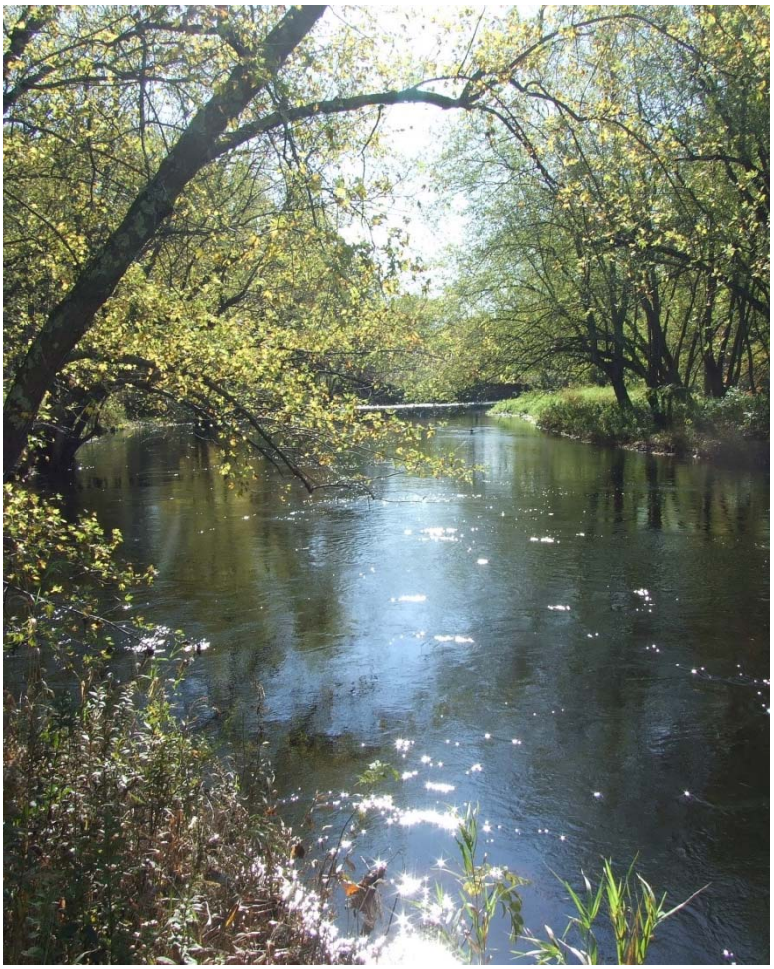
Preliminary Environmental Assessment
Northeast Energy Direct Pipeline



March 11, 2015

Prepared by:
Pipeline Environmental Impact Assessment Committee
Amherst Conservation Commission

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Executive Summary

This environmental assessment and the included recommendations have been prepared by the Pipeline Environmental Impact Assessment Committee of the Amherst Conservation Commission with assistance and contribution from other residents.

This assessment roughly follows the format for an Environmental Impact Statement (EIS) required for all Federal projects. Topics covered include land use, water resources, habitat and species, wetlands, geology and soils, visual resources, recreation, public health, hazardous materials, and air quality. Topics typically covered by an EIS that have been omitted from this assessment include safety, which is being covered by the Town of Amherst Board of Selectmen Pipeline Task Force team, and noise impacts, which has received general comment in the section on public health.

The Committee has focused its attention, review, and recommendations on the pipeline route proposed at this time by Kinder Morgan Energy Partners (Kinder Morgan) and its subsidiary Tennessee Gas Pipeline Company, LLC. The Committee recognizes that route changes may be proposed in the future, requiring updates to the assessment. Wherever in this report the pipeline route is referred to, the fact that the alignment is proposed (per the December 8, 2014 documentation from Kinder Morgan) and conditional is understood and the reference should be read with that understanding although not repeated with each reference.

Based on current knowledge, the installation of the natural gas pipeline proposed by Kinder Morgan appears to be intersecting with 2,600 linear feet of wetlands including 1,600 linear feet of the Ponemah Bog Sanctuary. The Ponemah Bog Sanctuary is a unique physical feature and one of the most visited recreational facilities in the Town of Amherst. Kinder Morgan should exercise a large degree of discretion in proposing to traverse and interact with this highly regarded natural resource. The alignment for the pipeline is proposed to cross the Souhegan River in four locations. Despite the impacts that may occur during construction of the 4.1 miles within Amherst, , and the potential for additional cleared pathways notwithstanding, the Committee has concluded that there will be limited long-term impacts on the natural systems affected by the pipeline construction provided concerns for the impacts on the pipeline from the acidic conditions in the subsurface of Ponemah Bog Sanctuary and from issues related to river channel meander potentially impacting the crossings of the Souhegan River are addressed adequately.

The Committee recommends that the Town join with abutting towns in any Federal or State proceedings. Furthermore, the Amherst Conservation Commission (ACC) recognizes that during construction there may be some impacts caused by the selected pipeline alignment or by the construction procedures that will or should be offset by mitigating steps that should include the Commission as party to any such deliberations.

It should be noted that these preliminary conclusions and recommendations are based on limited knowledge of the ultimate proposal for the pipeline alignment as well as the specific construction and operational methods to be employed. Additional studies should be conducted based on a final proposed alignment of the pipeline. The Town of Amherst and the ACC should request Kinder Morgan allow Commissioners to work collaboratively when conducting these studies and to provide preliminary findings to the ACC so that the Commission can review and provide feedback to ensure that all issues are addressed in a satisfactory manner.

Information on the contributors is given in Appendix I. Abbreviations used are summarized in Appendix II. Appendix III provides a list of the publications and sources used by the Committee in its efforts.

Cover Photograph: Souhegan River Flowing Past Amherst Conservation Lands (submitted by Bruce B. Beckley)

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1.0 Introduction

1.1 Purpose

This Preliminary Environmental Assessment of the proposed alignment of the Northeast Energy Direct (NED) pipeline is intended to give an overview of the ecological impacts potentially facing the Town of Amherst, New Hampshire. It is understood that the proposed pipeline alignment (as set forth by Kinder Morgan on December 8, 2014 may change during the development of the project. This Preliminary Environmental Assessment is not intended to be modified in its entirety during the development of the project and/or alignment of the pipeline. To the contrary, it is not anticipated that the Pipeline Environmental Impact Assessment Committee of the Amherst Conservation Commission (ACC) will revisit this document to make wholesale modifications. The Committee, however, may reconvene to discuss proposed changes to the project and the pipeline alignment and issue "addenda" to the report without altering the initial document.

This Preliminary Environmental Assessment will provide to the full membership of the ACC, the Town of Amherst Board of Selectmen, the residents of the Town of Amherst, and others the opportunity to review the potential ecological impacts of the proposed pipeline alignment. While the temptation was present to address issues such as global climate change or the need for alternative energy sources to offset impacts of less environmentally-friendly technologies, it was decided by the Committee to focus on the issues directly related to the Town of Amherst.

1.2 Role of ACC

On December 29, 2014, the Town of Amherst Board of Selectmen issued a letter signed by Selectman Dwight Brew to the ACC requesting that the Commission undertake on behalf of the Town an effort to assess the environmental impacts of the proposed NED pipeline. The ACC was established in 1968 under State of New Hampshire RSA (Revised Statutes Annotated) Section 36-A.3 "for the proper utilization and protection of the natural resources and for the protection of watershed resources" in the Town of Amherst. In addition to stewarding the Town lands and those directly assigned to the Commission, the ACC also has the responsibility under RSA 36-A.3 to steward all natural resources within the Town. As such, the ACC accepted the request of the BOS and formed a subgroup to assess environmental impacts, which assumed the title Pipeline Environmental Impact Assessment Committee ("Committee"). One member of the Committee was designated as "Liaison" to the newly formed Pipeline Task Force and members of that Task Force were invited to work with the Committee to complete this assessment.

1.3 Proposed Pipeline Alignment

The alignment of the proposed NED pipeline is presented in Figure 1.

At the west end of the pipeline alignment within the Town of Amherst (approximately Property IDs 1-10-3, 1-10-5, 1-19, 1-19-1, and 1-19-2) and generally coincidental with the existing Eversource Transmission Line, there appear to be vernal pools or other standing water bodies adjacent to or within the Eversource property. This water body, which is approximately 100 feet

long and 50 feet wide, surrounds an existing Transmission Line tower and may be caused by a lack of positive grading from the original construction for the support of the tower.

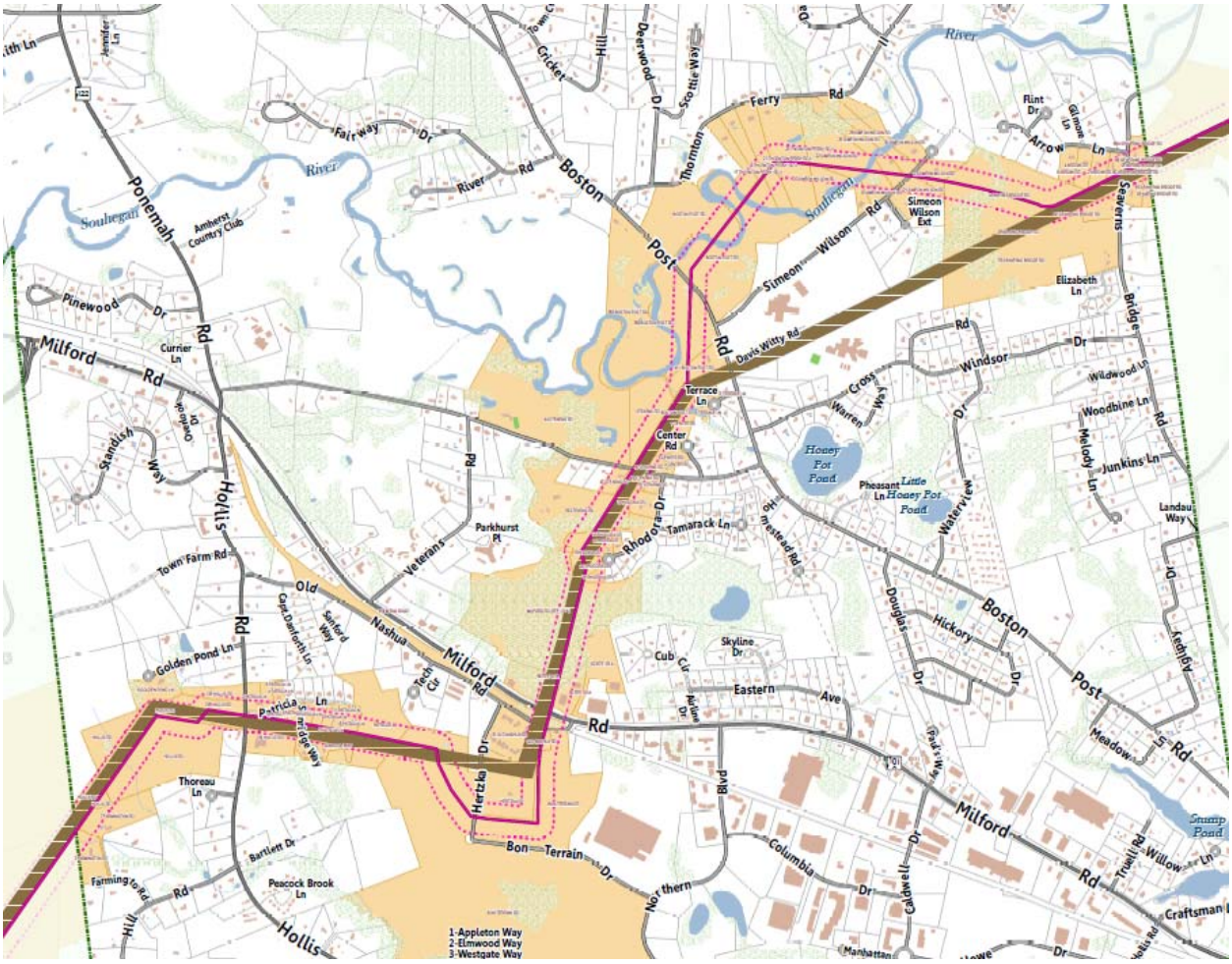

Figure 1: Proposed NED Pipeline Alignment – Town of Amherst
(Source: Nashua Regional Planning Commission)

To the west of Hollis Road (Rte. 122), Peacock Brook runs across 1-113-2 and 1-12, which was recently impacted by logging activities. The Brook is a tributary to Witches Brook, eventually connecting to the Pennichuck Brook, the water supply for Pennichuck Water Works, serving over 100,000 people in Nashua and surrounding communities, including the Town of Amherst.

After crossing Hollis Road (Rte. 122), the proposed alignment passes over three parcels (2-12-3, 2-12, and 2-26), which appear to have some water conveyance on the north side of the current Eversource Transmission Line. Furthermore, there may be some additional water bodies on these properties, based on aerial reconnaissance, despite the general removal of vegetation for maintenance of the Eversource Transmission Line.

The proposed alignment of the pipeline runs adjacent to the driveway for the Bon Terrain Water Tower, located off Hertzka Drive, crossing Hertzka Drive to the south of the current Eversource substation. Circumnavigating the substation, the proposed pipeline would turn north to a proposed metering station, which has been reported by Kinder Morgan personnel as "presently un-located" based on continuing negotiations with Liberty Utilities, a current Kinder Morgan contractee, who may desire to extract natural gas from the proposed pipeline in the vicinity of this location. Much of the land to the east of the proposed alignment is currently poorly vegetated, possibly from previous use as a sand and gravel facility. The proposed pipeline would pass northward over 2-26-3, the same owner as that of 2-26, as well as 2-26-1, a parcel owned by the Town of Amherst. The Town property is located at a low point of the Old Nashua Road Right-of-Way, and is known to receive rainfall runoff.

The proposed alignment of the pipeline traverses the 101A Right-of-Way (ROW), indicated by Kinder Morgan personnel at the February 18 Open House in Londonderry as to be constructed by horizontal/directional drilling (HDD). The proposed alignment of the pipeline cross a 5.78-acre commercially-zoned property on the north side of the ROW (2-87-3) and enters the 47.57-acre western parcel of Ponemah Bog (2-87). The pipeline runs across an undeveloped 6.68-acre parcel (2-87-5) and a parcel of 21.20 acres in trust to the south of the Stearns Road ROW. The pipeline is proposed to co-locate within the Eversource Energy property (2-27-2) and then altering alignment to circumvent Souhegan High School, entering a 4.85-acre residential property and 14.00-acre parcel (1-139), which is owned by Pennichuck Water Works and houses a booster station to the south of the Souhegan River. After crossing Boston Post Road, the proposed pipeline alignment crosses the 29.00-acre Scott Land (2-140), owned by the ACC.

The pipeline is proposed to cross three residential properties on Thornton Ferry Road II (4-63-3, 4-63-4, and 4-63), two residential properties on Thornton Ferry Road II north of the Souhegan River but with addresses on Simeon Wilson Road (4-62-7 and 4-62-9) – the former may be acquired by the ACC and the latter is crossed on both the north and south of the Souhegan River, and four additional residential properties on Simeon Wilson Road south of the Souhegan River (4-62-10, 4-62,11, 4-62-18, and 4-62-17), and a 30.00-acre undeveloped residential property (2-182-3), which contains a 12.38-acre wetland, before reconnecting with the existing Eversource Transmission Line ROW. Thereupon, the proposed pipeline alignment crosses three residential properties on Arrow Road (2-60-3, 2-60-2, and 2-60-1), Seaverns Bridge Road, and a residential property (2-61-2) before exiting the Town of Amherst at the Town of Merrimack.

1.4 Description of Construction Methods

1.4.1 Information Sources

At the time of this writing, (03/11/15) there are several open questions to be addressed to Kinder Morgan regarding which construction procedures will be used as the proposed 36" gas pipeline is installed across Amherst.

Installation procedures are well known and are being used elsewhere in the United States and other countries. Several short videos are available on the Internet showing construction in

several habitat conditions. These may be accessed under "Gas Pipeline Construction". Companies, including Ebasco, Barnard, and Williams have posted footage of their construction techniques including HDD.

The Argonne National Laboratory (ANL) has posted a document by its Environmental Science Division entitled, *Natural Gas Pipeline Technology Overview, ANL/EVS/TM/08-5*. This report presents construction practices typically used by several contractors. The Town may of Amherst and the ACC should request that the Federal and State licensing and inspecting authorities adopt many of the practices in the Argonne document as minimum standards for construction of the proposed pipeline.

1.4.2 Construction Methods Applied

The currently proposed plan for the pipeline in Amherst is to co-locate it on the existing Eversource Energy 345-kV ROW. That ROW is now cleared and periodically maintained with mechanical equipment that grinds up woody growth leaving the chips to mulch on the ROW. In addition to the high-voltage line, a second Eversource Energy sub-transmission line operating at 34.5 kV occupies some sections of the ROW.

The ROW passes through or over several varied terrain and habitat areas as described in more detail in Section 2.0. Each area will require specific procedures for construction, environmental protection, and restoration.

Dry Upland – this is the predominant terrain that the constructor will encounter. Approximately 90-percent of the ROW in Amherst appears to be of this type. When accessible in a month or two, a closer inspection of the route will be made. Construction in this terrain type is typically done beginning with additional side clearing (if required for equipment operation) followed by excavation of a trench deep enough to bed the pipe and cover it with 4-feet of selected backfill. Re-grading, provisions for erosion control, and re-seeding or planting native species complete the installation.

Wetlands and Small Streams – These vary from forested wetlands dominated by trees over 20-feet tall to bogs and vernal pools. From the aerial photography, it appears that 2,600 feet of the route may encounter wetland conditions. Also indicated are several small streams.

Construction across small streams and wetlands is typically done from mats to support the construction equipment to excavate a trench and lay the pipe. Pennichuck Water Works has recommended that the pipeline be installed under all wetlands using the HDD technique. The ACC does not endorse arbitrarily requiring the use of HDD for all such crossings of small streams and shallow wetlands. We conclude that HDD would require a wider ROW and larger work area thereby creating more environmental challenges than employing carefully planned conventional methods.

Major Stream Crossings – As currently proposed, the NED Pipeline is routed under the Souhegan River in multiple locations in order to avoid the segment of Eversource ROW which runs between the Souhegan High School and Amherst Middle School. These river crossings will

require HDD in order to construct the pipeline without interfering with river flows or associated habitat.

1.4.3 General Construction Impacts

Construction will have its impacts. Aside from those wetland crossings requiring HDD, typical pipeline laying on a prepared ROW has been demonstrated at about a mile of pipe installed per day. With allowances for New England soils, the constricted ROW and neighborhood courtesy such as limiting activity in residential areas to take place between 7 AM and 7 PM, pipeline laying might be completed across town in about a month.

The water used for hydrostatic testing probably would come from the Souhegan River. DES requirements for withdrawal and discharge will be necessary. The water used, to the extent feasible, should be re-used in testing subsequent sections as they are installed.

Regarding construction equipment emissions, the ANL report concluded that, "Direct emissions result[ing] from the construction of pipeline segments are considered minimal." The Argonne report lists emissions pollutants in pounds/day.

1.4.4 Impacts on Wildlife

The existing ROW which Kinder Morgan proposes to use is a man-created environment. Nature works hard to recapture the 300-plus acres of open grasses and shrubs for a forested habitat and, by so doing, to become home to a different species population not dependent upon woodland buffers and shrubs for browsing. The ROW has natural values of its own.

During construction some nesting species may be temporarily displaced. With the post-construction restoration of native ground cover, the ACC anticipates no extended wildlife disruptions. It is expected that mammal and amphibian species will likewise rebound, if disturbed at all. With proper use of silt control technology there should be less aquatic disturbance than that caused by springtime floods.

2.0 Environmental Assessment

This environmental assessment is a preliminary effort based on incomplete information and cursory review of the ecological conditions. The proposed pipeline alignment has not been examined on the ground due to the presence of snow. Furthermore, specific knowledge of vernal pools and other resources are unable to be assessed during winter as these are "vernal" (Latin for "spring") and are dependent upon winter snow melt.

Limitations notwithstanding, this environmental assessment attempts to call attention to the natural resources that may be impacted by either the construction or operation of the proposed pipeline. Subsequent and more thorough investigation is required to provide a complete assessment of potential environmental impacts.

2.1 Land Use

2.1.1 Existing Land Use

Based on a review of land use along the proposed pipeline route in Amherst as depicted by the Nashua Regional Planning Commission (see mapgeo.com), there are approximately seven different land use categories for properties along or abutting the proposed route.

1) Utility (6.2%) – With the exception of a proposed bypass in the vicinity of the Souhegan High School and Amherst Middle School, the proposed pipeline route aligns with the current Eversource Energy transmission line ROW along its entire path through Amherst. Land use for this ROW and a 13 acre parcel on Hertzka Drive are designated as Utility.
2) Open Space (13.6%) – Two properties designated as Open Space are traversed by the proposed pipeline route. These coincide with conservation lands owned by the Town of Amherst (Scott and Sherburne parcels) and the NH Audubon Society (Ponemah Bog Wildlife Sanctuary).
3) Vacant Land (16.5%) – Several areas abutting the proposed pipeline are designated as vacant land with no present use including large parcels where the route enters Amherst on the west and in several locations along the entire route through the Town.
4) Institutional (1.1%) – One 6 acre parcel abutting the pipeline route as it crosses Rte. 122 is designated as Institutional. This is the Amherst Christian Church property.
5) Commercial (3.5%) – Several Commercial properties are crossed by the proposed pipeline route. They are located on either side of Rte. 101A.
6) Residential (56%) – Residential properties (principally one household) abut the proposed pipeline route at several locations within the Town, but primarily in the eastern half.
7) Schools (2.8%) – This includes the Souhegan High School, Amherst Middle School and associated recreational fields.

2.1.2 Impacts

The principal impacts to current land uses from construction and operation of the proposed pipeline are associated with disruption during construction due to heavy equipment operation and potential blasting. Longer term impacts could occur as a result of disruption or interference with ground water and surface water flows to residential drinking water wells, the Souhegan River and its tributaries, and the unique setting of the Ponemah Bog Wildlife Sanctuary. Additionally, present use of the conservation lands on the Scott and Sherburne properties could be permanently disrupted by the presence of drill pads, relief valves or related pipeline infrastructure. Virtually all current uses of land in the immediate pipeline right of way would be encumbered by maintenance requirements and use restrictions for the final ROW.

2.2 Water Resources

Protecting water resources is one of the highest recommendations within the 2010 Amherst Master Plan with related action items of conservation of uplands and regulating development "as a watershed steward, considering the critical combination of water and land resources."

2.2.1 Existing Water Resources

2.2.1.1 Existing Groundwater Resources

Groundwater resources in the Project area are composed of stratified-drift, or overburden, aquifers. These deposits consist mainly of sand, silt, and gravel-sized particles including gravel and cobbles, which may yield a very efficient groundwater supply. According to the New Hampshire Department of Environmental Services (NHDES) Water Resources Primer (2008), "79 percent of the high-capacity wells in New Hampshire are located in stratified-drift materials". The aquifer system in Amherst is part of a much larger system that stretches to the north to Littleton and Whitefield and connected to the south to the system covering much of southeastern New England.

The aquifer within the Town of Amherst is the largest high-yield (greater than 2,000 ft^2/day) in the southern half of the State, corresponding to the largest population and greatest demand. There are 13.1 square miles of aquifer under Amherst (39% of total area), which is 15th highest of all municipalities in the State (NHDES, 2008). No sole source or State-designated aquifers were identified within the Town of Amherst. Under the Safe Water Drinking Act, the Town of Amherst has established an Aquifer Conservation and Wellhead Protection District. The proposed pipeline will be aligned within approximately 1.25 linear miles of the wellhead protection zone. Most residences and many businesses in Amherst utilize private wells for water supply.

2.2.1.2 Existing Surface Water Resources

The Town of Amherst contains numerous surface water resources including rivers, streams, wetlands, and vernal pools. The northern portion of the Town resides in the Baboosic Brook

watershed; the remainder of the Town resides in the Souhegan River watershed. Both watersheds contribute to the larger Merrimack River watershed. The State of New Hampshire General Court has designated the Souhegan River as a Class B waterway under the NHDES Rivers Management and Protection Program. According to NHDES Report to the General Court (2000), "The significance of maintaining a high level of water quality in the Souhegan River is evidenced by the use of wells in close proximity to the River for public drinking water supplies and by the presence of a high quality fishery." The Souhegan River currently is impaired [pursuant to the EPA 303(d) list] for aluminum, benthic macroinvertebrates, copper, dissolved oxygen, *Escherichia coli*, iron, lead, mercury, total phosphorous, and pH. Multiple agricultural operations in the basin utilize the Souhegan River for irrigation. The Souhegan River has been the focus of recent fisheries programs, which are discussed in more detail in the Recreational section.

The Souhegan River within the Town of Amherst experiences a considerable amount of fluvial erosion due to the nature of the soils (see Section 2.5 – Geology and Soils). As a result of this continual process of sediment removal, transport, and re-deposition, the watercourse of the Souhegan River is constantly moving within these soils. At least 29 oxbow ponds and fluvial vernal pools are present within 1,000 feet of the Souhegan River in Amherst, as reviewed by aerial photographs; many more, smaller waterbodies that have resulted from the active fluvial processes of the River may be revealed through ground inspection. Moreover, this creation of a new watercourse is happening presently, as evidenced by the changes in the watercourse in the vicinity of the proposed pipeline alignment that have occurred within the recent past. For example, the Souhegan River directly to the west of Boston Post Road, where Kinder Morgan is proposing to align their pipeline, has changed its position multiple times in the past 10 years. Likewise, the farmland and low-lying lands to the south and north of the Souhegan River to the east of Boston Post Road is subject to similar course modification.

Emergent wetlands, which provide water quality benefits, predominate the Souhegan River basin.

A large portion of the Souhegan River Basin resides in Federal Emergency Management Agency (FEMA) designated floodplain.

2.2.2 Impacts

2.2.2.1 General Impacts

According to the Town of Amherst Natural Resources Map, the proposed pipeline will be lain above and within a total of 2.6 linear miles of major aquifer including 0.2 linear miles in aquifer yielding 2,000 – 4,000 ft^2/day, 1.55 linear miles in aquifer yielding 4,000 – 8,000 ft^2/day yield, and 0.85 linear miles in aquifer yielding greater than 8,000 ft^2/day.

The proposed pipeline alignment crosses two properties to the west of Hollis Road (Rte. 122), one residential property abutting Boston Post Road, and three residential properties on Thornton Ferry Road II, five residential properties on Simeon Wilson Road, and four residential properties in the vicinity of Seaverns Bridge Road with private water supply wells. As there are no

municipal wastewater services with the Town of Amherst, all properties with structures contain private septic systems.

According to NHDES OneStop database, there are numerous hazardous waste generators, wastewater injection wells, and initial response spill sits within one mile of the proposed pipeline alignment. Additionally, there are 31 active and closed remediation sites in the Town of Amherst, many of which are in the industrialized zone in the vicinity of the proposed pipeline alignment. Contaminants released to groundwater at these locations, such as mercury, hydrocarbons, and other recalcitrant halogenated and non-halogenated volatile organic compounds, could adversely impact groundwater quality due to increased and altered activity in the aquifer. The scope of this assessment did not include a detailed investigation of the potential impacts to groundwater quality from hazardous materials released from these sites.

According to the NRPC NED-Environmental Resources Overlay Map, the pipeline crosses a waterway on a parcel on Hollis Road, another between Center Road and Terrace Lane and the Souhegan River in four locations to the east of Boston Post Road, impacting an estimated 2,200 linear feet of the River both directly (the alignment of the pipeline intersects with river) and indirectly (within the 400-foot study area); additionally, the 400-study zone intersects with approximately 700 linear feet of the Souhegan to the west of Boston Post Road.

2.2.2.2 Construction Impacts

Assuming a 150-foot construction zone, a total of 47.3 acres of land above a major aquifer would be impacted during construction. The proposed alignment will encroach 1.25 linear miles of wellhead protection zone, resulting in 22.7 acres of impacted wellhead protection zone during construction. The proposed pipeline will be lain within approximately 1.6 miles within the 100-year floodplain, resulting in 29.7 acres of impacted 100-year floodplain during construction.

Many construction activities can affect groundwater resources including clearing and grading, which may remove and alter riparian vegetation, hydrostatic testing, trench dewatering, which is probable given high groundwater elevations along much of the proposed pipeline alignment, blasting, spills or leaks of hazardous materials, and HDD. Such activities may result in reductions in water supply yields in wells on the properties along or near the proposed pipeline alignment. De-watered fluids would be discharged into vegetated upland areas to allow infiltration and to recharge the water table, producing a pathway for potential groundwater contamination. Groundwater resources also may be impacted by alteration of rainfall runoff and surface flow patterns as well as recharge caused by soil compaction, terrain alteration, and addition of impervious cover.

Kinder Morgan personnel have indicated that they will use the HDD intersect method at two locations along the proposed pipeline route. FERC requires an additional 50-foot buffer for workspace in areas of drilling near waterbodies, suggesting the aforementioned impacted acreages may be increased. Drilling utilizes a lubricating slurry of bentonite clay and unspecified additives to protect the drill bit, facilitate removal of cuttings, and maintain bore diameters. Depending on the depth to which borings advance, regional groundwater flows could be impacted including the need to breech underlying bedrock formations.

Impacts to surface waters may include increased sediment transport to and elevated turbidity in affected waterways as well as from releases of drilling fluids, which may coat the water body banks and beds with bentonite clay, hydrostatic test discharges, which may erode stream banks and scour stream beds, and spills of hazardous materials contained in fuels and engine lubricants.

2.2.2.3 Operational Impacts

Assuming a 75-foot permanently, cleared maintenance pathway, 23.7 acres of land above major aquifer would be impacted during operation. The proposed alignment will encroach 1.25 linear miles of wellhead protection zone, resulting in 11.4 acres of impacted wellhead protection zone during operation. The proposed pipeline will be lain within approximately 1.6 miles within the 100-year floodplain, resulting in 14.9 acres of impacted 100-year floodplain during operation.

The meandering nature of the Souhegan River presents long-term concerns for the stability of the soils in which Kinder Morgan proposes to install the pipeline. The primary concern is that the soils may be subject to fluvial erosion, causing the rechanneling of the River. The potential for erosion requires reassessment of the proposed pipeline alignment from immediately north of Stearns Road to 5,500+/- linear feet to the east. It is possible that some of the proposed pipeline may become uncovered over this section during the lifetime of the pipeline if installed, as much of this pipeline alignment is proposed to be placed with standard construction techniques (i.e. trenched). Two specific location, the area immediately to the west of Boston Post Road and the area between the two proposed HDD sections on the north side of the Souhegan River – approximately Station No. 1100+00, are highly susceptible to future reposition of the riverbed (within the next 10 to 100 years based on recent activity). The shallow depth to which these sections will be lain creates a potential hazard of exposure and vertical conflict with the future watercourse.

More ubiquitously, compaction of soils during construction may reduce stormwater infiltration mechanisms, potentially reducing locally recharge capacity in the aquifer. If vegetation is not restored and maintained properly, erosion can persist, increasing sediment loads. These impact may be reduced over time as vegetative roots systems mature.

2.2.3 Recommendations

The Town may seek to ensure that Kinder Morgan conduct pre- and post-construction monitoring of well yield and water quality of any landowner with water supply wells within 150 feet of the construction workspace and to ensure that a temporary source of water is provided and require that landowners are compensated for damages. Accidental spills and leaks associated with refueling or storage of fuel, oil, or other fluids pose the greatest risk to groundwater resources. The Town of Amherst and the ACC should request that Kinder Morgan develop and adhere to a SPCC Plan to minimize the potential for groundwater impacts associated with an inadvertent spill of hazardous materials. Disturbances may occur to the ground surface; therefore, erosion controls and stormwater management must be implemented during and after construction.

2.3 Habitat and Species

Biodiversity

Amherst is home to a rich diversity of both flora and fauna species. The ACC programs are designed to protect and encourage this biodiversity for the residents – human as well as wild. Education and provisions for passive recreation in natural settings are important components of the Commission's agenda along with protection of natural open spaces.

No specific inventory of the natural resources has been completed for the entire route of the NED pipeline. Inventories of plant and avian species have been made for the sensitive Ponemah Bog area. For other sections of the ROW, inventories made on comparable habitats nearby are fairly indicative of the species that may be expected to inhabit or use the proposed ROW.

Especially useful are references NR 2 and NR 3 (see Appendix III). The NBAS study, performed by ANL, provides inventories of upland and wetland areas including bogs. Grater Woods, for which report NR 3 (see Appendix III) was prepared, is about one mile away from the ROW and in the Souhegan River drainage area.

The Wildlife Action Plan, NR 1 (see Appendix III), is useful in depicting the regional significance of the area the proposed pipeline will traverse. The Plan also includes federal and state listed species. Along the route possibly some listed species could be encountered but none is specifically called out. The inventories on the NBAS identified the hog nosed snake as being observed on the Base and a bald eagle in the area. As concluded in the section on construction impacts, no long-term effects on these species (or others) are foreseen.

Reference NR 5 (see Appendix III) provides brief descriptions of the wetland habitats to be encountered. It makes recommendations for logging access routes which can also be applied to routes along utility rights of way.

References NR 4 and NR-6 (see Appendix III) both provide generic descriptions of the wildlife habitats involved and list the expected species using them. In NR 6, the Corps of Engineers writer states: "Riparian corridors are important in maintaining the ecological integrity of both wetland and the adjacent upland systems. In addition to providing hydrologic connections between different areas, they serve as habitat linkages…Preserving the biological integrity of these corridors is vital to the continued survival of the species that use them."

Reference NR 7 (see Appendix III) describes the river 10 miles upstream from Amherst as "Managed for trout and is stocked with brook, rainbow and brown trout. Atlantic salmon fry are also stocked."

Reference NR 1 (see Appendix III) provides information on flood plain forests. That habitat land cover is ranked as a "Highest Ranked Wildlife Habitat in NH". It occurs along the Souhegan River downstream from Boston Post Road to the Merrimack Town Line. In part the Wildlife Action Plan describes the flood plain forest.

Also referred to as riparian forests, they support diverse natural communities, protect and enhance water quality by filtering and sequestering pollution, and control erosion and sediment. Many wildlife species use these forests at some point in their life cycle. It would not be uncommon to find red-shouldered hawks, veery, or chestnut-sided warblers breeding in floodplain forests. Evidence of beaver, mink, or otter can usually be found along the water's edge. Other wetlands, like swamps and vernal pools, can be found in floodplain forests and these areas are particularly important for Jefferson salamanders, northern leopard frog, wood turtles, and state endangered Blanding's turtles. Since these species, like most wildlife species, use a variety of habitats, not only is a floodplain forest important but the adjacent upland is also crucial for these species.

2.4 Wetlands

Wetlands provide numerous ecological functions including sediment retention, contaminant amelioration, nutrient transformation and reduction, floodplain storage, groundwater recharge, and wildlife habitat. Wetlands in the area of the proposed pipeline alignment are regulated at the Federal level by the United States Army Corps of Engineers under Section 404 of the Clean Water Act (CWA) to review and issue permits for activities that would result in the discharge of dredged or fill material into waters of the United States, including wetlands, and at the State level by NHDES to meet water quality standards under Section 401 of the CWA.

2.4.1 Existing Wetland Resources

Wetlands in Amherst are regulated under the Town of Amherst's Wetland and Watershed Conservation District, designated systems with a dimension of 100 feet or greater as "Water Protection Wetlands" and of 50 feet or greater as "Significant Wetlands"; systems between 25-feet and 50-feet are considered "Other Wetlands". Numerous wetland areas have been identified in Amherst through Town of Amherst and Nashua Regional Planning Commission resources.

Emergent wetlands, which provide water quality benefits and habitat for numerous species, predominate the Souhegan River basin.

The largest wetland system in the vicinity of the proposed pipeline alignment is Ponemah Bog. Ponemah Bog, a peatland, is technically a poor fen and is the most heavily traveled sanctuary owned and maintained by the New Hampshire Audubon. It has a ¾-mile boardwalk leading to a large variety of plant communities. The plants include three species of orchids, one being the grass pinks, *Calopogon tuberosus*, and three species of carnivorous plants, with the pitcher plants, *Sarracenia purpurea*, one of these species.

The bog developed in a 100-acre glacial kettlehole. Having no water inlet or outlet, it resulted in the development of an ecosystem inhospitable to most plants due to the low nutrient level and high acidity. The 90% organic soil resulted from sphagnum moss growing on the surface of the water forming a thick mat, which was stabilized by interlacing roots and rhizomes from the herbaceous and woody plants that eventually slowly developed. This floating mat has 15 to 20 feet of acidic water (pH 4.5) beneath it; therefore, the common description, a "quaking bog."

This development has been very slowly happening over 10,000 years. Removal of narrow sections of the mat 70 years ago has seen very little regrowth of vegetation other than sphagnum moss due to the hostile growing environment.

Bogs and fens are frequently referred to as "berrylands" because of the copious fruits, which form on the shrubs. Therefore, abundant birds and mammals throughout the year frequently live in and visit them.

Numerous vernal pools are believed to exist in the proposed pipeline alignment, although most have yet to be documented, classified, or mapped. Vernal pools are subclassifications of emergent wetlands, comprised of transient ponds often formed in small, shallow depressions usually located within an upland forest. Vernal pools are typically flooded in spring (vernal) rainfall and snowmelt, typically dry in the summer, and are often refilled during fall months and provide critical developmental habitats for amphibians, macroinvertebrates, and other wildlife species. Vernal pools are known to exist in the Souhegan River basin, adjacent to the waterway and in adjacent properties with soil, hydrologic, and slope conditions amenable to the formation of these functionally critical systems.

2.4.2 Impacts

2.4.2.1 General Impacts

According to the NPRC NED-Environmental Resources overlay map, there are potentially indirect-impacted (within the 400-foot study area) wetlands on a parcel on Hollis Road and another parcel on Golden Pond, two potentially direct-impacted wetlands (the alignment of the pipeline intersects with NRPC-documented wetlands) on Patricia Lane (approximately 100 linear feet each), a public parcel between Old Nashua Road and Milford Road, or Rte. 101A (approximately 100 linear feet) – for which an argument could be made that it is stormwater-impacted and/or –created, and Ponemah Bog both south (approximately 1,600 linear feet) and north (approximately 300 linear feet) of Rhodora Drive. The pipeline crosses a wetland (approximately 100 linear feet) on the west side of Boston Post Road, the Souhegan River in four locations, a wetland (approximately 100 linear feet) on a parcel on Simeon Wilson Road, and a wetland (approximately 200 linear feet) on Seaverns Bridge Road. The total estimated linear distance the proposed pipeline will intersect is 2,600 feet.

Specific impacts to Ponemah Bog have been identified. Due to the hostile environment conditions present in Ponemah Bog, even minor disruption to the mat could take decades to repair, as has been evidenced from the situation of construction and maintenance of the Eversource Energy easement.

No wetlands would be affected at any of the aboveground facility sites.

2.4.2.2 Construction Impacts

Pipeline construction methods used in areas of known wetlands and vernal pools are soil-dependent with construction in stable soils closely mimicking that of upland installation (pipeline

assembly within the wetland) and construction in saturated soils using a push-pull technique, floating technique, or trenched under the stable soils at the bottom of the wetland. Pumps would be required for dewatering of trenches with discharges potential requiring long length of hose to a suitable receiving body or temporary dewatering pit.

Compaction of soils and disruption of emergent vegetation during construction will alter surface and subsurface hydrology including floodplain storage capacity. Potential discharge of drilling fluids, engine (vehicles and pumps) hydrocarbons, and other materials, which are likely to be recalcitrant in the highly absorptive soils, is a main concern during construction. Discharges of stormwater, trench de-watering fluids, and hydrostatic tests could increase sediment deposition to wetlands and vernal pools. Excavation of soils may result in the mobilization of recalcitrant chemicals such as nutrient or long-dormant hazardous materials, impacting not only the local environment but the larger, regional ecosystem for which wetland system provide critical function.

It is possible that smaller wetlands (those classified either as "Significant Wetlands" or "Other Wetlands") within the proposed pipeline alignment may be so greatly impacted from construction activities that offsite mitigation would be required as re-establishment would be impractical.

Concern has been expressed as to whether the acidic water within Ponemah Bog could impact the pipe material with HDD, a concern which requires a more detailed analysis to address.

2.4.2.3 Operational Impacts

Compaction of soils and disruption of emergent vegetation during construction will alter surface and subsurface hydrology, potentially for a very long time after commencement of operational activities, due to the slowly evolving nature of these natural systems. For example, seed germination could be altered, preventing the re-establishment of vegetation, or siltation could increase due to improper best management practices. Discharges of stormwater, trench de-watering fluids, and hydrostatic tests during construction would impact wetlands for a considerable time after construction due to the long retention times from low hydraulic head conditions, limited outflow of many of the wetlands and vernal pools (usually through infiltration to groundwater) and slowly evolving vegetation and observed in these fragile ecological systems.

As the lithological stratification is critical to the function of a wetland system, there is concern that topsoils and subsequent soil strata will be commingled during excavation, due to the saturated condition of much of the wetlands encountered by the proposed wetland alignment. The mixing of soil type during excavation and the subsequent backfilling (with commingled soils) would adversely affect the regeneration times required to return the system to a functional wetland. While trenching may be limited in width, disruption in any lateral hydraulic movement or biological or chemical activities may fragment wetlands, reducing the functional contiguous area of the wetland, impacting vegetation re-establishment of native wetland species, and jeopardizing the long-term sustainability of the system.

The low pH of both the water and the organic soil of Ponemah Bog could potentially increase the rate of deterioration of the pipeline. Since Ponemah Bog is an ecosystem with no water outfall or drainage, herbicide usage for management of the maintenance corridor could have significant deleterious effects.

2.4.3 Recommendations

The proposed pipeline alignment and the associated study area should be surveyed and all wetlands and vernal pools should be documented, classified, and mapped to further the assessment of specific impacts to these systems. It would be most ecologically advantageous to avoid disruption of wetlands and vernal pools altogether. If avoidance or disruption is not possible, disruption can be minimized through drilling beneath the hydraulically connected wetland soils for placement of the pipeline.

The Town may seek to secure protections for wetlands by requiring that vegetation outside the trenched area is removed above ground surface to avoid root system disruption and only permitting root system disruption in areas directly above trenched areas. Further protection could be achieved through mandating that soil strata are segregated during excavation by a qualified and independent soil scientist, covered during construction to avoid atmospheric exposure, and restored after pipe installation with compaction appropriate for proper hydraulic conductivity. The Town of Amherst and the ACC should request that Kinder Morgan ensure that all aggregate and soil are of local origin and are compatible with wetland and vernal pool functions. Restrictions on the use of herbicides in the vicinity of wetlands and vernal pools would prevent long-term impacts during operation. A long-term wetlands and vernal pools management program should be established prior to construction approval to be maintained through the life-time of the infringement.

2.5 Geology and Soils

2.5.1 Existing Geology and Soils

The surficial and bedrock geology underlying the proposed pipeline route has been mapped by the United States Geologic Survey and the New Hampshire Geologic Survey, though at varying scale and detail.

2.5.1.1 Bedrock Geology

The Generalized Bedrock Geologic Map of New Hampshire shows the Town of Amherst to be underlain principally by the Pre-Cambrian to Ordovician aged metamorphic and igneous rocks of the Massabesic massif. Bedrock (ledge) can be found closest to the surface in the western end of the pipeline route.

2.5.1.2 Surficial Geology

The Surficial Geologic Map of the Milford Quadrangle (Koteff, 1970) indicates that the proposed pipeline route traverses principally sands, silts and gravels associated with glacial Lake Merrimack deposited during the Wisconsinan glaciation. The pipeline route also intersects younger stream terrace deposits of silt sand and gravel associated with historic erosion and deposition by the Souhegan River, as well as more recent flood plain deposits. Swamp deposits are located throughout the Ponemah Bog area and glacial tills consisting of clay, silt, sand, gravel, cobbles and boulders are located along the pipeline route at the Milford-Amherst border.

2.5.1.3 Soils

The "Soil Survey of Hillsborough County" (1980) indicates three principal soil types can be found along the pipeline route and these correspond closely to the surficial geology. In the western portion of the pipeline route lie Canton-Chatfield soils characterized by moderately steep, loamy soils on hilly uplands. Hinckley-Windsor soils are found along the Souhegan River valley and are characterized as excessively drained sandy and gravelly soils. Occum-Pootatuck-Suncook soils characterized as loamy and sandy soils are found in the immediate Souhegan River floodplain.

2.5.2 Impacts

The presence of till and bedrock in the western portion of the pipeline route may necessitate blasting to bury the pipeline, which in turn could have deleterious impacts on nearby infrastructure or the quality and quantity of water supplied to residential drinking water wells. Burial of the pipeline through the peat deposits found in the Ponemah Bog may disrupt drainage and groundwater flow unique to that feature (see specific section on Ponemah Bog in Section 2.4 - Wetlands). Finally, pipeline construction through the soils found on either side of the Souhegan River may disrupt current agricultural activity.

2.6 Visual Resources

2.6.1 Existing Visual Resources

Visual Resources refer to the viewscapes, sightlines and other features visible to the human eye that may be impacted by the construction and operation of the proposed pipeline through the Town of Amherst. This assessment considers only generic categories of visual resources. These include existing vegetative cover (trees, shrubs, groundcover) on and abutting the proposed pipeline route. It does not evaluate site-specific resources or impacts. Presently, a visual buffer of mature trees and shrubs exists along much of the proposed pipeline route which serves to limit views of the existing Eversource power lines and poles from abutting properties.

2.6.2 Impacts

2.6.2.1 Construction Impacts

An approximate 150' wide construction and lay down corridor will have to be cleared for the proposed pipeline parallel to the Eversource ROW necessitating the removal of all existing vegetation. It is unclear how much or in what form any of this vegetation may be restored following construction. This clearing effort may result in loss of previous visual buffers opening up undesired views of the power line or other features. Additionally, mature trees of particular shape and beauty may be permanently lost to this clearing effort. Finally, above ground infrastructure associated with the pipeline such as relief valves and signage may be added as less desirable visible features.

2.6.2.2 Operational Impacts

Routine maintenance of the pipeline ROW would require the occasional presence of mowing equipment and potential clearance of vegetation which has become overgrown over time. These maintenance efforts would introduce the temporary visual impacts of the mowing equipment and potential for additional landscape alteration.

2.7 Recreation

2.7.1 Existing Recreation

The current recreation uses along the pipeline route include the following:

Boating, Fishing, Hiking, Swimming, Open Space Recreation. Tourism is New Hampshire's second largest industry and recreation areas provide value to the area.

There are two canoe accesses on the Souhegan River in Amherst and several other ports for kayaking and canoeing along the entire river. The Class II and, III rapids here are utilized in the spring months at medium to high water and begin the western region. There are sections in Amherst that are slower and ideal for family canoeing, swimming and picnicking even during the summer months when the river is otherwise too shallow.

The Souhegan River provides habitat for at least six resident cold and warm water fish species. Naturally reproducing fish species include small mouth bass, banded sunfish, pumpkinseeds, yellow perch, suckers and dace. Introduced game species include brown, brook and rainbow trout. The New Hampshire Fish and Game Department River stocks the River annually with more than 5,000 trout as part of a "put and take" angling program. The River is also stocked annually with up to 5,000 Atlantic salmon fry as part of an ongoing anadromous fish restoration effort by the Adopt a Salmon Family program sponsored by the Souhegan Watershed Association and the United States Fish and Wildlife Service. Further, adult salmon may return to their natal Souhegan to lay their eggs for the next decade or more.

2.7.2 Impacts

2.7.2.1 Construction Impacts

All recreation areas will be halted during construction. It is unclear if Kinder Morgan will invest in new canoe ports, conservation funds, or public relations outreach.

There may be a negative public perception issue during construction and future tourism may decline. Construction will be intrusive and visitors may remember the bulldozers, loud, destructive construction area and not return again. Out of state visitors are likely to avoid the construction area all together impacting recreation uses and neighboring businesses.

Construction would alter visual aesthetics by removing existing vegetation and disturbing soils. Construction would also generate dust and noise, which could be a nuisance to recreational users, and may interfere with or diminish the quality of the recreational experience by affecting wildlife movements and disturbing trails.

Improved canoe ports, restoration investment, and public relations need to be addressed in further detail.

2.7.2.2 Operational Impacts

It is unclear if there will be "pipeline inspection gauges" (PIGs) or how the area will be restored. More information is needed from Kinder Morgan to access how the operation will impact recreation uses, public perception, and scenic values.

2.8 Public Health

2.8.1 Existing Public Health

The Town of Amherst enjoys the public health benefits associated with economic stability including relatively clean air and water, below average amount of soil and groundwater contamination and remediation sites, and access to health care facilities. The Town has developed numerous regulatory mechanisms to ensure the continued public health scenario including protection of its natural resources through the establishment of an Aquifer Conservation and Wellhead Protection District as well as a Wetland and Watershed Conservation District.

2.8.2 Impacts

2.8.2.1 General Impacts

Public health impacts for operation of the pipeline would be most pronounced in the case of a rupture of the system. According to the United States Department of Transportation Pipeline and Hazardous Materials Safety Administration, there have been a total of 42 deaths and 172 injuries as a result of "significant incidents" associated with gas transmission pipelines in the United States since 1994; there have been an average of 63.5 "significant incidents" annually over the past 20 years, with a high of 110 in 2005.

The second greatest public health concerns from a transmission pipeline would be associated with non-rupturing leaks. Direct emission of natural gas, which contains approximately 50% methane (CH_4), can be detrimental to public health. Methane is an odorless, colorless gas and, if there is no additive to the gas transmitted, as there is in distributed product, potential victims may not be aware of exposure. Methane can cause acute toxicity through displacement of oxygen in the lungs, resulting in asphyxiation.

2.8.2.2 Construction Impacts

Impacts on public health are possible during construction activities for the proposed pipeline project including an increased risks of construction-related accidents. Moreover, construction impacts to public health could be realized by releases of hazardous or other materials from the construction areas to air or water resources. The release of increased emissions from vehicles and engines may adversely impact air and water quality. (Additional information on these specific impacts can be found in Section 2.2 – Water Resources and Section 2.10 – Air Quality.) Due to extra vehicle trips on roadways, especially those from construction vehicles, public health could be adversely impacted from the increased probability of traffic accidents. High-decibel construction activities may adversely impact noise pollution.

2.8.2.3 Operational Impacts

Operation of a transmission pipeline can pose additional public health risks beyond the rupture and leak scenarios discussed above. Activities such as maintenance and emergency repair generally would pose public health risks similar to those associated with construction. A possible scenario could be caused by accidental contact with the pipeline during construction activities by individuals not associated with Kinder Morgan. Given the obviousness of the location of a majority of the proposed pipeline alignment (i.e. within a vegetation-maintained corridor), such risk is unlikely. Risk of contact may be elevated in areas without the vegetation-maintained corridor (i.e. areas of HDD); however, the elevated risk may be offset by the increased cover in these areas.

Gas emissions (CO_2 and CH_4, which results from incomplete combustion) from the utilization of natural gas are major contributors to the global climate change, according to the Intergovernmental Panel on Climate Change. While there may be potential public health risks from the continued reliance on fossil fuel source of energy, an investigation on the impacts on global climate change are beyond the scope of this assessment.

2.8.3 Recommendations

The Town of Amherst should request minimum construction distances from residences or businesses that exceed that which is Federally- or State-mandated. Furthermore, the Town of Amherst and the ACC should request that all staging, excavation, and laydown areas, whether active or dormant, include temporary fencing. Discussion with Kinder Morgan and regulators may yield specific requests to install permanent fencing at aboveground facilities (valve, compressor stations, or metering stations) or other locales within the proposed pipeline alignment and impacted areas.

2.9 Hazardous Materials

2.9.1 Existing Issues with Hazardous Materials

Numerous sites have been identified in the vicinity of the proposed pipeline alignment that have or have had problems with hazardous materials. Several sites within one mile of the project have been documented through NHDES's OneStop database with PCB (polychlorinated biphenyl) contamination, spent halogenated compounds, waste oil spills, mercury, and non-halogenated volatile compounds (xylene, acetone). There are multiple subsurface wastewater injection site from municipal and recreational facilities in close proximity to the proposed pipeline alignment. Additionally, numerous residential petroleum storage tanks and commercial filling stations

No solid waste management facilities have been identified in the vicinity of the proposed pipeline alignment.

2.9.2 Impacts

2.9.2.1 Construction Impacts

The urban nature of the Rte. 101A industrial area suggests that fill material was likely used to level ground surfaces during development. Therefore, it is anticipated that trenching and backfilling during construction may mobilize contaminants such as polycyclic aromatic hydrocarbons, metals, and petroleum hydrocarbons and potentially impact groundwater resources.

2.9.2.1 Operational Impacts

Hazardous materials contained in the product may be deposited in soils and intersected groundwater during leaks. As each gas field exists in a unique geological environment and may be developed using proprietary techniques, it is difficult to assess what materials, hazardous or otherwise, may be present in natural gas. Detail analysis of the materials used in the development of the gas field and transmission including pipe, valves, separators, meter tubes, and fabricated assemblies is required to assess fully the potential hazardous materials that would be present in the transmitted gas.

2.9.3 Recommendations

A more thorough site investigation should be conducted using EDR to identify various facilities with potential and/or actual sources of contamination that may impact nearby groundwater along proposed pipeline and aboveground facilities. Subsequent sediments, soils, and groundwater should be field sampled to assess potential for impacts from hazardous materials.

The Town of Amherst and the ACC should request that Kinder Morgan provide a list of all constituents of the transmitted product, obtained through chemical analysis. Additionally, the Town of Amherst and the ACC should request that Kinder Morgan provide a list of all materials with which the product has come into contact during procurement and transmission.

2.10 Air Quality

Construction and operation of the NED Pipeline will contribute cumulatively to air quality degradation. Current Air Quality Conditions are moderate with no health impacts with current ranges. During construction air pollutant emissions and small particulates will contribute to poor air quality and present a significant health concern for people who suffer from respiratory diseases such as asthma and heart disease.

2.10.1 Existing Air Quality Conditions

The governmental standards for measuring air quality are the AQI and NAAQS. The AQI (Air Quality Index) is calculated by the EPA for five major air pollutants regulated by the Clean Air Act.: ground level ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2) , nitrogen dioxide (NO_2) and particle pollution (pm).

According to NHDES, as of Feb. 4, 2015, AQI is "Moderate" for Hillsborough County.

Current AQI, 58 "Moderate", Ozone, "Good", 0-50, no health impacts are expected when in this range, and Particles, "Moderate".

The table below presents the NH Ambient Air Quality Standards (NAAQS). (NH Code of Administrative Rules, Chapter Env-A 300), which are identical. Currently, there are NAAQS for seven criteria pollutants: ozone (O_3); carbon monoxide (CO); sulfur dioxide (SO_2); nitrogen dioxide (NO_2); particulate matter of 10 micrometers diameter and smaller (PM_{10}); fine particulates 2.5 micrometers and smaller ($PM_{2.5}$); and lead (Pb). Compliance with these

Table 3.2-1 National and New Hampshire Ambient Air Quality Standards

Pollutant	Standard Type	Averaging Period	Standard Value[a]
Carbon Monoxide (CO)	Primary and Secondary Primary and Secondary	8-hour Average 1-hour Average	9 ppm (10 mg/m^3)[c,d] 35 ppm (40 mg/m^3)
Nitrogen Dioxide (NO_2)	Primary and Secondary	Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)[e]
Ozone (O_3)	Primary and Secondary Primary and Secondary	1-hour Average 8-hour Average[g]	No Standard[f] 0.08 ppm (155 µg/m^3)
Particulates (PM10)	Primary and Secondary Primary and Secondary	Annual Arithmetic Mean[h] 24-hour Average[i]	50 µg/m^3 150 µg/m^3
Fine Particulates (PM2.5)	Primary and Secondary Primary and Secondary	Annual Arithmetic Mean[h] 24-hour Average[i]	15 µg/m^3 65 µg/m^3
Lead (Pb)	Primary and Secondary	Calendar Quarterly Mean	1.5 µg/m^3
Sulfur Dioxide (SO_2)	Primary Primary Secondary	Annual Arithmetic Mean 24-hour Average[k] 3-hour Average	80 µg/m^3 (0.03 ppm) 365 µg/m^3 (0.14 ppm) 1300 µg/m^3 (0.5 ppm)

standards must be achieved by any project to be constructed in the State of NH.

a. Short-term standards (1 to 24 hours) are not to be exceeded more than once in a calendar year.

b. Former secondary standards for carbon monoxide have been repealed.
c. ppm: parts per million.
d. mg/m3: milligrams per cubic meter.
e. µg/m3: micrograms per cubic meter.
f. The 1-hour average O_3 standard was repealed on June 15, 2005.
g. Maximum daily 8-hour average (averaged over a 3-year period, the 3-year average of the annual fourth-highest daily maximum 8-hour average O3 concentration must be less than or equal to the standard).
h. Annual PM10/PM2.5 average over a 3-year period must be less than or equal to the standard.
i. 99th percentile daily 24-hour mean PM_{10} concentration, averaged over a 3-year period.
j. 98th percentile daily 24-hour mean $PM_{2.5}$ concentration, averaged over a 3-year period.
k. National standards are block averages rather than moving averages.

Source: National – 40 CFR 50, Section 121; State – NH Code of Administrative Rules, Chapter Env-A 300

2.10.2 Impacts

2.10.2.1 Construction Impacts

The construction-related emissions would primarily be from diesel internal combustion engines and fugitive dust from earthmoving activities. Bulldozers, rock trenchers, bucket loaders, and other heavy equipment use diesel internal combustion engines, and would emit air pollutants. It is unclear if the area of tree removal and of decreased vegetation will impact air quality.

Fugitive dust would result from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. Construction impacts are comparable to the Algonquin Incremental Market (AIM) Project by Spectra.

Table 4.11.1-6 presents the total direct and indirect estimated construction emissions for 2015 and 2016.
Source: AIM EIS, http://www.ferc.gov/industries/gas/enviro/eis/2014/08-06-14-eis.asp

TABLE 4.11.1-6

Potential Construction Emissions (tons per year) for the AIM Project

Pollutant	2015 Direct Construction Emissions [a]	2016 Direct Construction Emissions [a]	2015 Indirect Construction Emissions [b]	2016 Indirect Construction Emissions [b]
NO_x	86.2	98.1	1.6	2.1
CO	116.6	155.2	11.1	14.8
SO_2	0.1	0.2	0.02	0.02
PM_{10}	59.6	43.1	0.05	0.06
$PM_{2.5}$	10.5 [c]	11.1 [c]	0.05 [c]	0.06 [c]
VOC	8.1	11.8	0.4	0.6
CO_2e	13,879	23,780	1,056	1,381
HAP (total)	0.4	0.7	0.2	0.2

[a] Direct emissions include fugitive dust emissions and non-road and on-road construction emissions.
[b] Indirect emissions include construction worker commuting emissions.
[c] A separate $PM_{2.5}$ emission estimate was not provided for non-road and on-road construction emissions or for construction worker commuting emissions. $PM_{2.5}$ emissions were conservatively assumed to be the same as PM_{10} emissions for non-road and on-road construction emissions.

2.10.2.2 Operational Impacts

The assumption is the pipeline route in Amherst is a closed system. If pigging is to be used, further review is needed. Compressor Stations are not proposed for Amherst currently and compressor stations have a significant impact on air quality. Further clarification is needed to determine the exact locations of the compressor stations, distances from Amherst and the compressor stations impact on Hillsborough County AQI.

The impact of the operating pipeline to Air Quality is leaking methane. The EPA does not currently regulate methane emissions and has not partnered with PHMSA to control methane leaks. Recent Studies in Boston and Washington DC have shown methane leaks are two to three times higher than government estimates. According to the July 25, 2014 EPA study, methane is a potent greenhouse gas (global warming potential 25 times that of carbon monoxide) and they estimated that more that 192 million dollars in natural gas was lost in 2011 due to leaks, cost that is borne by consumers.

For 2012, the 2014 GHG Inventory data estimates that potential emissions from leaks in production, processing and transmission are approximately 480,691 million MT of methane or about 8% of overall potential methane emissions from oil and gas.

3.0 Conclusions and Recommendations

Based on current knowledge, the installation of the natural gas pipeline proposed by Kinder Morgan appears to have limited long-term impact on the natural systems temporarily impacted by the pipeline construction. Of specific concern are potential impacts on the pipeline from the acidic conditions in the subsurface of Ponemah Bog Sanctuary and from issues related to river channel meander potentially impacting the crossings of the Souhegan River.

This preliminary conclusion is based on limited knowledge of the final pipeline alignment as well as the specific construction and operational methods to be employed. Additional studies should be conducted based on a final proposed alignment of the pipeline. The Town of Amherst and the ACC should request that Kinder Morgan work with the ACC when conducting these studies. Furthermore, the Town of Amherst and the ACC should request that Kinder Morgan provide preliminary findings to the ACC so that the Commission can review and provide feedback to ensure that all issues are addressed in a satisfactory manner.

The Town of Amherst and the ACC should request that Kinder Morgan:

- evaluate thoroughly the need to align the propose pipeline through the Ponemah Bog Sanctuary, carefully considering the potential construction impacts on the long-term health of this sensitive ecological system and the potential for impacts to the pipe material as a result of the acidic subsurface conditions;

- conduct pre- and post-construction monitoring of well yield and water quality of any landowner with water supply wells within 150 feet of the construction workspace and to ensure that a temporary source of water is provided and require that landowners are compensated for damages;

- maintain all staging, excavation, and laydown areas, whether active or dormant, with temporary fencing and place permanent fencing as determined through collaborative meetings between the Town and Kinder Morgan;

- perform a thorough site investigation to identify various facilities with potential and/or actual sources of contamination including field sampling of sediments, soils, and groundwater in areas determined by the Town to be of importance for potential mobilization of chemicals;

- provide a list of all constituents of the transmitted product or with which the product has come into contact during procurement and transmission, as determined by chemical analysis;

- develop and adhere to an Spill Prevention, Controls, and Countermeasures (SPCC) Plan;

- restore and maintain ground cover following pipeline construction to prevent and/or eradicate invasive species along the entire pipeline route;

- survey comprehensively the proposed alignment area and nearby areas and document, classify, and map all wetlands and vernal pools in order to quantify impacted acreage and determine potential mitigation or compensatory requirements;

- remove all vegetation in wetlands above ground surface to avoid root system disruption and that all soils are segregated during excavation by a qualified and independent soil scientist, covered during construction to avoid atmospheric exposure, and restored after pipe installation with compaction appropriate for proper hydraulic conductivity;

- ensure that all aggregate and soil used for fill or cover are of local origin and are compatible with wetland and vernal pool functions;

- not use herbicides in the vicinity of wetlands and vernal pools; and

- prepare and adhere to a long-term wetlands and vernal pools management program.

The Committee recognizes that during construction there may be some impacts caused by the selected pipeline alignment or by the construction procedures that will or should be offset by mitigating steps that should include the ACC as party to any such deliberations. The presence of Kinder Morgan's pipeline in Town can benefit the Town as a whole. The Commission's programs could benefit especially based on similar support provided by Kinder Morgan of conservation programs in other states.

The Committee further recommends that the Town join with abutting towns in any Federal, State or local activities associated with the proposed pipeline.

Appendix I

Members of the Committee and Contributors

Bruce Beckley grew up in the woods and on the hills of western Connecticut beside the Housatonic River. In this setting, he knew the love of the natural world in all its diversity. After graduation from MIT, he pursued a professional career in engineering and management with electric utilities in New England. Much of that time focused on nuclear power plant engineering, construction, and environmental management.

Nature and engineering became foci for Bruce's writing and photography. He has used these abilities in education and advocacy for conservation and sensible energy development. His library of photographs contains collections ranging from wildflowers to heavy construction and from beneath the ocean to mountain tops.

Bruce writes regularly on conservation subjects. He is a member of the Amherst Conservation Commission and the Amherst Land Trust through which he encourages natural space protection and enjoyment. The Beckleys live in Amherst, New Hampshire.

Bruce contributed to the development of Section 2.2 – Habitat and Species.

Rob Clemens is a resident of Amherst and a member of the Amherst Conservation Commission. Mr. Clemens is a retired professional geologist (CPG #6099) with over 35 years of experience in environmental protection programs and consulting. Rob contributed to the development of Sections 2.1 – Land Use, 2.5 – Geology and Soils, and 2.7 – Visual Resources.

Gina Frey is a resident of Amherst and a member of the Amherst Pipeline Task Force. Gina contributed to the development of Sections 2.6 – Recreation and 2.10 – Air Quality.

Jack Gleason, DMV is a resident of Amherst and a member of the Amherst Conservation Commission. Dr. Gleason is a retired veterinarian and served on the New Hampshire Board of Veterinary Medicine. He has been on the Nashua Audubon Chapter Board and the Steward for the Ponemah Bog Sanctuary for nine years. Additionally, he has served on the University of New Hampshire Cooperative Extension Continuing Education Committee as well as a Master Gardener and Natural Resource Volunteer since 2006. Dr. Gleason contributed to the development of Section 2.4 – Wetlands.

Paul Indeglia, Ph.D., P.E. is a resident of Amherst and an environmental scientist and professional engineer in seven states including New Hampshire. He has 29 years' of experience in consulting engineering and has worked throughout the United States to develop and improve infrastructure for the oil and gas industry, specifically in regards to the permitting process. Dr. Indeglia contributed to the development of Sections 2.3 – Water Resources, 2.4 – Wetlands, 2.8 – Public Health, and 2.9 – Hazardous Wastes.

Bill Wichman moved to Amherst with his family in 1967, but deferred almost all civic activity for the duration of an active career at Sanders/Lockheed/BAE. Following retirement in 1997, he

has served on the Conservation Commission (presently Treasurer), the Amherst Land Trust, the Stormwater Committee, the Recycling Task Force and the Cemetery Fields Replacement Committee. He has published the Newsletter for the Historical Society of Amherst since 1992 and served as its Editor since 2005. Bill provided critical information to the efforts of the assessment team by utilizing his GIS capabilities.

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Appendix II

Abbreviations Used

ACC	Amherst Conservation Commission
AIM	Algonquin Incremental Market
ANL	Argonne National Laboratory
AQI	Air Quality Index
CO	Carbon monoxide
CWA	Clean Water Act
Committee	Amherst Conservation Commission Pipeline Environmental Impact Assessment Committee
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
HDD	Horizontal/direction drilling
Kinder Morgan	Kinder Morgan Energy Partners
NED	Northeast Energy Direct
NHDES	New Hampshire Department of Environmental Services
NO_2	Nitrogen dioxide
O_3	Ozone
PCB	Polychlorinated biphenyl
PIG	Pipeline inspection gauge
$PM_{2.5}$	Particles less than 2.5 micrometers
PM_{10}	Particles less than 10 micrometers
ROW	Right-of-Way, or right-of-way
RSA	Revised Statutes Annotated
SO_2	Sulfur dioxide

Appendix III

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Section 1.0

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