

Electricity  
Transmission

# ISO-NE PAC MEETING

07/25/2023

Northboro Road  
Substation –  
Breaker Replacements

This document has been reviewed and does not contain Critical Energy Infrastructure (CEII)

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# Outline

- Purpose
- Transmission One-Line
- Aerial View
- Station One-line
- Needs Assessment
- Alternatives Review
- Questions

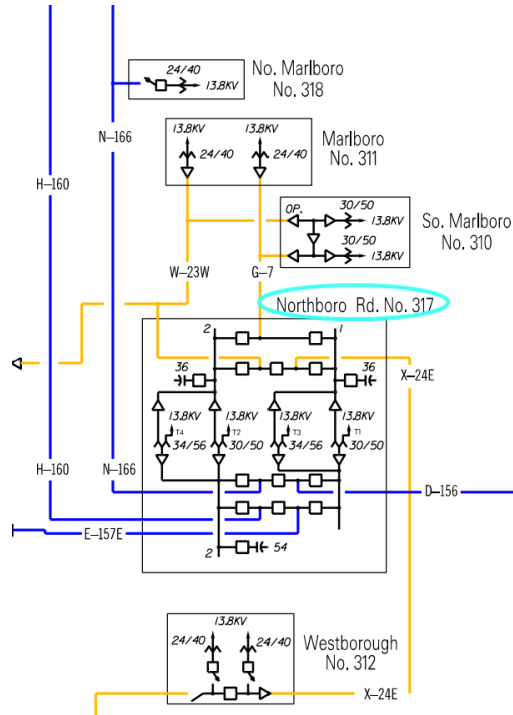
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# Purpose

- Discuss the circuit breaker asset condition needs at the Northboro Road substation.
- Discuss the proposed solution alternatives to address the identified circuit breaker condition needs.

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# Transmission System One Line Diagram



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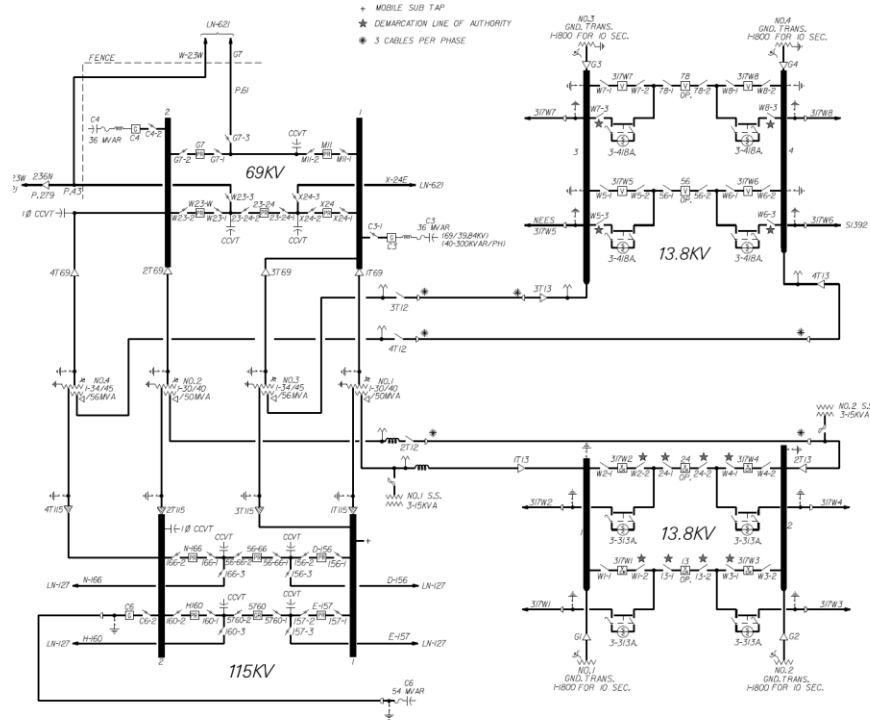
# Aerial View



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# Substation One Line Diagram



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# Asset Condition - Needs Review

- There are two 69kV and four 115kV Westinghouse type GM Oil Circuit Breakers manufactured in 1962
  - Test results from these breakers indicate contact timing problems and questionable insulation integrity outside of the manufacturer specifications.
- There are three 69kV and two 115kV General Electric type FK Oil Circuit Breakers manufactured in 1967
  - There have been problems with bushing oil leaks and lift rod issues due to moisture ingress with these circuit breakers. In addition, lead paint is prevalent in this family of breakers.
- Common to both types of breakers is the lack of manufacturer support and the inability to locate replacement parts. In some cases, these breakers are kept in service using salvaged secondhand parts from retired equipment. This situation is not sustainable.
- Replacement is recommended as part of this project

G7 69kV OCB



H160 115kV OCB



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# Alternatives Assessment

- **Option 1: Replace 69kV and 115kV Oil Circuit Breakers - Preferred**
  - Replace five 69kV 2000A continuous 40kA oil circuit breakers with vacuum circuit breakers
  - Replace six 115kV 3000A continuous 40kA oil circuit breakers with gas circuit breakers
  - Project Cost:
    - \$5.23M PTF
    - \$1.15M non-PTF
  - Total: \$6.38M (+50/-25%)
  - Expected in-service: July 2024
  
- **Option 2: Comprehensive Circuit Breaker Refurbishment**
  - Involves the disassembly of the majority of the circuit breaker components
  - Requires replacement of damaged and degraded parts
  - This option is not viable due to lack of manufacturer parts and support

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