic Noise Model (TNM) program for each alternative. The TNM input data will include peak hour traffic volumes, vehicle speeds, and relative roadway and receptor geometry at each individual receptor location within the project area. The geometry and traffic inputs will be based on data from most current design plans available at the time of the noise study. The TNM will be used to determine the number of residences that experience sound levels exceeding the DEPARTMENT's noise impact criteria under both the Existing Condition and Build Condition for each alternative. If noise impacts are determined, then VHB will evaluate potential noise barriers along the project corridor. A preliminary assessment of a noise barrier will be evaluated following the DEPARTMENT'S noise abatement policy. The TNM will be used to develop preliminary noise barrier parameters by calculating sound level reductions associated with a potential noise barrier.

VHB will prepare draft noise report and a summary for the ES that document the methodology, assumptions, results, potential noise barrier evaluations, and an appendix. This report will include appropriate visual aids, such as aerial photos or project plans, to clearly identify the locations and results of each modeled noise receptor location. Once the DEPARTMENT provides comments, VHB will prepare a final report and summary for the ES that address the DEPARTMENT's comments. VHB will provide electronic copies of all model (TNM) input and output files.

2.6.5 Groundwater Resources

Using updated aquifer and public water supply well mapping, VHB will describe and potential impacts to these resources and will calculate the amount of new impervious surface areas within these areas.

2.6.6 Surface Water Resources

Estimates of direct impacts to intermittent and perennial streams will be tallied for the Proposed Action based on field-mapped stream data collected during the wetland delineation. VHB will use the most current conceptual plans for this impact assessment. Refined impact estimates will be developed for the Proposed Action as the conceptual design is advanced.

2.6.7 Chloride Loading (Salt)

VHB will estimate potential net increase in future chloride loads for the entire project area based on the estimated net change in lane-mileage for the Proposed Action. The potential net impact will be preliminarily assessed by comparing the estimated net chloride load increase to the size of the water body. Potential impacts for each individual discharge point or stream will not be estimated for this phase of the project.

2.6.8 Nutrient Loading (TN, TP & TSS)

For the Proposed Action, VHB will conduct a pavement-only, nutrient loading analysis based on the estimated net increase in pavement area for each preliminarily identified drainage outlet within the project area using the proposed roadway profiles and existing topography data. The nutrient loading

analysis will focus on estimating the net change in loading for total suspended solids (TSS), total phosphorus (TP) and total nitrogen (TN) based on estimated differences in pre- and post-development impervious area within each sub-catchment area. Based on the pollutant loading results, VHB will describe the overall removal efficiency and type of storm water treatment BMPs that will be necessary to maintain no net increase in the future loading for each of the water bodies. Preliminary storm water BMP locations and assumed roadway segments draining to each BMP will be identified as part of this analysis. It is assumed that actual BMP design and sizing will not be performed for this phase of the project.

2.6.9 Floodplains

Floodplain impacts will be calculated on an aerial basis for each alternative by overlaying the proposed limits of fill onto FEMA FIRM mapping. Fill volumes will be estimated for the Proposed Action.

2.6.10 Wetlands

Estimates of direct impacts to wetlands will be tallied for each alternative based on GIS-mapped wetland delineations collected during Task 2.1. VHB will use the most current conceptual plans for this impact assessment, and will update impact estimates for the Proposed Action as the conceptual design is advanced.

2.6.11 Wildlife/ Vegetation/ Fisheries

VHB will quantify the amount of wildlife habitat, vegetation and fishery habitat impacted by the Proposed Action by overlaying project limits onto resource mapping. A narrative discussion will identify the type and scope of potential impacts for incorporation into the ES.

2.6.12 Threatened or Endangered Species

VHB will develop an analysis of potential impacts to threatened and endangered species as follows:

- Consult with the NHFGD on the potential impacts to the state-listed wildlife species, if present, based on a qualitative analysis.
- Using the results of the field surveys for rare plants completed in Task 2.1, VHB will prepare a narrative analysis of potential impacts to these resources.
- If necessary, VHB will work with the NHFGD and NHNHB to develop recommendations to avoid or minimize potential impacts which could include field marking locations for avoidance during construction, limitations on vegetation removal, or potentially relocating the plants/ animals to a new area outside of the immediate construction zone(s) and/ or construction phase field monitoring and assessments.

2.6.13 Parks/ Recreation/ Conservation Lands

VHB will evaluate impacts to parks, recreation and conservation lands. Generally, the determination of impacts will include quantification of right-of-way acquisition from properties in one or more of these categories. A discussion of ROW and functional impacts will be developed for the ES and Section 4(f) Evaluation as needed.

2.6.14 Cultural Resources

The results of the Section 106 review (identification and description of historic properties and effects to them) will be summarized in the ES. Mitigation measures determined during consultation between the DEPARTMENT, NHDHR, and FHWA will be presented in the ES.

2.6.15 Hazardous Materials

The ES will identify properties which are known or suspected to contain contaminated soils or groundwater. Impacts will be quantified based on the amount of area impacted and a qualitative risk assessment will be discussed.

2.6.16 Visual Resources

VHB will develop a brief narrative discussion of the potential impacts to the visual environment resulting from the project addressing the following elements:

- Sensitivity of Viewpoints: The expected visual experience, the distance from the project, the duration of view, the scenic quality of the view, and the expressed public value in either local, state or national planning or other documents.
- Assessment of Visual Impacts: The degree to which characteristics of the proposed project may affect the overall experience of the landscape within the region as a whole or change views from highly sensitive viewpoints.

A summary of the report of the methods and findings of the visual assessment including photomontages will be produced for incorporation into the ES. The discussion of visual issues in the ES will include:

- A description of the visual environment
- Identification of the visual quality of the area
- Identification of any visually sensitive resources
- A description of the viewers of and from the highway
- An explanation of potential visual impacts
- Measures to mitigate adverse visual impacts

The discussion will explain the character of the visual environment and the visual impacts arising from the project while being commensurate in magnitude with the potential for visual impacts.

2.6.17 Environmental Justice (provided by the DEPARTMENT)

VHB assumes that the DEPARTMENT will conduct the Environmental Justice analysis. The results of the analysis will be incorporated in the ES narrative.

2.6.18 Indirect and Cumulative Impacts

The environmental impact discussion in the ES will focus on the Proposed Action – which has yet to be defined. However, as per NEPA guidance, the document will also briefly discuss the reasonably foreseeable indirect impacts and cumulative effects. Under this task, VHB will develop an analysis of

such impacts including the impacts on the environment that would result from the Proposed Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions. The discussion will include indirect effects, including growth-inducing effects and other effects related to induced changes in the pattern of land use, if such impacts are determined to be more than negligible. Due to the relatively limited nature of this project, the focus of this analysis will be on potential impacts within the Study Area, since regional effects are not anticipated. In developing this discussion, VHB will translate the findings of the socio-economic analysis into a limited discussion of the effects on relevant resources.

2.6.19 Construction Impacts

VHB will review the current plans for the reconstruction project and will discuss potential construction impacts such as noise, air quality, water quality, truck traffic, etc. in as much detail as practical. The discussion will address standard mitigation options including possible limitations on work periods to avoid effects to adjacent residential areas. General constructability analysis will be discussed to assess possible locations for temporary stormwater treatment areas.

2.6.20 Environmental Commitments

The ES will identify possible means to minimize or compensate for unavoidable impacts on various resources as is typical of NEPA documents. As necessary or appropriate, this effort will discuss measures to minimize wetland impacts, reduce noise, minimize the visual impact of the project, mitigate and/or minimize adverse effects on historical resources, and avoid impacts to water quality *etc.* Mitigation plans will be conceptual in nature and would not involve detailed engineering or analytical plans.

2.7 Section 4(f) and Section 106

VHB will prepare a Section 4(f) evaluation that complies with applicable federal laws and regulations, including Section 4(f) of the Department of Transportation Act, 23 CFR 774, FHWA's *Section 4(f) Policy Paper*, and other resources as appropriate. The evaluation will include: a description of Section 4(f) resources; a description of any project "use" of the resources; an alternatives analysis, including a least overall harm analysis; measures to minimize harm; coordination activities with FHWA; and conclusions.

VHB will also coordinate the Section 106 review with the DEPARTMENT, NHDHR, and FHWA, which involves identification of the APE which would be preliminarily defined in the Request for Project Review form, and subsequent preparation of individual and historic district area inventory forms, as needed; determination of effects to these historic properties, and if applicable, the preparation of a Memorandum of Agreement (MOA) that includes agreed-upon mitigation measures. If required, VHB will prepare a draft MOA that will summarize the Determinations of Eligibility and Effect, and which will further stipulate appropriate measures to mitigate adverse effects to historic and archaeological resources that are determined to occur. An initial draft of the MOA will be provided to the DEPARTMENT for review and revisions prior to the DEPARTMENT supplying the document to the FHWA and NHDHR.

2.8 Section 6(f)

Section 6(f) properties will be identified, and potential impacts to 6(f) properties will be quantified. Coordination for use of 6(f) properties will include one field meeting with the Department of Resources

and Economic Development and additional coordination activities if needed. Since direct 6(f) impacts are not anticipated, this task does not include a full 6(f) evaluation.

2.9 Environmental Study

VHB will compile an environmental study using NHDOT's standard format. The Environmental Study will address the following elements as necessary:

- Project Description
- Alternatives Considered
- Environmental Impacts of Proposed Action
- Section 4(f) Evaluation

VHB will work directly with the Town of Jaffrey, NHDOT and FHWA staff to ensure that the CE documentation and supporting Environmental Study adequately addresses agency concerns.

The Environmental Study will document the resource impacts outlined in this scope. The document will also identify which environmental permits are required, but the actual permit applications will not be prepared during this phase of work; permit applications will be prepared during future final design work. The Section 4(f) evaluation, resource reports, agency correspondence, and public meeting summaries will be appended. An administrative Draft will be prepared for review by the DEPARTMENT and FHWA. After comments are addressed by VHB, the Draft ES will be submitted to the DEPARTMENT, FHWA, the Town of Jaffrey, and all other parties as directed, for review. Twenty five (25) copies and forty (40) CDs of the Draft ES will be provided by VHB.

2.10 Final Environmental Study

Following review of the ES and comments received at the Public Hearing, VHB will meet with the DEPARTMENT and FHWA to go over comments. VHB will then revise and resubmit the document. It is anticipated one (1) review round will be necessary. Any public comments will be addressed by the Department through the Report of the Commissioner. Twenty-five (25) printed copies of the Final ES will be provided to the DEPARTMENT as well as a PDF copy and up to twenty five (25) CDs containing the document.

3.0 Public Participation

3.1 Prepare Public Involvement Plan

VHB will develop and submit to the DEPARTMENT for review and approval an outline of how the Team proposes to maintain public involvement throughout the course of the study. The plan will include public informational meetings, stakeholder workshops and other related study communications such as the project website, e-mails, newsletters and media communications.

3.2 Technical Advisory Committee Meetings

VHB will attend regularly scheduled Technical Advisory Committee meetings. For budgeting purposes, we have assumed nine (9) meetings will be held during the course of study. VHB will be responsible for:

- Preparing and distributing meeting notices and meeting agenda by email to all group members in advance of each meeting.
- Preparing presentation graphics, handouts, and support displays. Depending on the agenda, graphics could include large scale colored plan rolls, various design displays, PowerPoint presentations, computer visualizations/ renderings, landscape architectural perspectives/ sketches of alternatives, traffic simulations, and/ or video preparation.
- Leading technical portions of presentations relative to engineering, traffic, and environmental components of the project.
- Preparing and distributing meeting notes to the group.

3.3 Public Informational Meetings

VHB will facilitate up to three (3) public informational meetings (in addition to the Public Hearing). The first Public Meeting will occur early during the Preliminary Engineering Phase, with a second meeting occurring at the completion of the alternatives development, and a third meeting occurring during the NEPA Documentation Phase and will focus on the Proposed Alternative.

3.4 Project Website

VHB will develop and maintain a project website, regularly posting meeting notices and prepared meeting minutes for posting on the project website, and other pertinent information. VHB will maintain a project email listing and coordinate responses to comments and questions as submitted via the website.

3.5 Project Newsletter

VHB will develop up to three (3) colored newsletters to be published and distributed over the course of the study. The newsletters will be posted on the project website and distributed to key stakeholders, project abutters, resource agencies, and others as determined by the DEPARTMENT.

3.6 Public Hearing

VHB will assist the DEPARTMENT in preparation for the Public Hearing including determining and scheduling the meeting venue, preparing and distributing advance notice of the meeting, and the preparation of presentation material and graphics. VHB will attend and participate as needed at the Public Hearing. Subsequent to the hearing, VHB will assist the DEPARTMENT in evaluating, addressing and responding to the comments submitted at the hearing through the development of the Commissioner's Report.

4.0 Project Administration

4.1 Internal Project Team Meetings

The VHB Team Leaders and sub-consultants will meet regularly at VHB's office in Bedford, NH or by conference call to review project status, issues, and schedule – including some brainstorming sessions. For budgeting purposes, we have assumed eighteen (18) meetings over the course of the study.

4.2 Client Progress Reports

VHB will prepare monthly progress reports that will accompany all submitted invoices. The reports will summarize the study progress by task. Work under this task will include coordination with sub-consultants, team product and schedule oversight and project cost control.

4.3 Project Management

Work effort under this task is not technical in nature but rather is limited to the Study Manager's overall oversight of the project. The overall oversight includes such tasks as ensuring the direction of the project complies with project scope, schedule, and fee commitments, coordination with the DEPARTMENT on addressing requests from outside groups and agencies and for addressing requests from the DEPARTMENT.