

K42 Asset Condition Project

Franklin County Line Upgrade

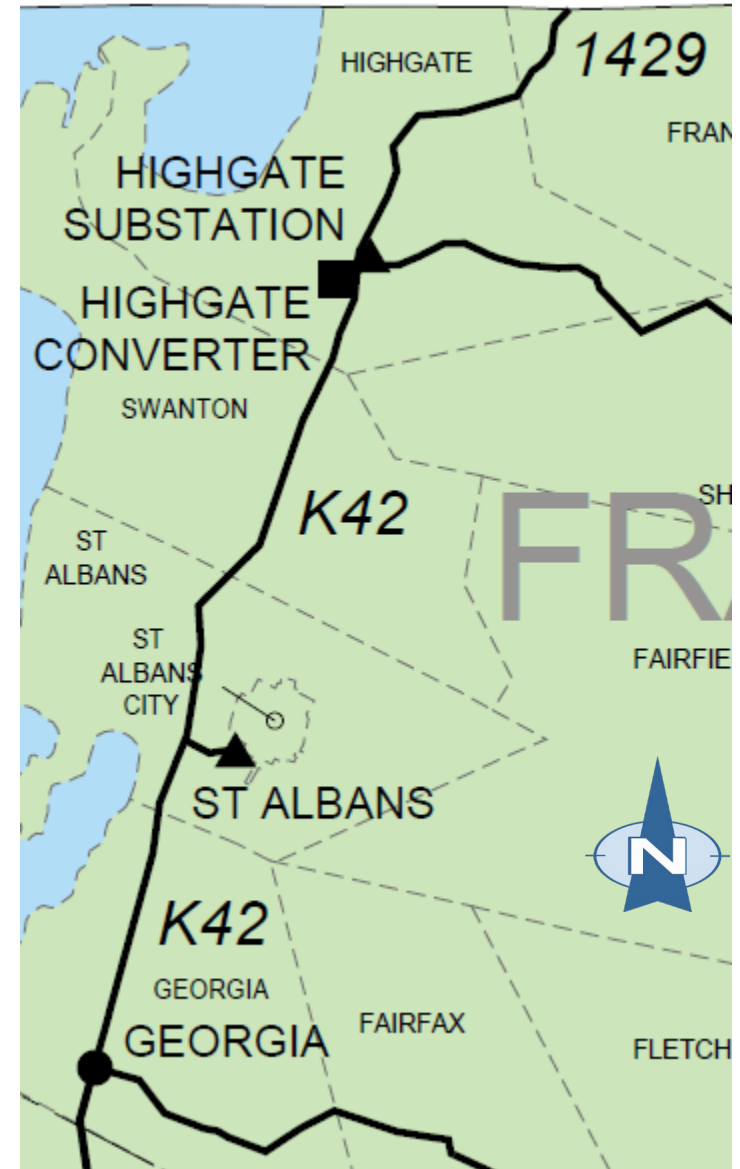
Vermont System Planning
Committee
Geo targeting meeting

June 1, 2022



K42 Line Overview

- Constructed in 1958; majority of 212 structures are original build
- 115 kV wood H-frame line from Highgate to Highgate Converter Tap to St Albans Tap to Georgia (16.6 miles)
- Main transmission path for HVDC Converter and wind generation toward load center (Burlington)
- Significant wetlands, crop farming, and long access routes drive need for substantial matting



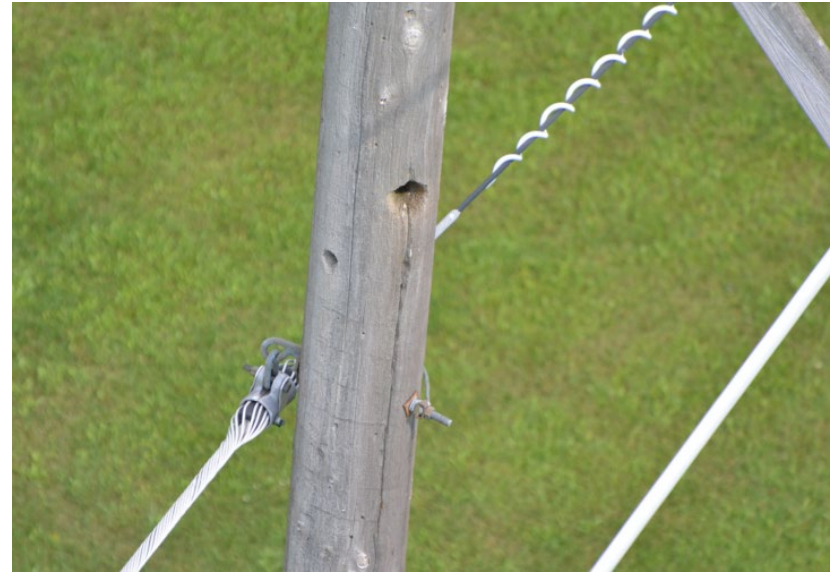
Identified K42 Deficiencies

- 146 (~70%) out of 212 structures to be replaced in the near term
 - Pole and cross arm damage:
 - Woodpecker holes
 - Cracks, splitting, rotting wood
 - Leaning poles
 - Reaching end of asset life
- Additional future structure replacements as needed
 - Reevaluation every 8 years

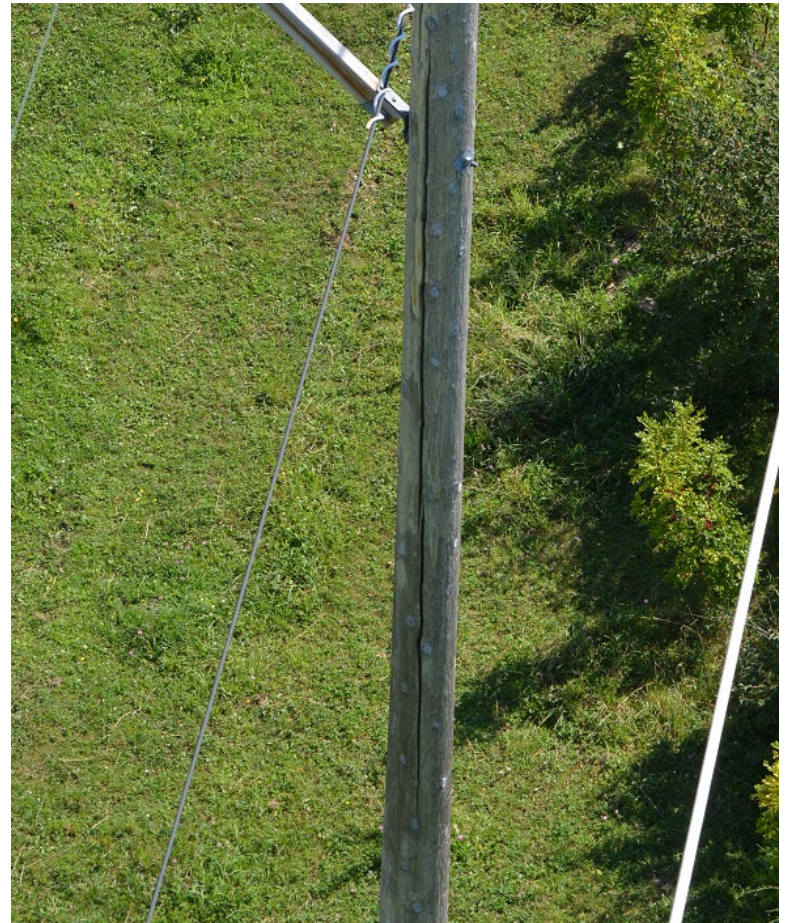
Examples of rotted pole tops



Examples of woodpecker damage



Examples of poles splitting



Examples of target practice damage



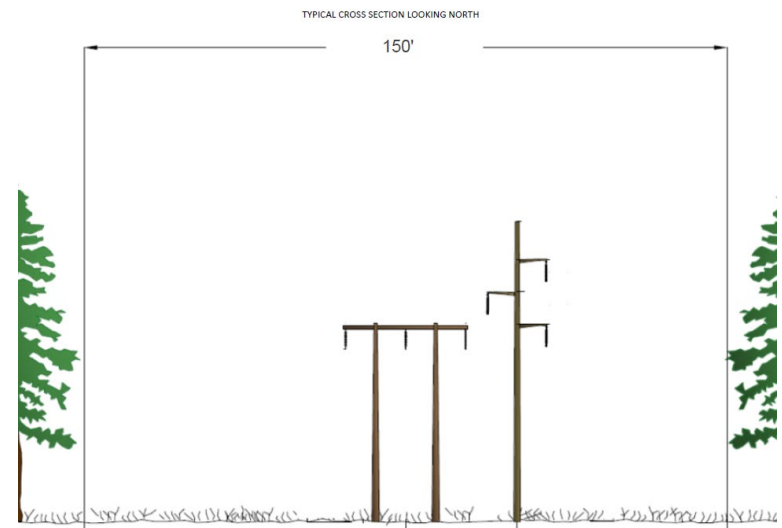
K42 line very difficult to take out of service

- System topology and load/gen balance are problematic
 - Outages result in radial supply almost 100 miles long
 - Loss of Northern Loop load post-contingency (15% of VT peak, nearly all of Vermont Electric Coop's service territory)
 - Portions of structure work disconnect St. Albans Tap
 - Exposure to low voltage post-contingency
 - Several resources switched off during outages
 - Highgate converter – 97% capacity factor
 - Wind plants – High generation except in the summer
 - K42 outages potentially can restrict planned outages in Vermont, Southern NH, and Central MA

Proposed solution:

Rebuild K42 as single-pole line 2x1272 conductors

- More efficient construction – minimizes mobilizations, reduces landowner issues and environmental impacts
- Maintains the existing line in service during construction
 - Avoids approximately 30 daily outages and their consequences
- Steel structures lower ongoing maintenance costs and future replacements
- Meets current VELCO line design standard
- Creates space in key ROW for a future line if needed by region
- Benefit-to-cost ratio is greater than 1.0 for bundle conductors



Project Value - FERC ANOPR holistic planning

- Addresses asset condition need with minimal disruptions
- New single-pole line
 - More efficient construction
 - Avoids outages and associated generation and reliability impacts
 - No interference with other planned outages
 - Lowers maintenance cost and structure replacement frequency
 - Optimizes utilization of the ROW
- Bundle conductors
 - Reduce losses by 50%
 - Improves system strength and reactive margin
 - Addresses current export constraints
 - Facilitates renewable energy growth
 - Ensures equitable access to renewables

Project milestones

- ISO-NE approval (March 2022)
- Discussions with VDUs & DPS (April 2022)
- NTA screening with VSPC Geographic Targeting Sub (May 2022)
- Public outreach/ stakeholder engagement process (July 2022)
- Permitting process (2023)
- Construction and removal of old line (2024-2025)

NTA Screening

For use in screening to determine whether or not a transmission system **reliability issue** requires non-transmission alternatives (NTA) analysis in accordance with the Memorandum of Understanding in Docket 7081. Projects intended for energy market-related purposes – “economic” transmission – and other non-reliability-related projects do not fall within the scope of the Docket 7081 process.

Identify the proposed upgrade:	<u>Franklin County Line (K42 Highgate-Georgia 115 kV) Asset Condition Project</u>
Date of analysis:	_____ May 31st, 2022 _____
<p>1. Does the project meet one of the following criteria that define the term “impracticable” (check all that apply)?</p> <ul style="list-style-type: none"> a. Needed for a redundant supply to a radial load; or <input type="checkbox"/> b. Maintenance-related, addressing asset condition, operations, or safety; or <input checked="" type="checkbox"/> c. Addressing transmission performance, e.g., addition of high-speed protection or a switch to sectionalize a line; or <input type="checkbox"/> d. Needed to address stability or short circuit problems;¹ or <input type="checkbox"/> e. Other technical reason why NTAs are impracticable. <i>Attach detailed justification that must be reviewed by the VSPC.</i> <input type="checkbox"/> <p><i>If any box above is checked, project screens out of full NTA analysis.</i></p>	
<p>2. What is the proposed transmission project’s need date? _____ <u>Not applicable</u></p> <p><i>If the need for the project is based on existing or imminent reliability criteria violations (i.e., arising within one year based on the controlling load forecast), project screens out of full NTA analysis.</i></p>	

¹ “Stability” refers to the ability of a power system to recover from any disturbance or interruption. Instability can occur when there is a loss of synchronism at one or more generators (rotor angle stability), a significant loss of load or generation within the system (frequency stability), or a reactive power deficiency (voltage stability). Stability problems are influenced by system parameters such as transmission line lengths and configuration, protection component type and speed, reactive power sources and loads, and generator type and configuration. Due to the nature of instability, non-transmission alternatives involving addition of generation or reduction of load will not solve these problems.



NTA Screening (continued)

3. Could elimination or deferral of all or part of the upgrade be accomplished by a 25% or smaller load reduction or off-setting generation of the same magnitude? Yes No
(See note.)

If "no," project screens out of full NTA analysis.

4. Is the likely reduction in costs from the potential elimination or deferral of all or part of the upgrade greater than \$2.5 million. (See note.) Yes No

If "no," project screens out of full NTA analysis.

Sign and date this form.

This analysis performed by: Hantz A. Présumé – System Planning Manager


Print name & title

VELCO

Company

May 31st, 2022

Date



Signature