

Appendix 4

NHDES Section 401 Water Quality Certification Application



October 19, 2015

William G. Comstock
NHDES Water Pollution Division
29 Hazen Drive; PO Box 95
Concord, NH 03302-0095

RE: Northern Pass Transmission Project – 401 Water Quality Certificate
Application

Dear Mr. Comstock:

On behalf of Northern Pass Transmission LLC, Normandeau Associates, Inc. is pleased to provide the attached application for a 401 Water Quality Certificate for work associated with the proposed Northern Pass Transmission Project for your review. Northern Pass is a 192-mile transmission line project that will bring 1,090 megawatts (MW) of clean, affordable energy from Hydro-Québec's world-class hydroelectric plants in Canada to New Hampshire and to the rest of New England. To bring this energy to the region, the project will build a new direct current (DC) transmission line from the Canadian border to Franklin, NH, where a converter terminal will be built to convert the electricity from DC to alternating current (AC). From there, a new AC transmission line will carry the energy to an existing substation in Deerfield, NH and into New England's electric grid.

A complete copy of the 401 Water Quality Certificate application for the Northern Pass project was provided to the five Local River Advisory Committees in the project area, and certified mailing receipts are included as proof of delivery.

We appreciate the pre-application meetings and informal discussions and guidance provided by you and your staff throughout this process. Thank you, in advance, for your review of this application. Please feel free to contact me if you have any questions or require additional information.

Sincerely,



Lee E. Carbonneau
As agent for Northern Pass Transmission, LLC.
Senior Principal Scientist
Normandeau Associates, Inc.

Attach.

Cc: Robert Clarke, Director, Transmission Business Operations, Eversource Energy
Kevin F. McCune, Supervisor, Environmental Affairs Licensing and Permitting

I. Applicant Information

Principal Place of Business of the Applicant

1. Eversource Energy Service Corporation, as duly authorized agent for Northern Pass Transmission LLC: Manchester, NH (Eversource Energy Park)
2. Eversource Energy Service Corporation, as duly authorized agent for Public Service Company of New Hampshire d/b/a Eversource Energy: Manchester, NH (Eversource Energy Park)

Mailing Address [Street, PO Box, RR, etc.]:

1. Eversource Energy Service Corporation, as duly authorized agent for Northern Pass Transmission LLC: 780 North Commercial Street
2. Eversource Energy Service Corporation, as duly authorized agent for Public Service Company of New Hampshire d/b/a Eversource Energy: 780 North Commercial Street

Telephone No.:

1. Northern Pass: 781-441-8057
2. PSNH: 339-987-7020

Email Address:

1. Northern Pass:
Robert.Clarke@eversource.com
2. PSNH: Kevin.mccune@eversource.com

Name and Title of Signatory Official Responsible for the Activity for which Certification is Sought (e.g., President, Administrator):

1. Eversource Energy Service Corporation, as duly authorized agent for Northern Pass Transmission LLC: Robert P. Clarke, Director, Transmission Business Operations
2. Eversource Energy Service Corporation, as duly authorized agent for Public Service Company of New Hampshire d/b/a Eversource Energy: Kevin F. McCune, Supervisor, Environmental Affairs Licensing and Permitting

II. Project Information

Name of Project:

The Northern Pass Transmission Project

Name of Town and County that contains the Project:

Multiple Towns (31), Coös, Grafton, Belknap, Merrimack, Rockingham counties

Name of Receiving Waterbody and Drainage Basin:

"MULTIPLE"

Summary of Activity (e.g., construction, operation, or other practice or action):

The Northern Pass Transmission Project (“Project”) is a new 192+/- mile transmission line that will carry 1,090 MW of renewable hydroelectric power from Canada to the State of New Hampshire and the New England region. The Project includes 158 miles of direct current (“DC”) transmission line from the Canadian border to a new converter terminal in Franklin, NH, and 34 miles of alternating current (“AC”) transmission line from the converter terminal to the Deerfield Substation. The 192 mile Project includes: 102 miles of existing transmission right-of-way (“ROW”); 58± miles of underground (“UG”) cable in existing road ROW; and 32 miles of new overhead (“OH”) transmission line ROW between the Canadian border and Dummer, NH. Expansion of the Deerfield Substation in the Town of Deerfield and the Scobie Pond Substation in the Town of Londonderry, with small upgrades to the two existing 345-kV lines between them is also required.

III. Additional Submittal Information

(PLEASE SUBMIT IN ELECTRONIC FORMAT AS MUCH INFORMATION AS POSSIBLE)

Please provide an individual response to each bullet, below. If applicable information is contained in the application materials, please provide a reference to the specific section in the application materials that will represent the response to the individual bullets, below.

Appendices:

Appendix A: USGS Maps

Appendix B: US Army Corps of Engineers Section 404 Permit Application

Appendix C: NHDES Wetlands Permit Application

Appendix D: NHDES Alteration of Terrain Permit Application

Appendix E: New Hampshire Watershed Report Cards for the Assessment Unit ID (AUIDs) associated with the nine development sites associated with the Project

Appendix F: Fisheries and Aquatic Invertebrates Resource Report and Impact Analysis

Appendix G: Alteration of Terrain/401 Plan Set

Appendix H: Stormwater Pollution Prevention Plan (SWPPP)

1. *Type of activity (e.g., construction, operation, other action such as water withdrawal) and the start and end dates of the activity.*

The Northern Pass Transmission Project (the “Project”) will involve construction and operation of a new OH and UG transmission line proposed to carry 1,090 MW of renewable hydroelectric power for 192 miles from Canada to the State of New Hampshire and the New England region. This will include the construction of a new DC to AC converter station, two substation expansions at existing Public Service Company of New Hampshire d/b/a

Eversource Energy (“PSNH”) substations, construction of six new OH to UG transition stations, and the establishment of temporary access roads, laydown yards, and temporary work/crane pads. The proposed Project route follows existing PSNH transmission line ROW or public road ROW for over 80% of its length. Within the existing PSNH ROWs approximately 78 miles of existing transmission lines of will be relocated to make room for the new line. Approximately 32 miles of the Project route requires clearing of new ROW.

Total permanent alteration of terrain associated with the proposed Project components will be 35.3 acres, the majority (33.7 acres or 95% of the total permanent alteration of terrain) of which will be associated with the proposed converter station, transition stations, and substation expansions (development sites). The construction of the transmission line portions of the Project will involve minimal permanent impacts (1.5 acres or 5% of the total permanent alteration of terrain) with temporary access roads and work pads restored following construction.

Other activities associated with the Project include upgrades of existing AC facilities (“AC System Support facilities”) at the Deerfield Substation in the Town of Deerfield and the Scobie Pond Substation in the Town of Londonderry. Small upgrades (the modification of ten existing structures) are also required to two existing 345-kV transmission lines extending 18 miles along existing PSNH ROW, between the two substations. The Project does not include any water withdrawals.

Construction is proposed to commence in the first quarter of 2017 and end third quarter 2018, and the Project is proposed to be energized and operational by the second quarter 2019.

2. *The characteristics of the activity: Whether the activity is associated with a discharge and/or water withdrawal and whether the discharge and/or withdrawal is proposed or occurring.*

Construction and operation of the Project involves several primary activities:

- Clearing trees on approximately 32 miles of new ROW (120 feet wide in the northern portion of the state); and clearing existing ROW in order to accommodate the project in another approximately 100 miles of the Project route to accommodate the new line;
- Establishing temporary on-ROW and off-ROW access roads and crane/work pads in OH portions of the Project area;
- Erecting approximately 1,178 new transmission structures, primarily lattice and monopole, spaced an average of 600 feet apart in the OH portion of the Project, and relocating another 1,132 existing transmission or distribution structures in the ROW;
- Establishing trenches, jack & bore and horizontal directional drilling (“HDD”) sites, and splice vaults along the UG portions of the line;

- Clearing, grading, and erecting electrical equipment for the following nine development sites:
 - Six transition stations (TS1 – 6) (Pittsburg, Clarksville (2), Stewartstown, Bethlehem, and Bridgewater)—approximately 2 acres each;
 - Two existing substation expansions (7.7 acres in the Town of Deerfield at the Deerfield Substation and 3.4 acres in the Town of Londonderry at the Scobie Pond Substation); and
 - One converter terminal (City of Franklin)—approximately 17 acres.

There are no Project components that require permanent water withdrawal or discharge, and no Project-related withdrawals or discharges are currently occurring.

Discharge types associated with the proposed Project include:

- Temporary and permanent wetland fills associated with construction activities and proposed infrastructure (see US Army Corps of Engineers Section 404 Permit Application and New Hampshire Department of Environmental Service (“NHDES”) Wetlands Permit Application, Appendices B & C);
- Short-duration stormwater discharges associated with construction activities (Construction Phase) that have passed through erosion control Best Management Practices (“BMPs”) as specified in the Project’s Stormwater Pollution Prevention Plan (“SWPPP”) (Appendix H); and
- Operational phase discharges of treated stormwater at the nine permanent development sites associated with the Project, including the proposed DC to AC converter station, six transition stations and two substation expansions (operational stormwater discharges detailed in the NHDES Alteration of Terrain Permit Application, Appendix D and pollutant loading analyses in also located in Appendix D).

These discharges will occur at the two major divisions of the Project: the transmission line and the development sites. The transmission line division of the Project includes the OH DC and AC transmission line and the UG DC transmission line and it associated structures, conductors, and UG infrastructure such as conduit and splice vaults. The development sites include the proposed DC to AC converter station in Franklin, six OH to UG transition stations, and the two existing substation expansion sites.

Construction or operation of the OH and UG portions of the transmission line Project will not have any unreasonable adverse effects on water quality. The permanent wetland and stream impacts (0.28 acres) associated with these parts of the Project is very small, and the majority of these disturbances will occur within areas that are already routinely disturbed by ongoing line maintenance activities.

The proposed converter station, transition stations and substation expansions will involve the majority of the permanent wetland and stream impacts (2.22 acres). These development sites have been designed to capture and treat stormwater during construction and the operational phases of the Project. The NHDES Wetlands Permit Application, NHDES Alteration of Terrain Permit Application and its associated SWPPP detail these civil engineering measures.

Steps will be taken across all portions of the Project to minimize potential pollutants within stormwater which could potentially threaten surface water quality. These include, but are not limited to:

- no use of pesticides (including herbicides and insecticides),
- restricted use of fertilizers limited to vegetation restoration efforts and restrictions within outstanding resource water (“ORW”) watersheds, Class A watersheds and near other sensitive waters/wetlands (discussed below),
- prohibitions against the use of road salt on temporary access roads or work pads, measures to prevent unauthorized uses along access roads that cross streams and wetlands including gates and other measures designed to limit access by off-road vehicles (“ORVs”),
- strict adherence to established and Project-specific construction, clearing and blasting BMPs (see item #3 below),
- detailed protocols to limit the risk of HDD “fracout” events and specific procedures associated with mitigating impacts if these occur, (see item #7 below).

3. The characteristics of the discharge and/or withdrawal

The types of discharges associated with the Project and the two major divisions of the Project are discussed above. Potential Construction Phase and Operational Phase discharges for each division will be discussed in detail in the sections below.

Construction Phase

The potential construction phase discharges are those associated with disturbances necessary to construct Project components for both the transmission line (OH and UG), and site development. The primary pollutant associated with construction activities involves suspended solids derived from the interaction of water (rainfall or meltwater) with disturbed ground surfaces (including sand and other fine mineral sediments, rocks, and fine organic soil material). The resulting stormwater can carry these suspended minerals and organic materials away from the construction site and into other waterbodies. The mineral and organic constituents of the stormwater are often referred to as and measured in terms of total suspended solids (“TSS”) and/or turbidity.

TSS/turbid stormwater discharges during construction will be addressed through proactive planning and protective measures, active monitoring and maintenance, and

restoration/mitigation when necessary. These include the adherence to numerous BMPs and the Project's SWPPP.

Stormwater Runoff Erosion and Sediment Controls

Erosion and sedimentation controls will be installed after tree clearing activities have been completed and prior to construction activities commencing. All work performed by Project contractors in New Hampshire will follow the NHDES *Best Management Practices Manual For Utility Maintenance In And Adjacent To Wetlands And Waterbodies In New Hampshire*, which is published by the New Hampshire Department of Resources and Economic Development (NHDRED)¹ and *NH Stormwater Manual, Volume 3* (NHDES, 2008).² Additionally, Eversource and Northern Pass require that all employees and contractors are trained on wetland BMPs that must be followed during construction activities.³

With respect to managing stormwater to protect sensitive wetlands and habitats during site preparation activities, Northern Pass's contractors will follow BMPs detailed in the *NH Stormwater Manual* and adhere to the conditions specified in the Certificate of Site and Facility to be issued by the NH Site Evaluation Committee ("SEC"). At the federal level, the Project will require a Construction General Permit ("CGP") through the US Environmental Protection Agency ("USEPA") National Pollution Discharge and Elimination System ("NPDES") Phase II program.⁴ A significant component of the CGP involves development and implementation of a SWPPP to govern site-specific construction activities and guide the required management of stormwater pollutants and sediments using BMPs prior to and during construction and after construction is complete until stabilization is achieved.

For UG portions of the Project, temporary erosion and sedimentation controls will also be installed and maintained in accordance with the New Hampshire Department of Transportation ("NHDOT") *Guidelines for Temporary Erosion and Sediment Control and Stormwater Management*.⁵

Northern Pass contractors will follow all appropriate procedures specified by state law and all permit conditions when they are issued for the Project. Land clearing (forestry) contractors are required to comply with NHDRED *Best Management Practices for Erosion Control on Timber Harvesting Operations in New Hampshire*.⁶ Blasting contractors will be required to adhere to the conditions specified in the Certificate of Site and Facility to be issued by the NH SEC will also observe local municipal ordinances. NHDES has produced technical publication *WD-10-12 Rock Blasting and Water Quality Measures That Can Be Taken to*

¹ <http://www.nhdf.org/library/pdf/Publications/DESUtilityBMPPrev3.pdf>

² <http://des.nh.gov/organization/divisions/water/stormwater/manual.htm>

³ http://www.transmission-nu.com/contractors/pdf/Contractor_Online_Training.pdf

⁴ <http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

⁵ <http://www.nh.gov/dot/org/projectdevelopment/construction/documents/erosioncontrolmanual.pdf>

⁶ <http://www.nhdf.org/library/pdf/Publications/BMPs%20erosion%20control%202004.pdf>

Protect Water Quality and Mitigate Impacts which outlines BMPs to protect water quality before and during blasting activities.⁷

Environmental Monitors and Water Quality Protection Plans

Northern Pass will employ the services of one or more environmental monitors (“Monitor”) who shall be or shall be directly supervised by a Certified Professional in Erosion and Sediment Control (“CPESC”) or a Professional Engineer licensed in the State of New Hampshire for the purpose of inspecting the site throughout construction and restoration phases of the work. The Monitor will provide technical assistance and recommendations to the Project contractor(s) on the appropriate BMPs in order to meet RSA 485-A:17 and all applicable NHDES permit conditions.

In addition to the Monitor, Northern Pass will develop and submit several additional plans designed to protect water quality to the NHDES for approval at least 90 days prior to the start of construction activities. Following approval of the plans, Northern Pass will implement the plans throughout Project construction.

Spill Prevention, Control, and Countermeasures Plan (“SPCC”)

Northern Pass will also prepare and submit an SPCC for the Project in accordance with federal regulations (40 CFR Part 112) that will include a certification from a Professional Engineer licensed in New Hampshire.

Concrete Wash Water Plan

In addition to the SPCC, Northern Pass will submit a plan to prevent water quality violations due to discharges of concrete wash water during construction.

BMP Inspection, Reporting and Turbidity Monitoring Plan

Northern Pass will develop and submit a Construction BMP Inspection and Maintenance Plan. A weekly erosion control meeting between the Project’s prime contractor and the Monitor will be held and minutes will be kept on file and made available upon request to DES. In addition to the weekly meeting, the prime contractor will inspect erosion control measures on a daily basis until construction is complete. The Monitor will conduct weekly inspections of erosion control measures during construction and report findings and recommendations to the Project’s prime contractor. The Monitor will also conduct pre- and post-storm inspections within 24-hours of a forecasted or measured 0.5 inch rain event to determine if the existing measures are adequate and functioning properly. A rain gauge (or gauges) and weather station(s) will be maintained to measure and record environmental conditions. One weather station and one rain gauge will be maintained within each of the four major counties associated with the Project (Coös, Grafton, Merrimack and Rockingham) (Project is located within only one town within Belknap County) depending on the location of active construction activities. Emergency inspections during storm events will be

⁷ <http://des.nh.gov/organization/commissioner/pip/publications/wd/documents/wd-10-12.pdf>

conducted when plumes are visible or if turbidity sampling indicates water quality standards are exceeded due to turbid stormwater from Project activities.

Turbidity Sampling Plan

Surface water sampling is proposed within specific areas along the Project alignment that are associated with the development sites and UG construction near sensitive surface waters, including ORW and Class A waters. Surface water sampling is not proposed in areas associated with OH line construction and UG line construction in non-sensitive areas/watersheds (see below). This will include pre-construction sampling and implementation of a pre-determined sampling plan and turbidity monitoring during construction in these areas. The plan will be developed based on guidance provided in the August 14, 2013 State of New Hampshire, Water Division Watershed Management Bureau memorandum regarding *Guidance for SWPPPs, BMP Inspection and Maintenance, Turbidity and Sediment Monitoring for NHDOT Projects with 401 Water Quality Certification* as authored by Gregg Comstock P.E. and Jocelyn Degler, or applicable more recent guidance provided by NHDES. The plan will be submitted to NHDES for approval at least 90 days prior to construction activities and implemented unless otherwise authorized by NHDES. A copy of the Project's Draft SWPPP is included in Appendix I.

Sensitive Waters/Wetlands

- ORW Watersheds

The Project crosses through several ORW watersheds including:

- Connecticut River (RSA 483:7-a I): Pittsburg, Clarksville, Stewartstown; and
- Waters within the White Mountain National Forest (WMNF) or that Drain to WMNF (Env-Wq 1708.05(a)): Stark, Easton, Woodstock; and
- Waters associated with the North Branch River [RSA483:7-a I (North Branch)] within the ROW in Raymond.

- Class A Waters

The Project crosses through Class A watersheds in 2 locations, including:

- Wild Ammonoosuc river and its tributaries, in the towns of Easton, Benton, Woodstock and Landaff, from their sources to the intake dam of the Woodsville public water supply system, Class A (Easton and Woodstock)
- All other surface waters of the Lake Massabesic watershed hitherto unclassified down to the crest of the outlet dam at the downstream end of the Manchester Water works canal serving the low pressure pumping station, Class A (Chester)

- Trout Fisheries and Rare Mussels

No impacts are proposed to any of the Quality Trout Fisheries in NH⁸. The majority of larger rivers and brooks will either be spanned by the OH transmission line or the cable will be installed UG via HDD. Where HDD is not used the cable will be placed in excavated trenches, which will be constructed in such a manner as to protect the existing stream crossings. Stormwater will be carefully managed and monitored throughout construction efforts and the majority of the area will be restored. Other potential effects on fisheries are discussed below, and in the NPT Fisheries and Aquatic Resources Report included in Appendix F. No rare freshwater mussels were found in the Project area, so no impacts are expected.

- **High-Quality Wetlands and Vernal Pools**

High-quality wetlands and vernal pools were identified based on a review of the resource's functions and values, landscape context and characteristics such as productivity for VP species and prior disturbances. High-quality wetlands and VPs are identified on the Project plans and impacts have been avoided and minimized where possible. These resources are discussed in detail within the NHDES Wetlands Permit Application (Appendix C) and shown in the attached Alteration of Terrain/401 Plan Set (Appendix G).

Table 1. Summary of Permanent and Temporary Wetland, Stream, and Vernal Pool Impacts

	Estimated Permanent Fill (acres)	Estimated Temporary Fill (acres)
Wetlands	2.48	137.11
Streams/Rivers	0.02	2.58
Vernal Pools	0.03	0.28
Total:	2.53	139.96

Detailed impact summary tables for individual wetlands and streams are included in the NHDES Wetland Permit Application and its associated appendices.

Transmission Line

Construction of the transmission line will include tree clearing and trimming, temporary access road and work pad establishment between and at the location of proposed transmission line structures for OH portions of the line, and trenches, jack & bore and HDD sites, and splice locations along the UG portions of the line. The vast majority of the proposed construction phase disturbances will be temporary in nature and occur within existing transmission and road ROW areas, and previously disturbed existing access roads

⁸ http://www.wildlife.state.nh.us/Fishing/trout_quality.htm

will be utilized where possible. The permanent footprint will be minimal and limited to the footings and/or foundations associated with the new transmission line structures for the OH portions of the line. For the UG portions of the line, the only at or above grade components will be man-hole covers associated with the splice locations with all the remaining components installed below grade.

Minimal clearing width of overhead transmission line ROW– Impacts shall be minimized to the extent practical during clearing activities, including vegetation removal, placement of fill, and use of low impact equipment where possible, tire rutting, and alteration of hydrology. The Project will involve clearing trees on approximately 32 miles of new ROW (to a width of 110 feet in the northern portion of the state) and selective clearing in 102 miles of existing ROW to accommodate the new line. The limits of the area to be cleared are shown on the NHDES Standard Dredge and Fill and Army Corps of Engineers Section 404/10 (Wetlands) Permit Plans.

High-voltage direct current (“HVDC”) UG transmission line construction will generally progress in a linear fashion, similar to that of installing a water or sewer main. Typical techniques used for UG construction include open trenching, direct-bury duct banks with concrete caps, “jack and bore,” and HDD. HDD will be utilized at all perennial stream crossings along the UG portions of the line. This includes the Connecticut River crossing in Pittsburg/Clarksville, all perennial streams along the northern UG section in Clarksville and Stewartstown and the southern UG section beginning in Bethlehem and terminating in Bridgewater. Each HDD installation will begin and terminate an average of 300 linear feet away from each water and will be carefully monitored for releases of drilling fluid (see Section 7, below). The amount of water needed for HDD and its source (surface water, groundwater, or truck) will be determined for each crossing during the detailed design process once geotechnical borings are completed. Water will be discharged to the ground surface and treated through filter bags or frac tanks, depending on local conditions. The fate of the residual material will also be determined during final design, but will be disposed of in a manner to preclude impacts to wetlands and surface waters. Stream impacts are not anticipated at other crossings associated with the UG portions of the Project. Existing culverts will be trenched under without disrupting the existing culvert and backfilled appropriately.

Transition Stations, Converter Terminal, and Substation Expansion Sites (Development Sites)

Construction of the nine development sites will involve the installation of erosion and sediment control BMPs, and will be sequenced to minimize, contain, and treat stormwater generated on each site. Details are provided in the BMP manuals referenced above, and located in the NHDES Alteration of Terrain Permit Application (Volume X, Appendix D).

Operational Phase

Transmission Line

The operational phase of the transmission line portion of the Project is not expected to result in any adverse impacts to surface water quality due to careful restoration and re-vegetation of all disturbed areas associated with construction. All disturbed areas will be restored to pre-construction grade and topography, to the extent practicable, seeded with an appropriate seed mix of native ground cover, and stabilized with mulch or other suitable materials. The UG sections within paved road surfaces or road shoulders will be restored to original conditions within the original roadway footprint, resulting in no additional impervious surfaces.

Impervious surfaces associated with the transmission line will be limited to the footprints associated with new transmission structures (which have minimal cross-sectional area) and at-grade man-hole covers associated with the UG splice locations.

Site Developments

The stormwater controls engineered for the nine development sites to manage stormwater runoff include site design, pollutant source controls, structural BMPs (including associated operation and maintenance measures), and construction phase practices. The systems have been designed to meet or exceed the requirements of the New Hampshire Stormwater Manual. The plans include long-term BMP maintenance and inspection plans for the catch basins, detention basins, infiltration sites, and other similar areas as applicable.

Three of the development sites are located within ORW watersheds, including Transitions Stations 1, 2, and 3. The aforementioned engineering controls, BMPs and construction phase practices will ensure compliance with 1708.05.

- ***Flow rate (cfs)***

Stormwater discharge flow rates vary depending on the intensity and duration of storm events and snow-melt. Flow rates from the development sites have been modeled for typical storm events and these are included in the NHDES Alteration of Terrain Permit Application.

- ***Potential chemical, physical, biological constituents***

As discussed above, the major constituent of the stormwater generated during the construction phase of the Project is likely to be TSS in the form of mobilized sediment from disturbed surfaces. Other potential constituents include oils and other fluids utilized on construction equipment. Applicable BMPs associated with the fueling of equipment in the field and those requiring spill kits and other countermeasures and procedures will also be followed throughout construction. Care will also be taken to minimize the spread of invasive species throughout the

Project site, including cleaning and brushing timber mats and other devices prior to being relocated.

- *Frequency (e.g., daily, hourly)*

The frequency of discharges during the construction phase of the Project is a function of the frequency of storm events (or rapid snow-melting events) and the nature of the stormwater and erosion control measures and BMPs that are in place at the time at any given location where work is occurring. Stormwater and erosion control measures will be installed prior to the initiation of work activities and monitored and maintained accordingly throughout the work until the areas are restored and stabilized. Treated stormwater discharges are likely to occur during the construction phase of the Project, however the frequency is difficult to predict with certainty and water quality impacts are not expected.

The frequency of discharges during the operational phase of the Project, from the nine development sites, will also be a function of the frequency and intensity of storm and snow-melt events along with the engineered capacity of the stormwater treatment measures integrated into the sites. The nine development sites have been designed to treat and detain stormwater based on the applicable NHDES requirements. Discharges from the transmission line during the operational phase of the Project are expected to be negligible compared with existing conditions due to the site restoration and stabilization measures that will be implemented following the completion of work.

- *Duration*

As with the frequency of discharges, the duration of any discharges of treated stormwater will depend on the intensity and duration of any storm or rapid snow-melt events. Other factors will include the capacity of installed stormwater and erosion control BMPs and measures and the engineered capacity of permanent stormwater treatment measures. The nine development sites have been designed to treat and detain stormwater based on the applicable NHDES requirements. Discharges from the transmission line during the operational phase of the Project are expected to be negligible compared with existing conditions due to the site restoration and stabilization measures that will be implemented following completion of work.

- *Temperature (Celsius)*

Stormwater treatment systems at the nine development sites associated with the Project have been designed to minimize the potential for elevating the temperature of discharged stormwater.

Stormwater and erosion control BMPs along the transmission line portions of the Project will not be detailed in detention ponds or other areas where the temperature would be likely to increase above ambient temperatures. Temporary access roads and work pads will be installed in such a manner as to limit the contact time of stormwater with the disturbed areas and shorten the flow path lengths.

See Section 7, below for more information regarding stream temperatures as they relate to trout and other aquatic life.

- ***Latitude and longitude (dd:mm:ss)***

The coordinates of important Project landmarks are included in Table 2, below. The USGS Location Maps, located in Appendix A, also detail the location of the Project.

Table 2. Coordinates of Important Project Landmarks/Components

Project Landmark/Component	Latitude	Longitude
Northern End/Project Start	45° 1'03.95" N	71°30'04.45" W
Transition Station 1 (Pittsburg)	45° 1'20.35"N	71°27'56.31"W
Transition Station 2 (Clarksville)	45° 1'9.09"N	71°27'39.91"W
Transition Station 3 (Clarksville)	45° 0'36.79"N	71°25'17.54"W
Transition Station 4 (Stewartstown)	44°56'2.21"N	71°22'12.85"W
Transition Station 5 (Bethlehem)	44°16'57.08"N	71°43'31.81"W
Transition Station 6 (Bridgewater)	43°42'41.84"N	71°39'26.30"W
Proposed Franklin Converter Station	43°23'32.54" N	71°38'59.17" W
PSNH Deerfield Substation	43°08'30.02" N	71°11'07.13" W
PSNH Scobie Pond Substation/Project End	42°54'18.31" N	71°20'29.21" W

4. *The existing and designated use(s) that are potentially affected by the proposed activities. (Designated Uses are listed in the NHDES Consolidated Assessment and Listing Methodology.)*

Designated uses for New Hampshire surface waters include: aquatic life, fish consumption, shellfish consumption (tidal only), drinking water supply after adequate treatment, primary contact recreation (i.e., swimming), secondary contact recreation and wildlife⁹. Stormwater control measures associated with the nine development sites have been designed according to the NH Stormwater Manual and any treated discharges are not expected to have any adverse impacts on designated uses or surface water quality. Pollutant loading analyses

⁹ NHDES. 2014. *STATE OF NEW HAMPSHIRE, 2012 Section 305(b) and 303(d) Consolidated Assessment and Listing Methodology*.

(item #6 below) have been completed for these sites, and support the assumption that there will be no adverse effects on surface water quality.

The New Hampshire Watershed Report Cards for the AUIDs associated with the nine development sites associated with the Project are included in Appendix E. Table 3 includes the watershed and AUIDs associated with the Project's nine development sites.

Table 3. Watersheds and AUIDs associated with the nine development sites

Site Development	Town	HUC 12 ID	HUC 12 Watershed Name	AUID(s)	AUID Name(s)
TS1	Pittsburg	10801010203	CLARKSVILLE TRIBUTARIES (CT River)	NHRIV801010203-07	Connecticut River
TS2	Clarksville	10801010203	CLARKSVILLE TRIBUTARIES (CT River)	NHRIV801010203-07	Connecticut River
TS3	Clarksville	10801010203	CLARKSVILLE TRIBUTARIES (CT River)	NHRIV801010203-06	Favreau Brook
TS4	Stewartstown	10801010401	UPPER MOHAWK RIVER	NHRIV801010401-04-01	West Branch Mohawk River
TS5	Bethlehem	10801030403	LOWER AMMONOOSUC RIVER	NHRIV801030403-09	Baker Brook – Unnamed Brook
TS6	Bridgewater	10700010404	PLYMOUTH/ASHLAND TRIBUTARIES (Pemigewasset River)	NHRIV700010404-07	Pemigewasset River
	Bridgewater	10700010404	PLYMOUTH/ASHLAND TRIBUTARIES (Pemigewasset River)	NHRIV700010404-03	Clay Brook
Franklin Converter Station	Franklin	10700060101	WEBSTER PLACE TRIBUTARIES (Merrimack River)	NHRIV700060101-08	Unnamed Brook
	Franklin	10700060102	BOSCAWEN-CANTERBURY TRIBUTARIES (Merrimack River)	NHRIV700060102-01	Merrimack River

Northern Pass Transmission Project
401 Water Quality Certification

Site Development	Town	HUC 12 ID	HUC 12 Watershed Name	AUID(s)	AUID Name(s)
Deerfield Substation Expansion	Deerfield	10600030704	PAWTUCKAWAY POND	NHRIV600030704-02	Back Creek – Unnamed Brook
Scobie Substation Expansion	Londonderry	10700061203	UPPER BEAVER BROOK	NHRIV700061203-11	Beaver Brook

Forty-three other HUC12 watersheds are associated with the transmission line portions of the Project; however, the Watershed Report Cards have been omitted based on the expectation that BMPs and other stormwater and erosion control measures will limit the potential for any degradation of any designated uses associated with surface waters. Permanent impacts are minimal along the transmission line portion of the Project, and areas of temporary impact will be restored following construction activities. On-site monitoring will ensure compliance with BMPs and other permit conditions designed to protect natural resources and surface water quality.

5. *The provision(s) of surface water quality standards (Env-Wq 1700) that are applicable to the designated uses affected by the proposed activities.*

Surface water quality and the designated uses associated with the waters located within or near the Project site will not be adversely impacted by the Project during the construction or operational phases. Measures to eliminate or reduce the discharge of TSS loaded stormwater during construction and operation of the transmission line and development sites have been discussed in detail, above.

The water quality standards associated with discharges of TSS in stormwater include:

- Env-Wq 1703.03c(1)a – Benthic Deposits
- Env-Wq 1703.03c(1)c – Turbidity
- Env-Wq 1703.08(a-b) – Benthic Deposits
- Env-Wq 1703.11(a-d) – Turbidity

The water quality standards associated with temperature (see Section 7, below) include

- Env-Wq 1703.13(a-b) – Temperature

6. *A pollutant loading analysis to show the difference between pre-development and post-development pollutant loads for a typical year. The objective of the loading analysis is to show post-development pollutant loads do not exceed pre-development pollutant loads. Loading analysis guidance and a simple spreadsheet model will be provided by DES. The loading analysis will be used to determine appropriate stormwater management measures,*

which must be effectively designed, installed, and maintained to ensure compliance with surface water quality standards.

The Project has completed detailed pollutant loading analyses per the methodology recommended by the NHDES for each of the nine development sites associated with the Project. The pollutant loading analyses are included within the NHDES Alteration of Terrain Permit (Appendix D) as Appendix J of the Stormwater Management Study for each site.

Pollutant loading analyses have not been completed for the transmission line portion of the Project as the majority of impacts are temporary in nature and it is assumed that the BMPs and other measures designed to prevent stormwater discharges will be sufficient to ensure compliance with surface water quality standards. In addition, the amount of impervious surfaces associated with the new transmission line is negligible compared with the pre-existing impervious surfaces. All areas temporarily disturbed will be restored and stabilized following construction activities.

7. *A description of any other aspect of the activity that would affect the chemical composition, temperature, flow, or physical aquatic habitat of the surface water.*

Temperature and Cold-Water Fisheries

The New Hampshire Fish and Game Department (“NH F&G”) requested that the Project identify the potential for increases in stream temperatures which could have an adverse effect on cold-water fisheries. Fisheries and mussel survey work plans were developed by Normandeau Associates (“Normandeau”) in consultation with state and federal biologists, and an Essential Fish Habitat (EFH) assessment was conducted following standard protocols (see Fisheries and Aquatics Report in Appendix F).

Tree canopy removal is expected to be the only activity likely to have more than a temporary effect on cold-water fisheries in the Project area, since no new permanent culverts, bridges, or stream relocations are planned. The Project area contains 163 perennial rivers and streams more than 1 ft wide (this is less than one per mile), and all were assessed for potential impacts to water temperatures through modeling. The Stream Segment Temperature Model (“SSTEMP”) was used to predict the likelihood of impacts to cold-water fisheries (using brook trout temperature tolerances) from proposed vegetation clearing activities in the Project area.

The results of the modeling and analysis revealed that the estimated increase in *mean annual* stream temperature resulting from vegetation clearing was not significant at any of the streams in the Project area, including the northern segment where new ROW would be cleared. The estimated increase in *maximum* July stream temperature resulting from vegetation clearing was significant for five of the streams within Section N1, where there is currently no maintained ROW. For one of these streams in Dixville (DX243S – Unnamed Trib – Sugar Hill Brook), the maximum stream temperature may temporarily exceed the

tolerance level for brook trout, an important cold-water species, during the warmest period of the year, which would potentially increase trout avoidance of the stream segment in the ROW. This is a relatively small effect on cold-water fisheries for a project of this size.

The Connecticut, Androscoggin, Merrimack, and Lamprey Rivers, including their tributaries, have been designated as EFH for Atlantic salmon eggs, larvae, juveniles, adults, and spawning adults. The proposed above ground ROW crosses the main channels and tributaries of the Merrimack and Lamprey Rivers, and tributaries of the Androscoggin and Connecticut Rivers. The Lamprey River is the only EFH river within the ROW that is currently accessible to Atlantic salmon, as dams on the other waterways prevent access. In addition to determining that impacts to water temperatures will have a negligible effect on fisheries, the potential for temporary construction related effects on EFH was considered. Since only the Lamprey River is currently accessible to Atlantic salmon, it was determined that construction activities near the Lamprey River that occur between October and June could have the potential for very minor effects on Atlantic salmon. However, the access paths were modified to avoid crossing this waterbody, clearing near the stream will be minor and done with all BMPs in place, and the closest earthwork will now be over 200 feet from the stream. Therefore, adverse impacts to the Lamprey River and its EFH will be negligible.

Horizontal Directional Drilling (“HDD”)

HDD will be utilized along the UG portions of the transmission line to minimize impacts to larger perennial rivers and brooks by allowing the line to be installed under these waters without needing to trench through the surface of the channel and bank areas. However, there is the potential for the release of drilling fluid into the environment, including the water being drilled under which could result in a short-term degradation of the water quality. In order to minimize the risk of such a release, a HDD crossings will be addressed in the Monitoring and Operations Plan (“M & O Plan”), which will be prepared and will specify the procedures that will be followed during the performance of HDD for the Project. The HDD activities will involve the installation of a DC UG transmission cable beneath certain rivers and waterbodies.

The protocols and procedures identified in this M & O Plan will be followed by the Projects’ HDD contractor(s) for each HDD crossing. As a result of permit and certificate conditions for the Project, additional conditions may be identified for specific HDD river crossings. The M & O Plan, along with any such site-specific conditions, will be incorporated into the HDD contract(s) for the Project. The plan will cover three conditions:

1. Normal Directional Drilling Conditions
2. Loss of Circulation
3. Drilling Fluid Release and Remediation

Table 4 summarizes the conditions, operational parameters and actions detailed in the M & O Plan as it will pertain to HDD Crossings.

Table 4. Summary of M & O Plan for HDD Crossings

Condition	Operational Parameters	Actions
Condition 1: Normal Directional Drilling Conditions	No drilling fluid release	<ul style="list-style-type: none"> • Exit pit bentonite removal • Perform routine drilling data collection • Conduct routine visual monitoring
Condition 2: Loss of Circulation	Loss of circulation during drilling	<ul style="list-style-type: none"> • Slow down drilling and adjust drill operation to regain circulation • Perform focused visual monitoring • Restart or continue drilling if no release is detected but continue to visually observe drill alignment and adjacent area(s)
Condition 3: Drilling Fluid Release and Remediation	Drilling fluid release confirmed	<ul style="list-style-type: none"> • Take appropriate steps to stop loss • Perform monitoring to define release area • Notify regulatory agencies • Perform bentonite sampling and notify NHDES of test results • Provide NHDES with copies of manifests of remediation and material disposal

8. *An original or color copy/reproduction of a United States Geological Survey Quadrangle Map that clearly shows the location of the activity and all potential discharge points.*

USGS Mapping is located in Appendix A.

9. *A copy of the final complete federal permit application or federal license application, including the federal permit, license, or project number.*

Please see Appendix B for a complete copy of the US Army Corps of Engineers Section 404 Permit Application.

10. *A copy of the NHDES wetlands permit (RSA 482-A:3), if necessary.*

Please see Appendix C for a complete copy of the NHDES Wetlands Permit Application.

11. A copy of the NHDES Alteration of Terrain Permit (RSA 485-A:17), if necessary.

Please see Appendix D for a complete copy of the NHDES Alteration of Terrain Permit Application.

12. The name(s) and address(es) of adjoining riparian or littoral abutters.

The names and addresses of Project abutters are included as a part of the US Army Corps of Engineers 404 Permit Application (Appendix B) and as a part of the NHDES Alteration of Terrain Permit Application (Appendix D)(for the nine development sites).

13. A plan showing the proposed activities to scale including:

- ***The location(s) and boundaries of the activities***

The locations and boundaries of the proposed activities are indicated in detailed engineering and permit plans produced to support the Alteration of Terrain Permit and this 401 Water Quality Certification Application (Appendix G). Another plan set detailing proposed water resource impacts is associated with both the NHDES Wetlands Permit Application and the US Army Corps of Engineers 404 Permit Application (one copy has been omitted). Detailed engineering plans for the development sites are included as part of the NHDES Alteration of Terrain Permit Application.

- ***The location(s), dimension(s), and type(s) of any existing and/or proposed structures***

Locations of proposed structures are shown in detail on the engineering and permit plans Appendix G. The general types of proposed structures are new OH transmission structures, which are comprised of the following major types:

- steel lattice configuration with approximate base dimension of 30' × 30', tapering to 6' × 5' column half way up the structure with four concrete foundations, approximately 3' to 5' in diameter
- monopole configurations approximately 5' to 10' in diameter at the base, tapering to approximately 1' to 2' in diameter at the top with concrete foundations, approximately 7' to 12' diameter
- tubular steel H-Frame structures 26' wide and approximately 52' wide at crossarm with combination of direct-embed and concrete foundations, approximately 3' to 4' wide

Typical techniques used for the UG construction are open trenching and direct-bury duct banks with concrete caps. In some locations the use of a Jack & Bore or HDD is required. The trenches will be excavated to the design depth and the sidewalls shored for support to allow safe worker access and protect the public. Conduits will be installed into spacers to maintain their position in the trenches. The conduits will be either backfilled with a granular material or a high slump concrete, then capped

with a layer of concrete for protection against accidental dig-ups. Any temporary shoring will be removed as the trench is backfilled. After backfill, roadways will be restored and paved and undeveloped areas will be restored.

Cable splice locations are installed along the UG cable route at intervals corresponding to the greatest length of cable that can be transported on a reel. This distance will vary depending upon the diameter and unit weight of the cable. Approximately 1,500–2,000 feet between locations is typical. Typical splice locations are constructed of precast concrete and are likely to be 6 × 8 × 20 feet. Each splice location will have two (2) man-hole covers at grade.

Work is also proposed at nine development sites, including six transition stations associated with the UG portions of the Project, the proposed Franklin converter station, and two existing substation expansions, one each at the Deerfield Substation in Deerfield and Scobie Pond Substation in Londonderry. The work at each development site will include the following:

- Survey, staking and protection of any sensitive areas
- Establish access to the work sites
- Implement to safety measures throughout construction
- Clear trees, shrubs and debris (if needed) from work sites
- Install temporary erosion and sediment BMPs
- Monitor and maintain BMPs throughout the duration of construction
- Grub, strip grade and restore to the design elevations
- Relocate existing transmission or distribution lines
- Excavate, install foundations, drainage systems, perimeter fence, ground grid and UG conduits within the station footprint
- Station materials, structures and equipment will be delivered to the site for installation
- Install steel structures and equipment on the foundations
- Erect buildings, install and terminate control cables and conductors.

Following the installation and prior to the energization an extensive electrical testing process begins to confirm that each piece of equipment and circuit is installed and operating in accordance with the specifications. As with the construction, the energization is a sequential process that energizes the equipment and facilities in a logical order to coordinate with the equipment and system requirements to meet the Project milestones. When construction is complete, final restoration of any disturbed areas will take place. Environmental controls are removed, though some may remain until the area is completely stabilized.

- *The location(s), name(s), identification number(s), and extent of all potentially affected surface water bodies, including wetlands*

Surface waters, including wetlands, are identified on wetland permit plans (Appendix B) and discussed in detail in the NHDES Wetlands Permit Application, US Army Corps of Engineers 404 Permit Application and as a part of the NHDES Alteration of Terrain Permit Application.

Also see the Watershed Report Cards for the AUIDs associated with the Project's nine development sites located in Appendix E.

Signature – MUST BE SIGNED AND DATED BY APPLICANT

To the best of my knowledge, the data and information described above, which I have submitted to the New Hampshire Department of Environmental Services, is true and correct. I understand that an approval of the requested 401 Certification based upon incorrect data may be subject to revocation of the 401 Certification. I have complied with all local regulations or ordinances relative to the proposed activity and have obtained or will obtain, prior to the commencement of any work, all other approvals that may be required.

Signed:  Date: 10/14/2015

Signed:  Date: 10/14/2015

Date: _____

Appendices:

Appendix A: USGS Maps

Appendix B: US Army Corps of Engineers Section 404 Permit Application (includes Wetland Plans)

Appendix C: NHDES Wetlands Permit Application (Wetland Plans Omitted)

Appendix D: NHDES Alteration of Terrain Permit Application

Appendix E: New Hampshire Watershed Report Cards for the AUIDs associated with the nine site developments associated with the Project

Appendix F: Fisheries and Aquatic Invertebrates Resource Report and Impact Analysis

Appendix G: Alteration of Terrain/401 Plan Set

Appendix H: Stormwater Pollution Prevention Plan (SWPPP) (Draft)

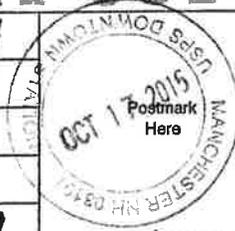
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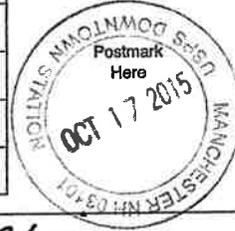
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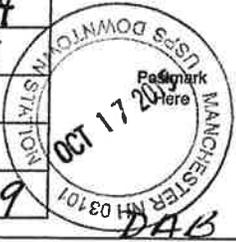
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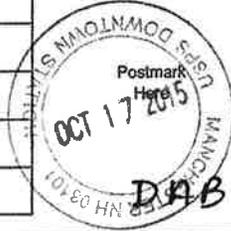
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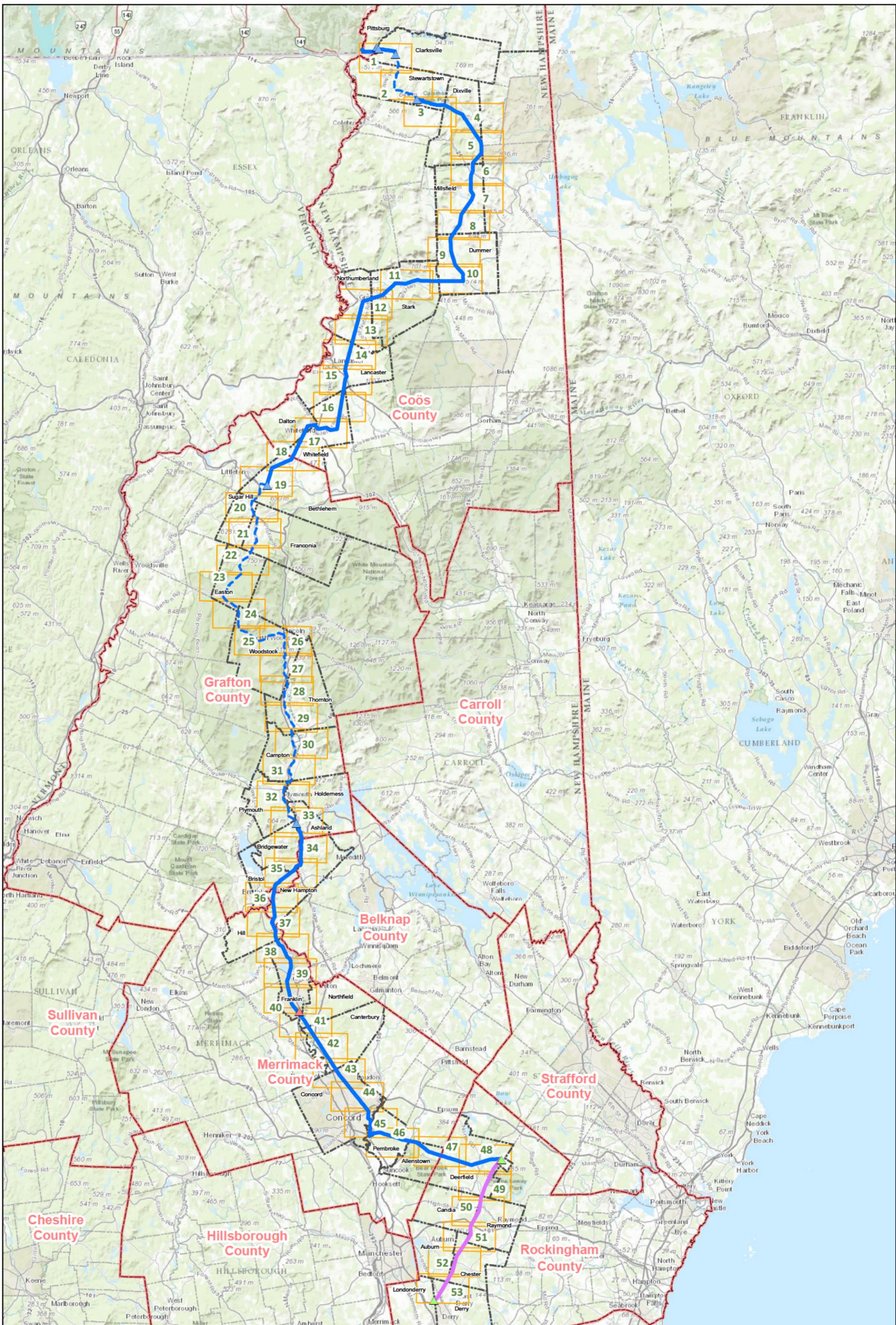


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Appendix A: USGS Maps

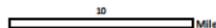


Legend

- Proposed Route (Overhead)
- Proposed Route (Underground)
- Deerfield to Scobie Pond Route
- ▲ Proposed Converter Terminal
- ▲ Existing Substation to be Upgraded
- Map Sheet
- Town Boundary
- County Boundary
- ▲ Transition Station

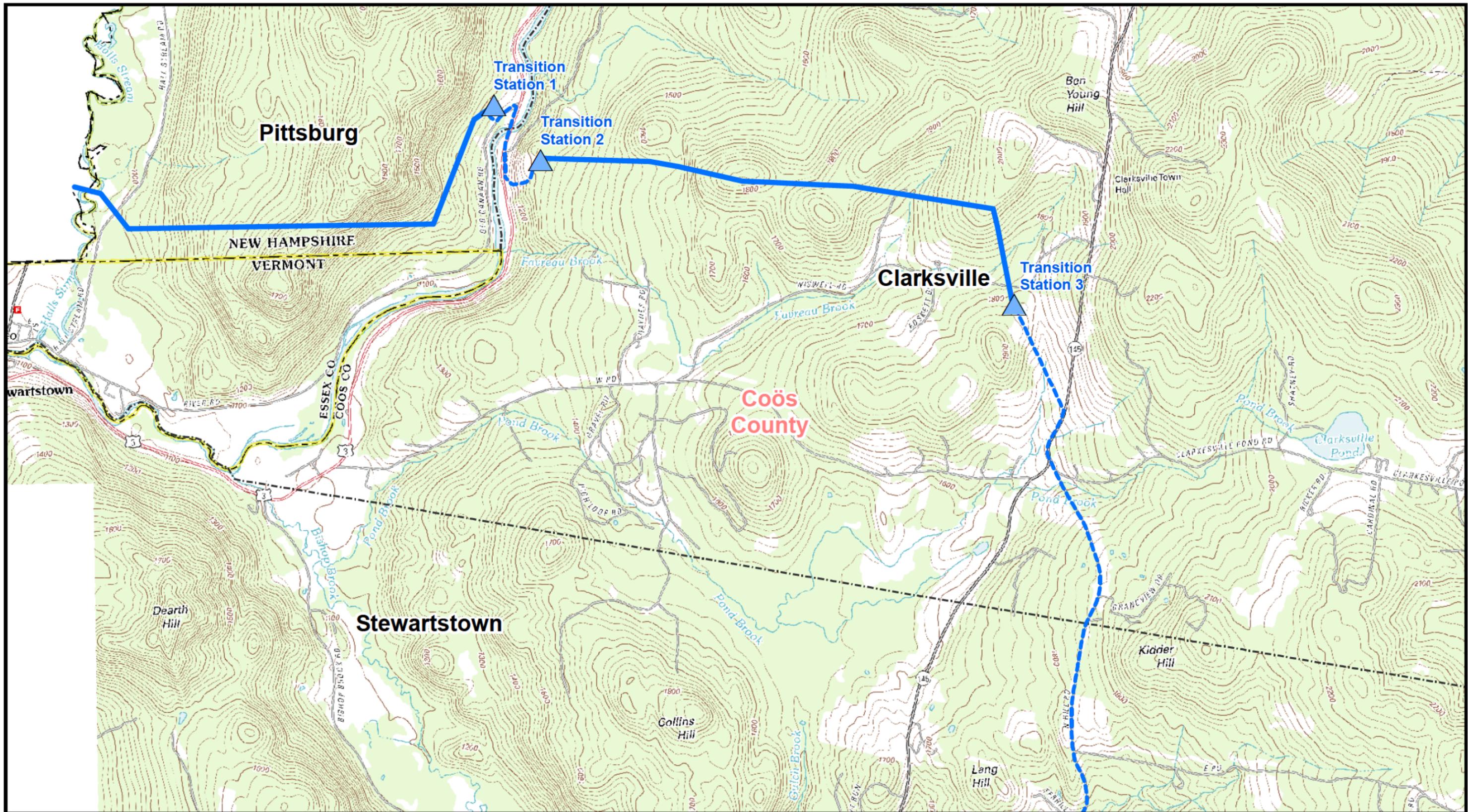


Date: 9/16/2015
Additional Sources
Burns & McDonnell, NH GRANIT



**The Northern Pass
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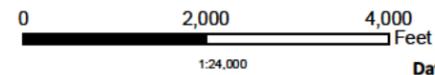
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- Municipal Boundary

Sources : USGS Topo, Burns & McDonnell

The Northern Pass Transmission Line Project
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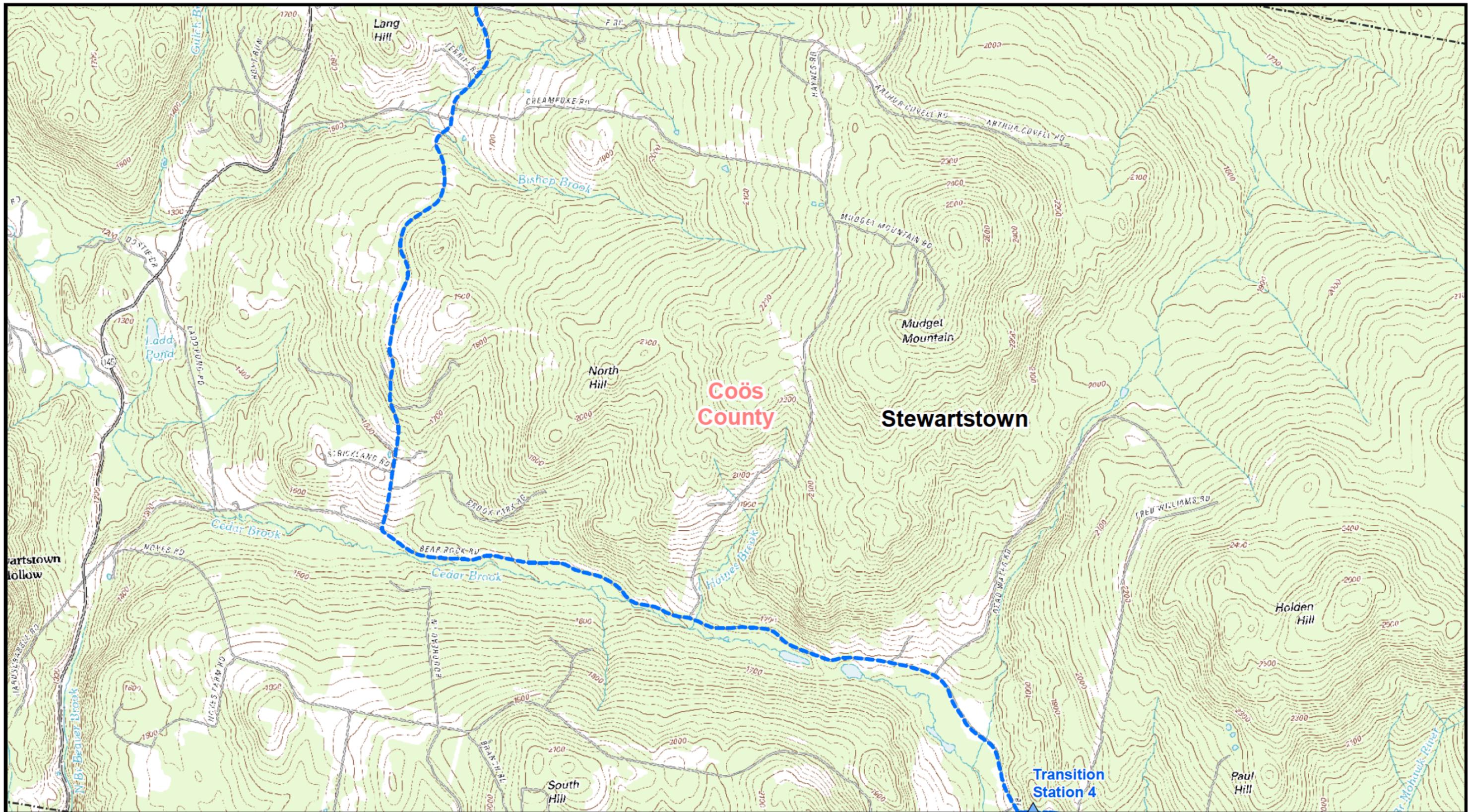
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USGS Quads : Pittsburg OE E, Pittsburg, Lovering Mountain



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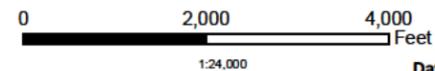
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Sources : USGS Topo, Burns & McDonnell

The Northern Pass Transmission Line Project
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USGS Quads : Lovering Mountain, Diamond Pond



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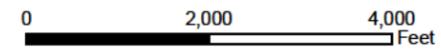
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USGS Quads : Lovering Mountain, Diamond Pond

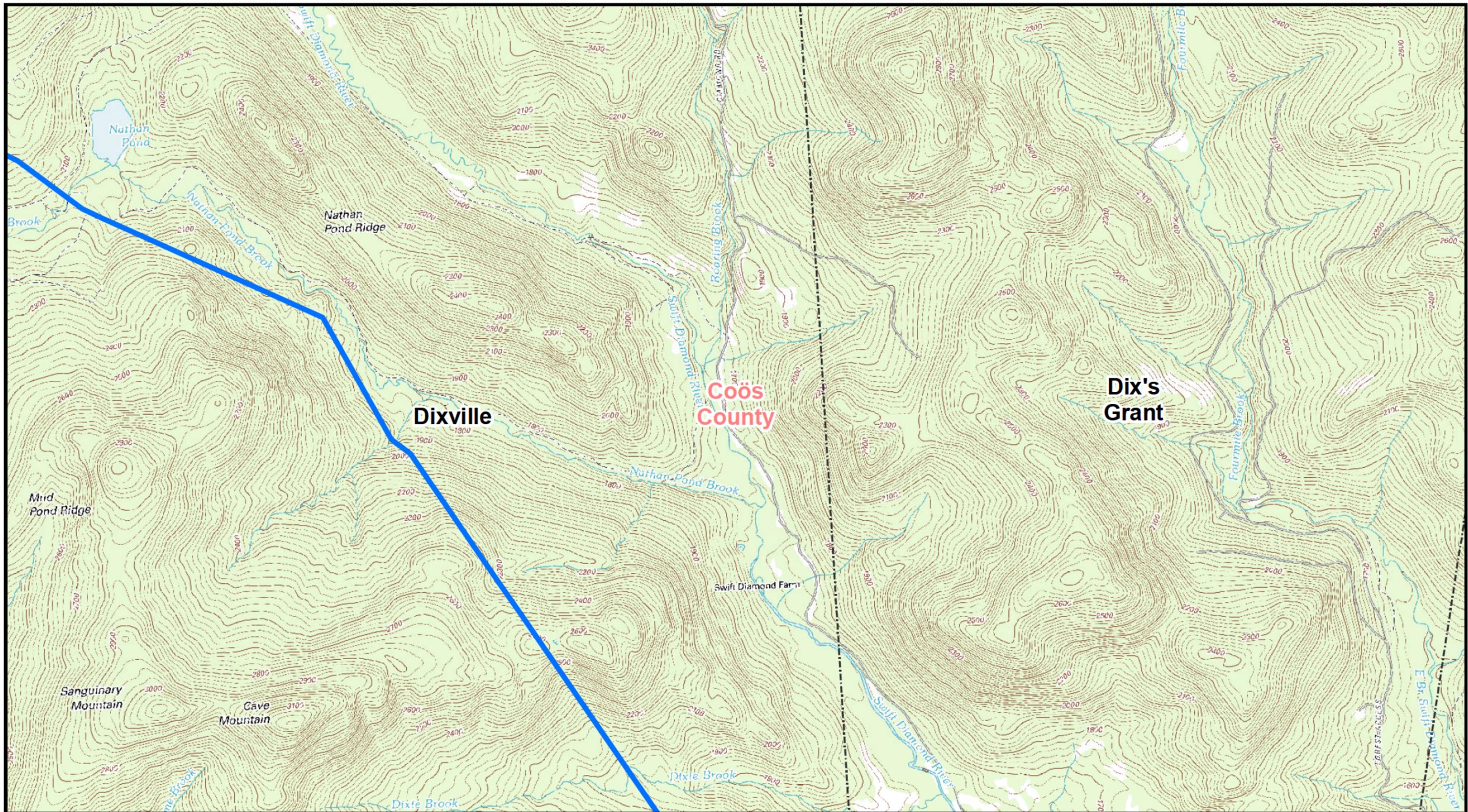


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Sources : USGS Topo, Burns & McDonnell



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USGS Quads : Diamond Pond, Mount Pisgah

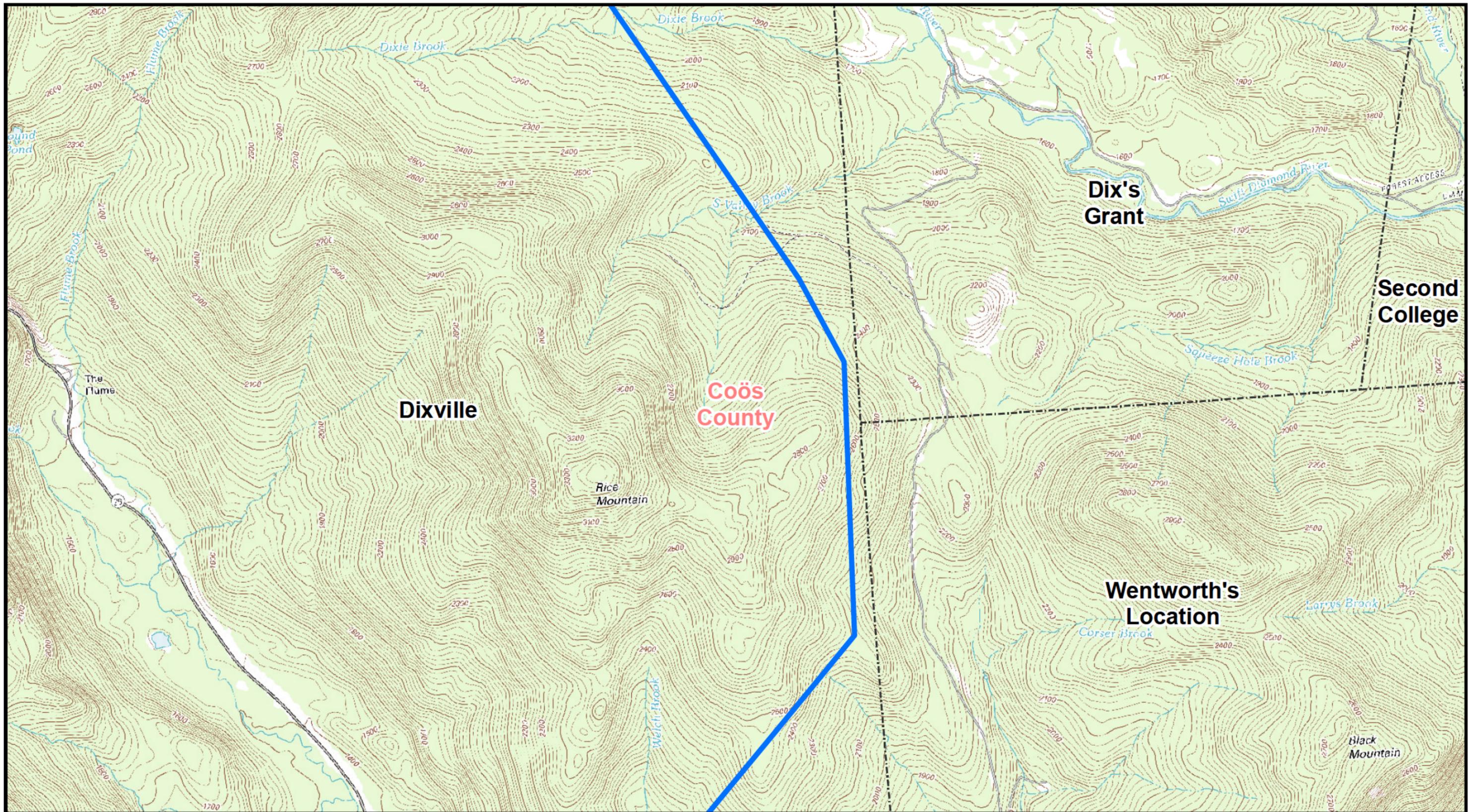


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Sources : USGS Topo, Burns & McDonnell



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Sources : USGS Topo, Burns & McDonnell

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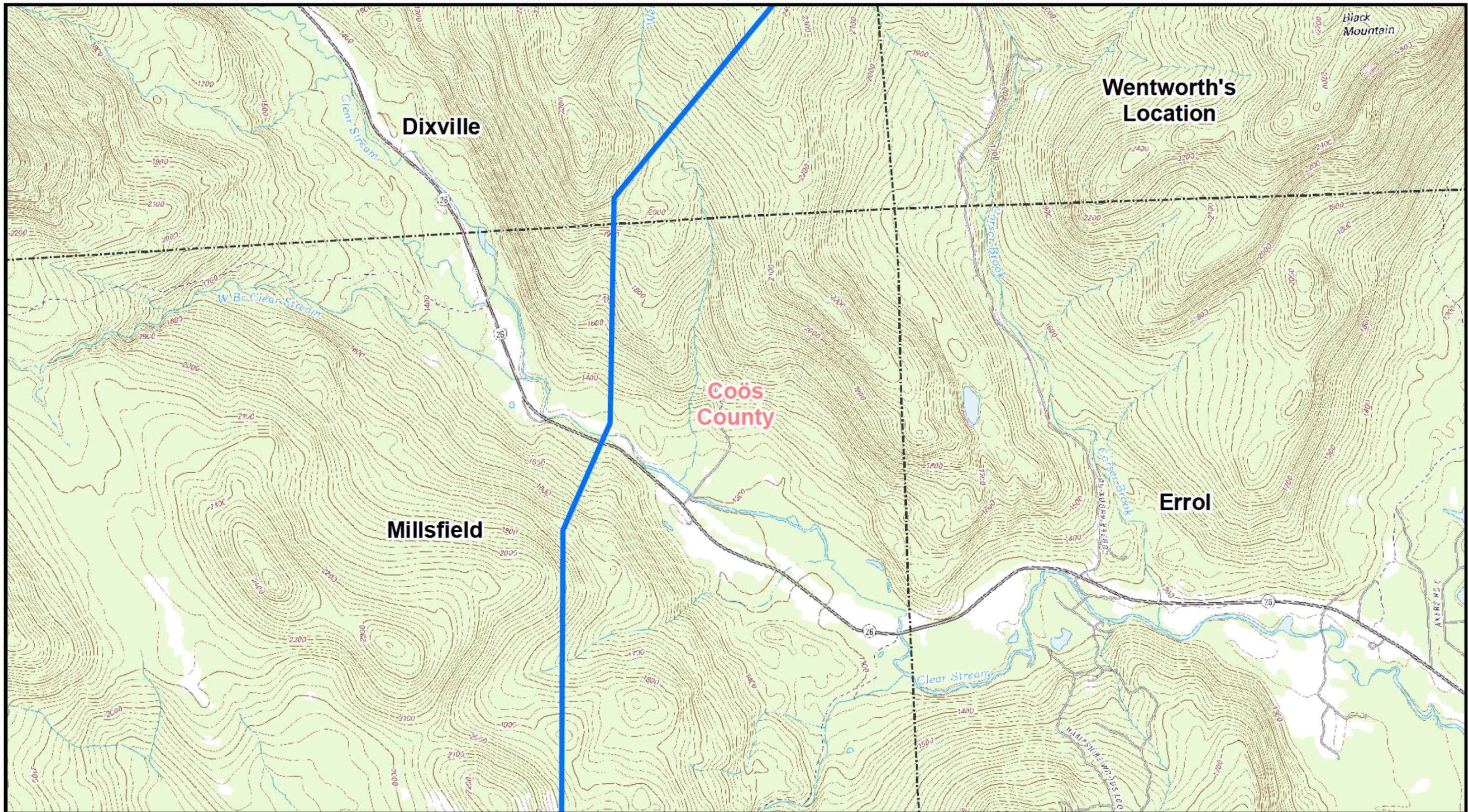
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USGS Quads : Dixville Notch, Diamond Pond, Mount Pisgah, Errol



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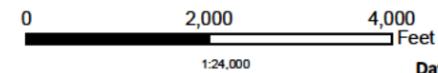
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Sources : USGS Topo, Burns & McDonnell

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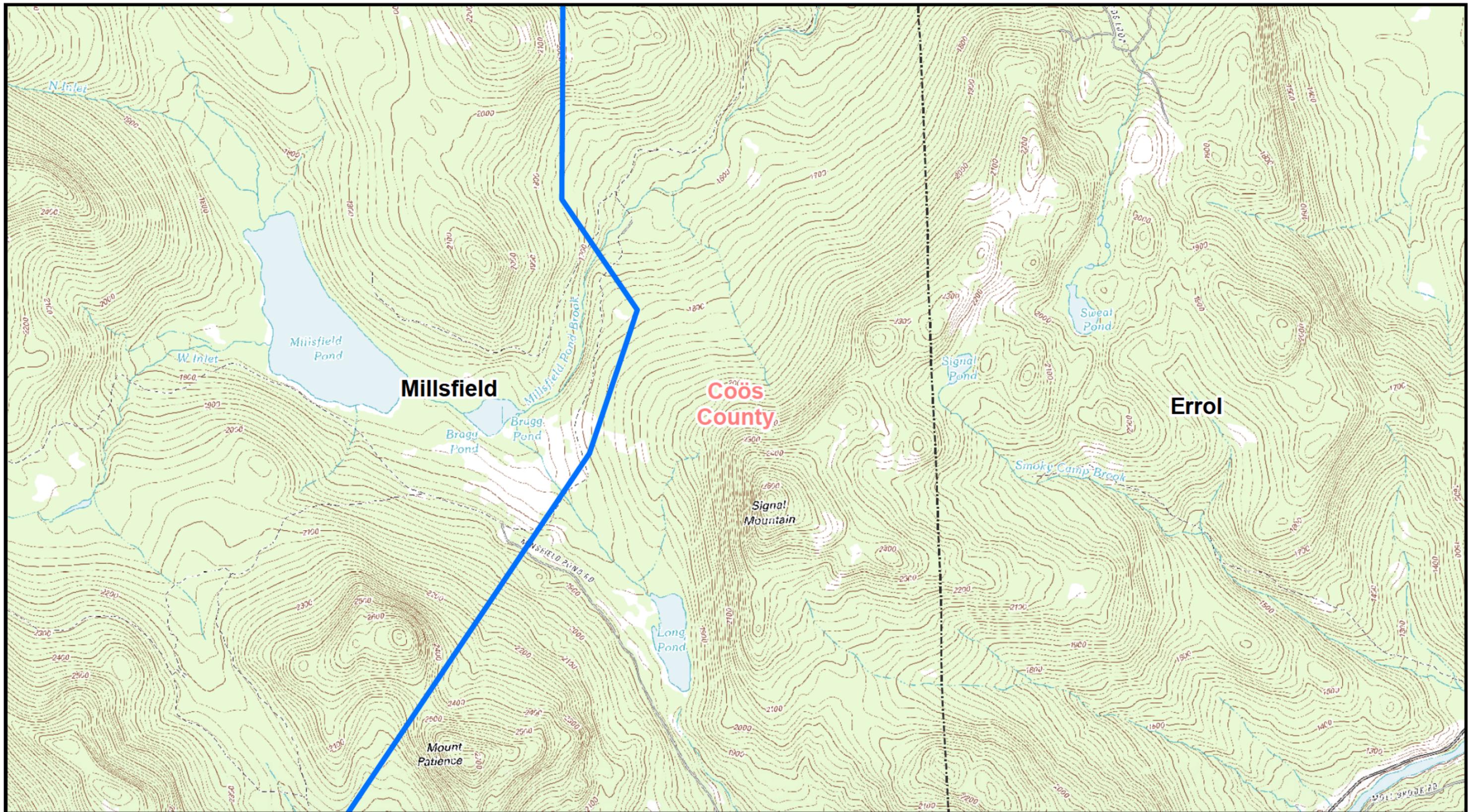
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USGS Quads : Dixville Notch, Errol



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Sources : USGS Topo, Burns & McDonnell

**The Northern Pass Transmission Line Project
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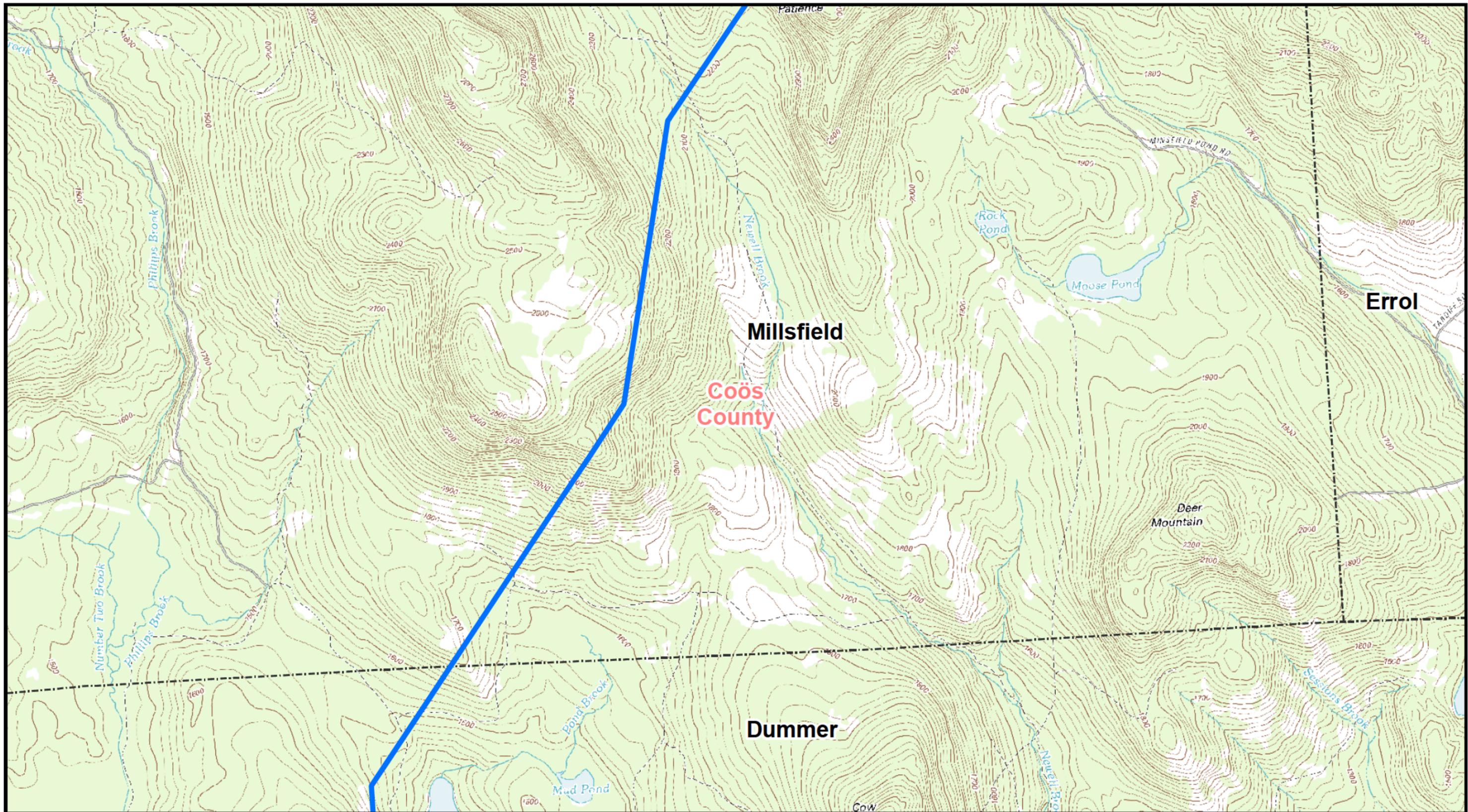
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USGS Quads : Dixville Notch, Dummer Ponds, Teakettle Ridge, Errol



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Sources : USGS Topo, Burns & McDonnell

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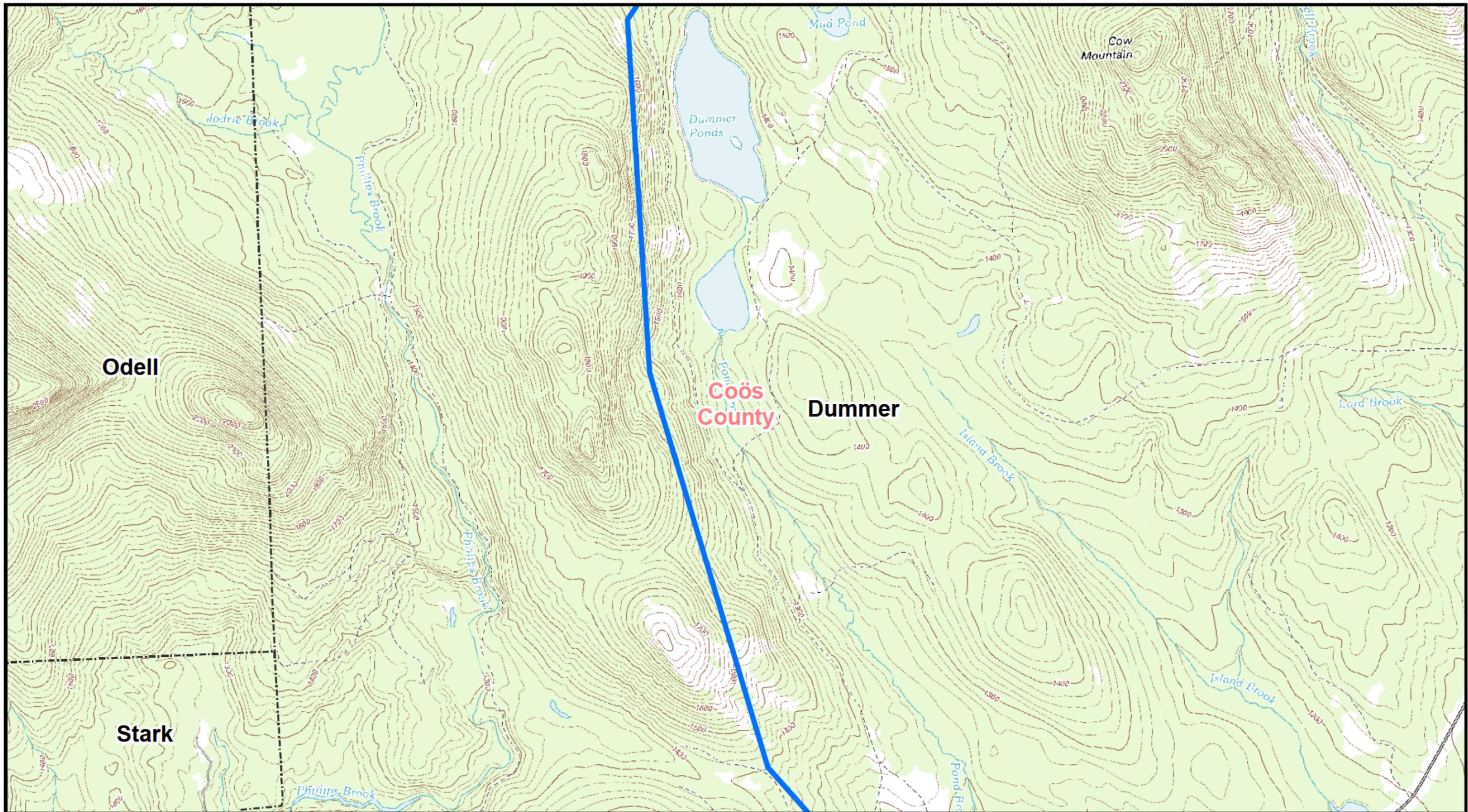
USGS Quads : Dummer Ponds, Teakettle Ridge



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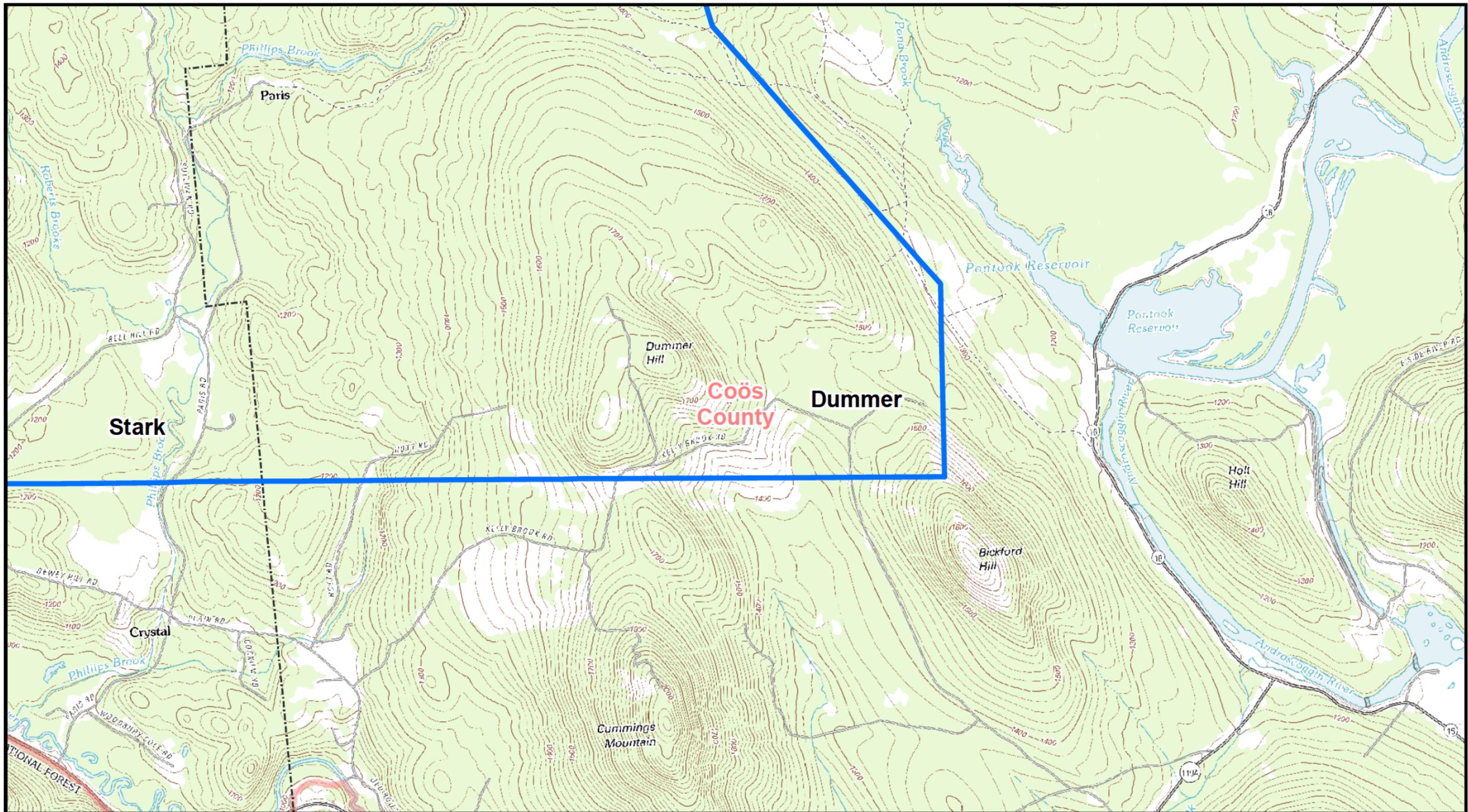
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Date: 9/16/2015



Sources : USGS Topo, Burns & McDonnell



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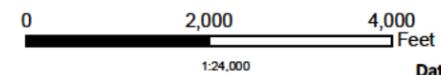
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- Municipal Boundary

Sources : USGS Topo, Burns & McDonnell

**The Northern Pass Transmission Line Project
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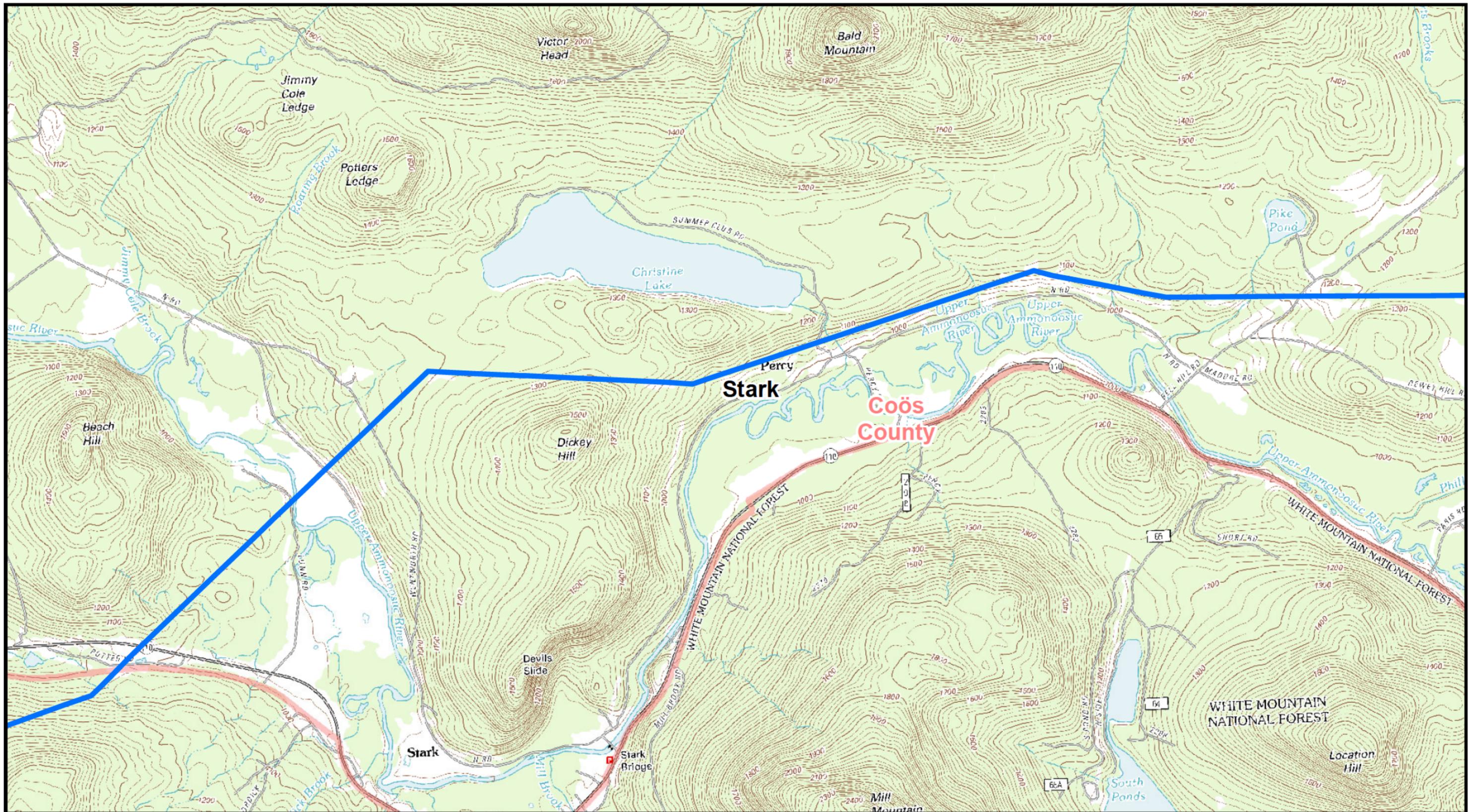
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USGS Quads : Dummer Ponds, Teakettle Ridge, West Milan, Milan



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The Northern Pass Transmission Line Project
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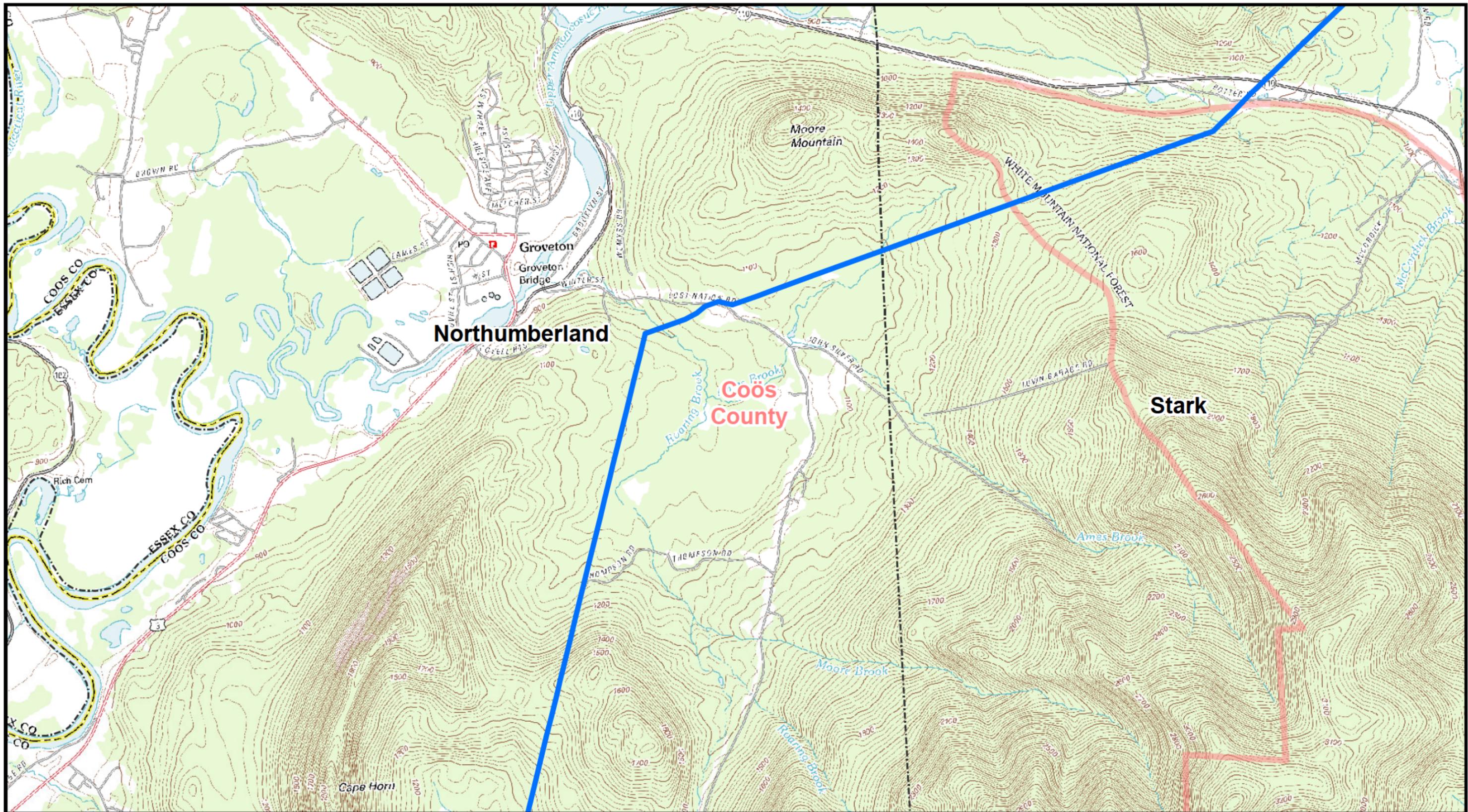
USGS Quads : Percy Peaks, Dummer Ponds, Stark, West Milan



Date: 9/16/2015



Sources : USGS Topo, Burns & McDonnell



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**The Northern Pass Transmission Line Project
Proposed Route**

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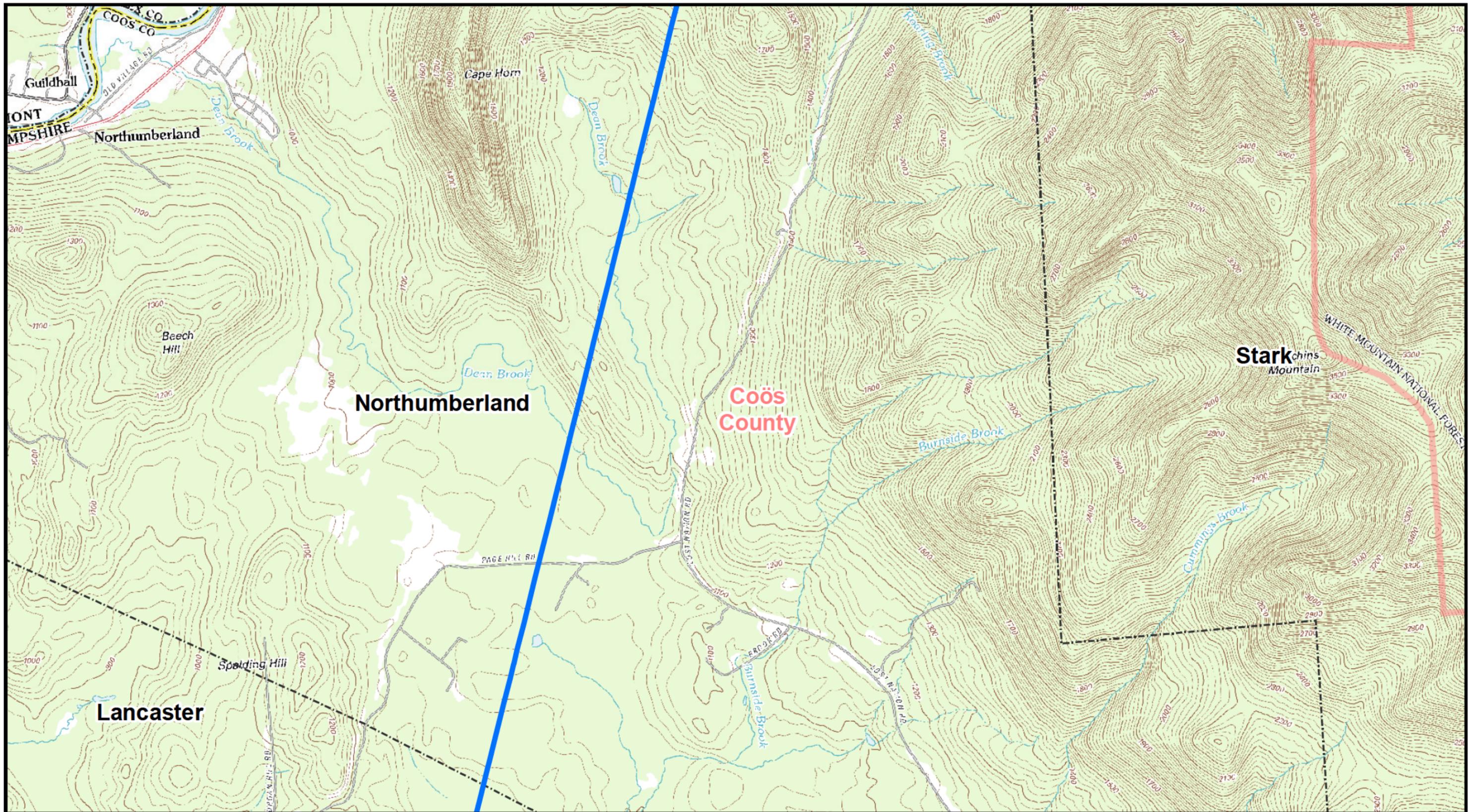
USGS Quads : Groveton, Stark



Date: 9/16/2015

Sources : USGS Topo, Burns & McDonnell





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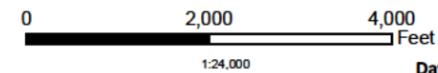
Legend

- Proposed Route (Overhead)
- Proposed Route (Underground)
- Deerfield to Scobie Pond Route
- Proposed Converter Terminal
- Existing Substation to be Upgraded
- Proposed Transition Station
- Municipal Boundary

The Northern Pass Transmission Line Project
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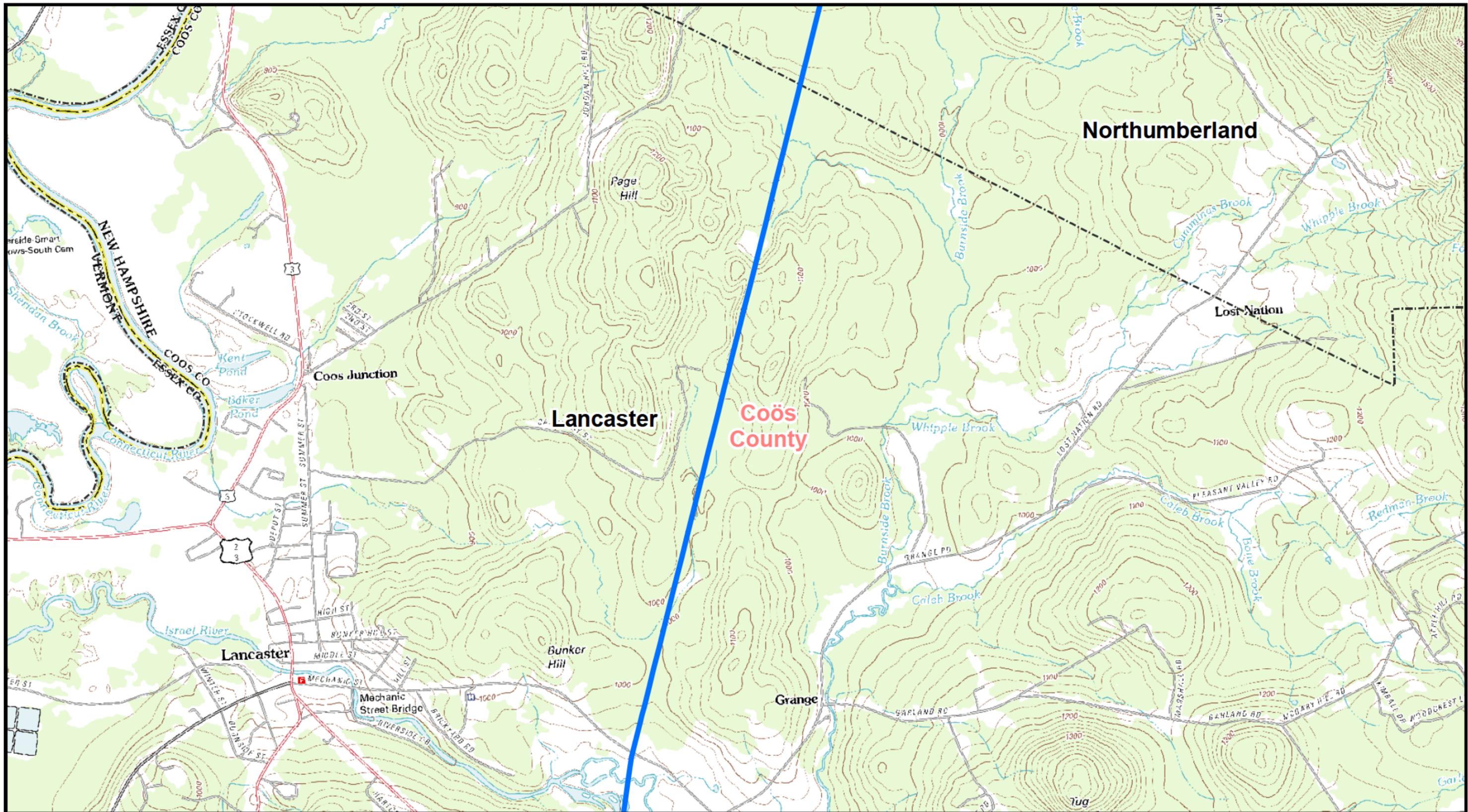
USGS Quads : Groveton, Stark



Date: 9/16/2015



Sources : USGS Topo, Burns & McDonnell



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**The Northern Pass Transmission Line Project
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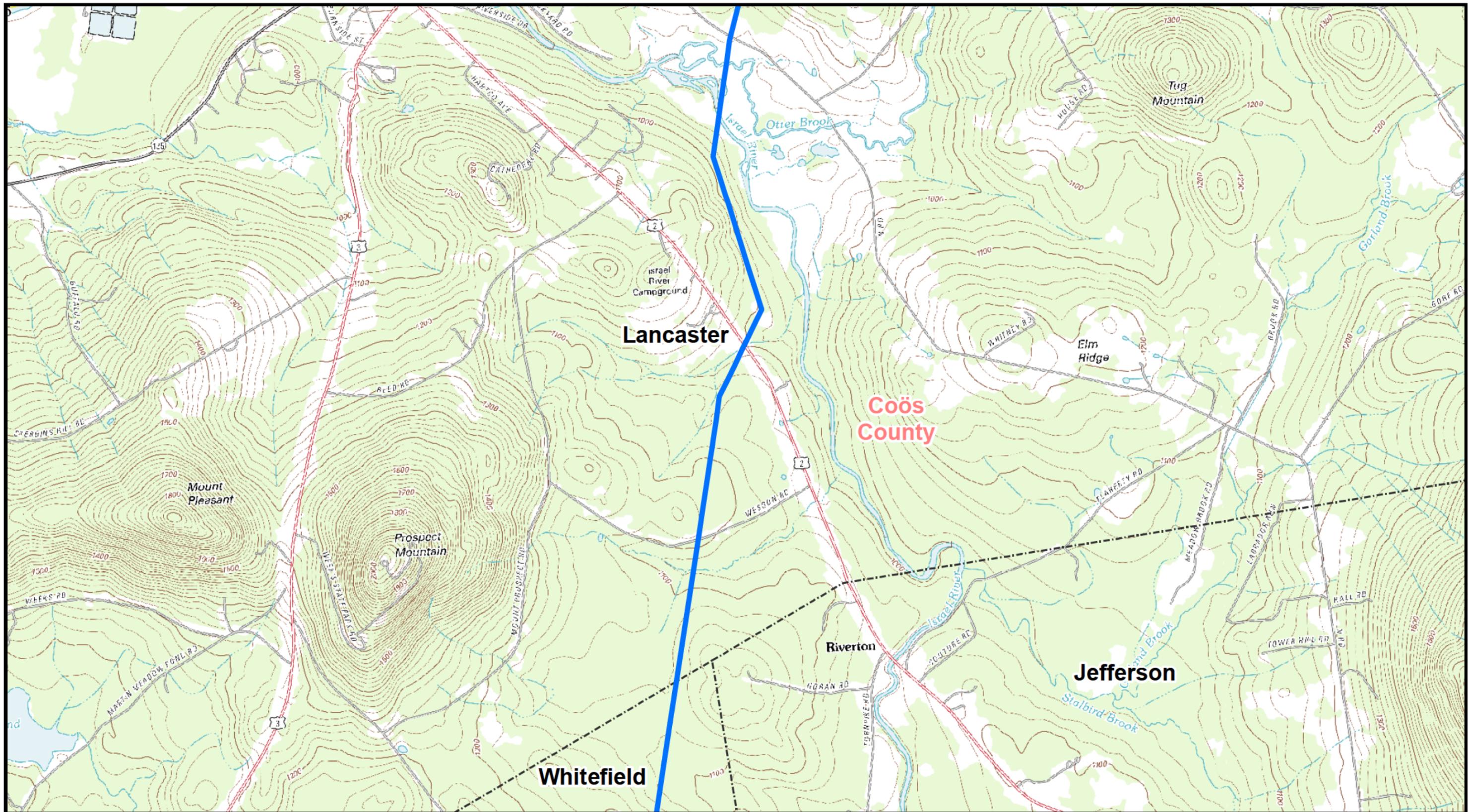
USGS Quads : Groveton, Stark, Lancaster, Jefferson



Date: 9/16/2015



Sources : USGS Topo, Burns & McDonnell



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**The Northern Pass Transmission Line Project
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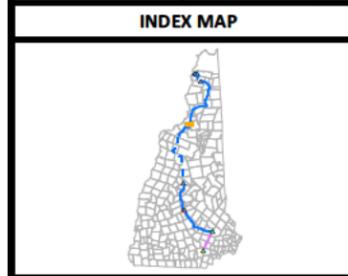
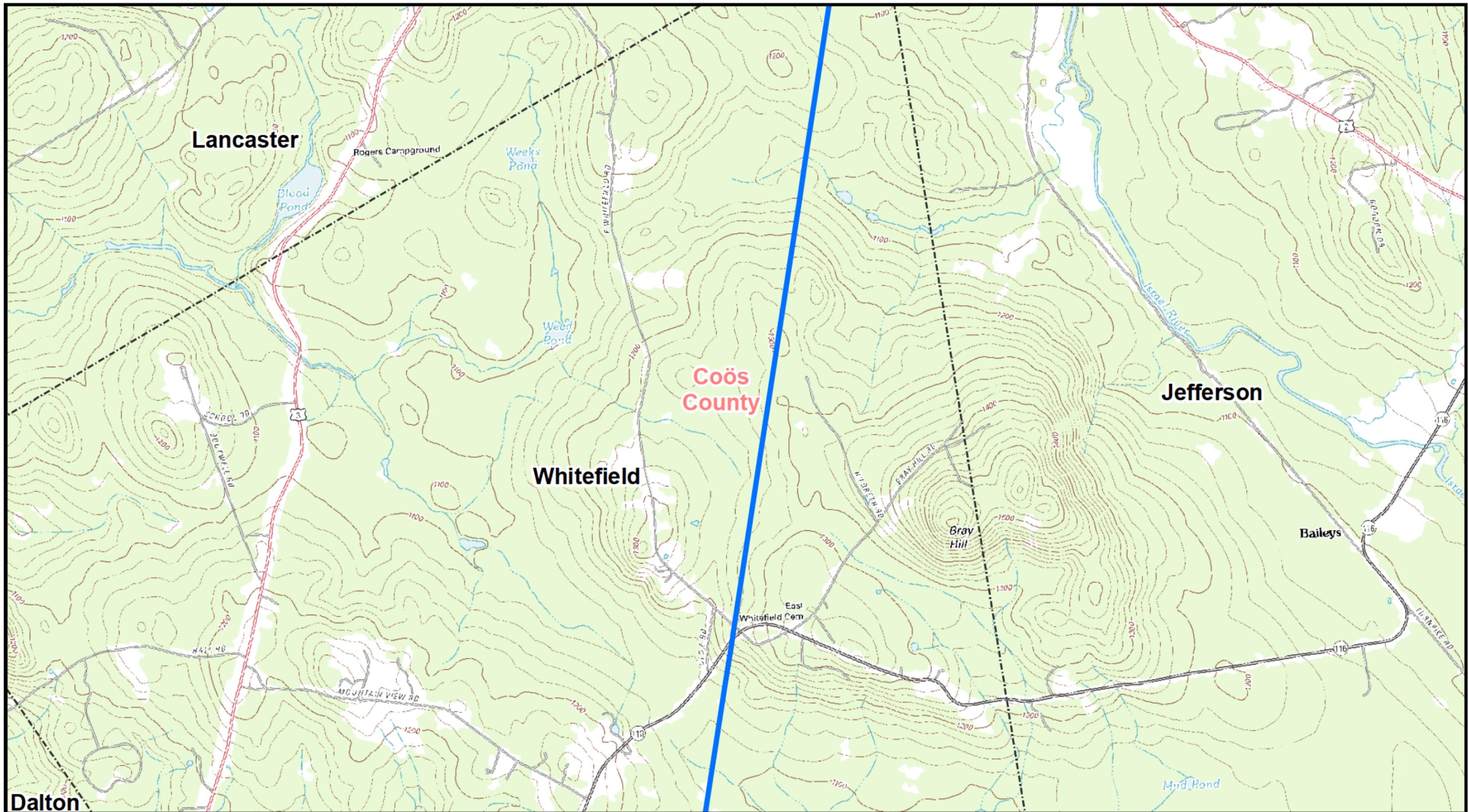
USGS Quads : Lancaster, Jefferson



Date: 9/16/2015

Sources : USGS Topo, Burns & McDonnell





Legend

	Proposed Route (Overhead)		Proposed Converter Terminal		Proposed Transition Station
	Proposed Route (Underground)		Existing Substation to be Upgraded		Municipal Boundary
	Deerfield to Scobie Pond Route				

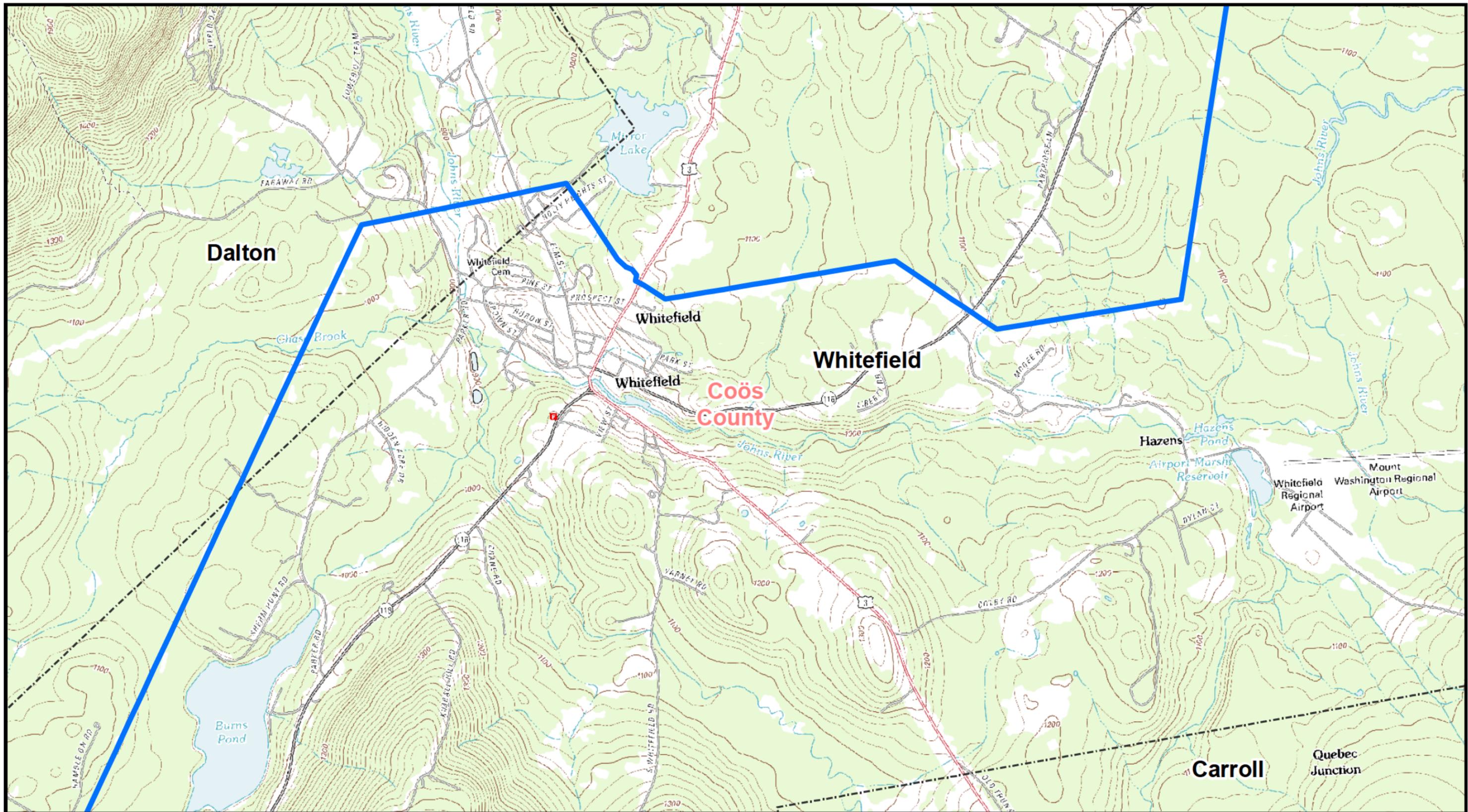
Sources : USGS Topo, Burns & McDonnell

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- ▲ Proposed Converter Terminal
- ▲ Existing Substation to be Upgraded
- ▲ Proposed Transition Station
- Municipal Boundary

Sources : USGS Topo, Burns & McDonnell

**The Northern Pass Transmission Line Project
Proposed Route**

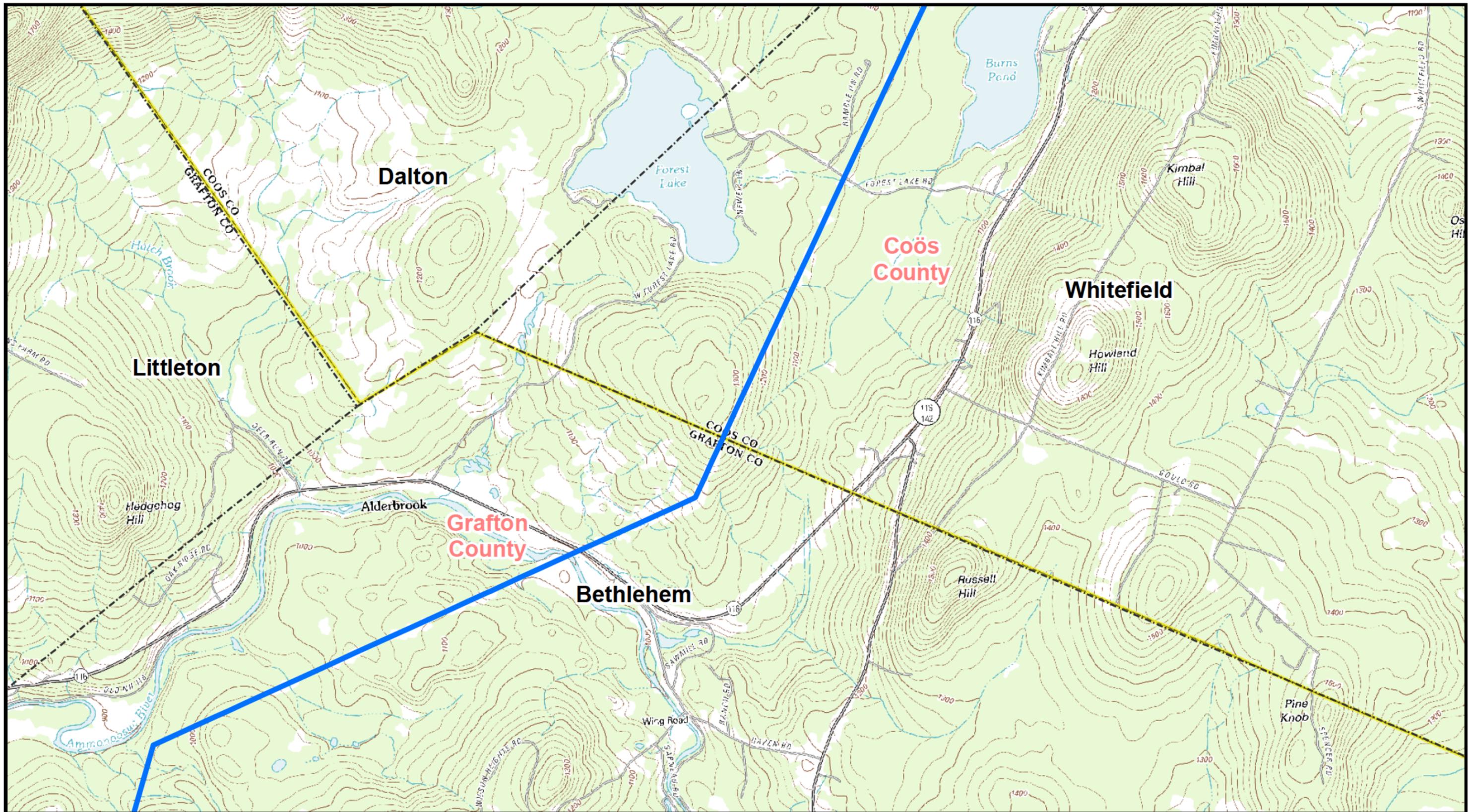
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USGS Quads : Gilman, Lancaster, Twin Mountain, Bethlehem



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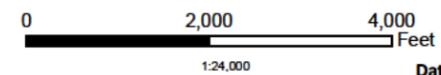
- Proposed Route (Overhead)
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- Municipal Boundary

Sources : USGS Topo, Burns & McDonnell

**The Northern Pass Transmission Line Project
Proposed Route**

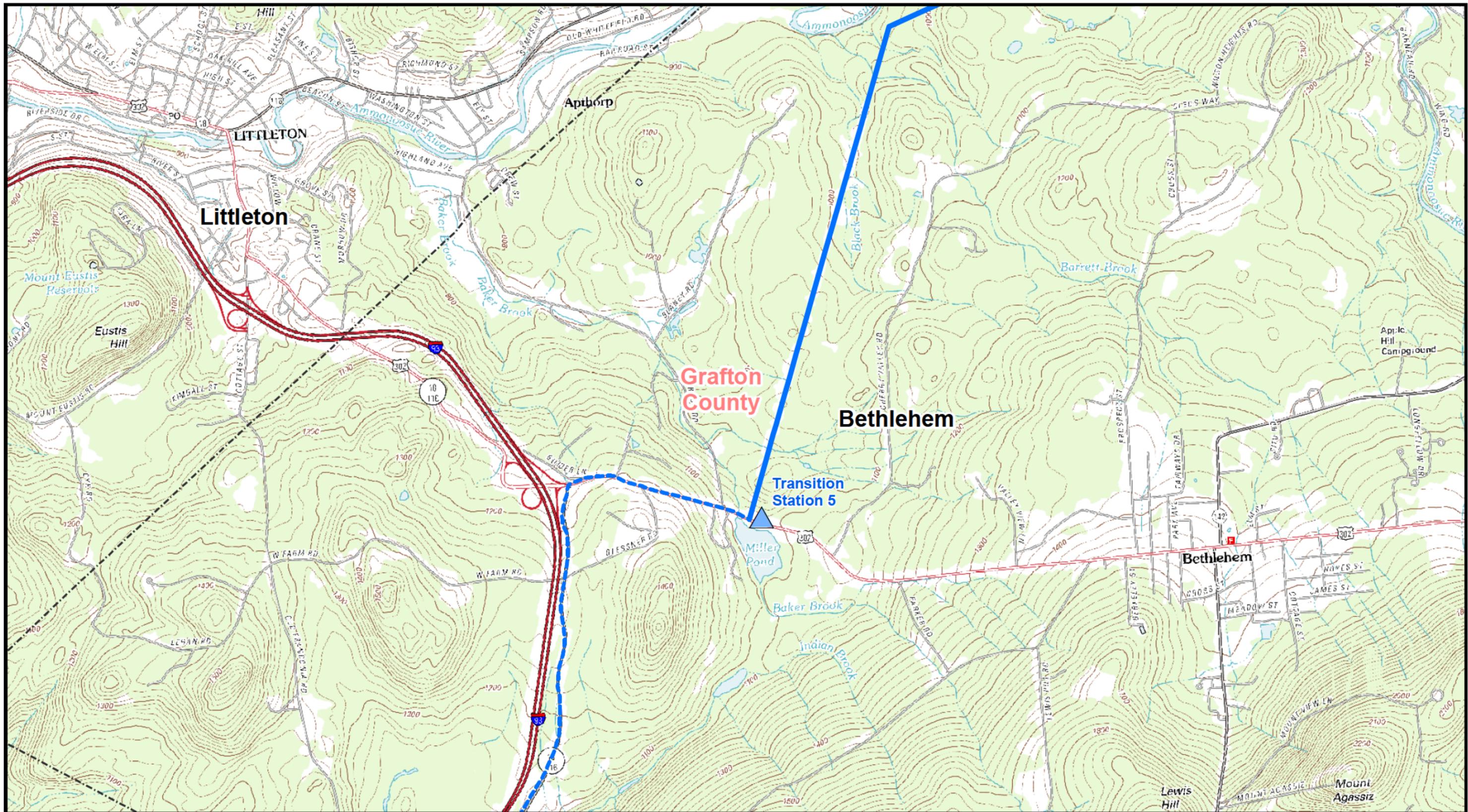
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USGS Quads : Twin Mountain, Bethlehem



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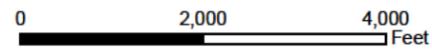
- Proposed Route (Overhead)
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- Deerfield to Scobie Pond Route
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Sources : USGS Topo, Burns & McDonnell

**The Northern Pass Transmission Line Project
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USGS Quads : Littleton, Bethlehem



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