MEPCO S396/3001

End of Life Strategy

PAC Presentation

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Today's Presentation

Objective

- Present the comprehensive needs assessment for the Project.
- Present solution alternatives to address the identified needs.
- Identify the preferred solution alternative.
- Next steps

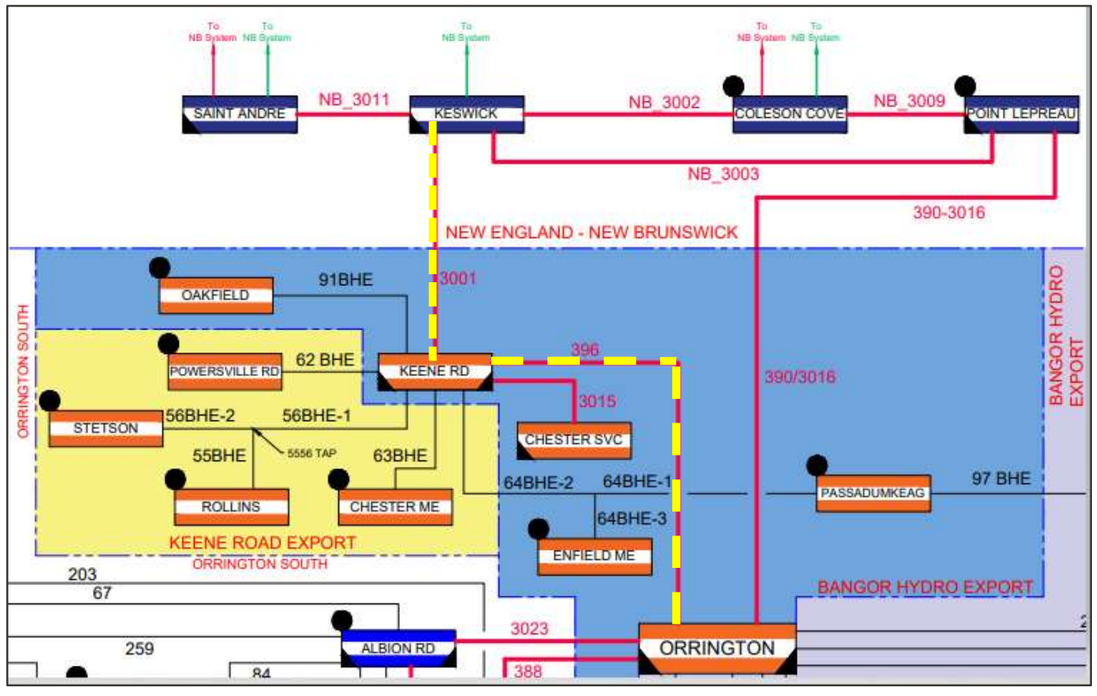
Agenda

- Background
- Needs Assessment / Approach
- Summary of Needs
- Review of Solution Alternatives
- Selection of Alternative
- Selected Alternative Rationale

Background

- Built in 1969, Section 396 is a 50.3 mile 345kV transmission line running from Orrington S/S to Keene Road S/S with 388 wood H-Frame and 3 pole structures with bundled conductor consisting of 795 ACSR, 850.8 ACSR, 1192 ACSR.

- Built in 1969, Section 3001 is a 51.1 mile 345kV transmission line running from Keene Road S/S to the New Brunswick Power border with 376 wood H-Frame and 3 pole structures with bundled conductor consisting of 850.8 ACSR and 1590 ACSR.



Geographic Location

Approach

Determination of Needs:

- Asset Condition: A review was conducted of the existing line condition for visual and structural deficiencies:
- Visual Inspection: Criteria includes pole splitting and cracking, woodpecker and insect damage, ground line damage, etc.
- Reliability: Operational needs
- Planning: Existing and future load

Solution Alternatives:

- Evaluate solutions to address identified needs, such as full rebuild and structure replacements.

Needs

Asset Condition Needs

- Section 396 was assessed with a “Fair” overall condition.
- Section 3001 was assessed with “Good” overall condition.
- Conductor tested in good condition.
- Transmission maintenance crews currently replace all “Reject” structures every year and a portion of the “Fair” structures. On average 25 structures per year. This effort was started in 2010.
- 2020 groundline inspection results:

MEPCO		Section 396	Section 3001
Structure Condition	Good	44%	57%
	Fair	54%	43%
	Reject	2%	0%

Planning Needs

- No known voltage concerns, thermal overloads, or need for increased load capacity on S396/S3001. These lines were not identified in the 2050 study.

Operational Needs

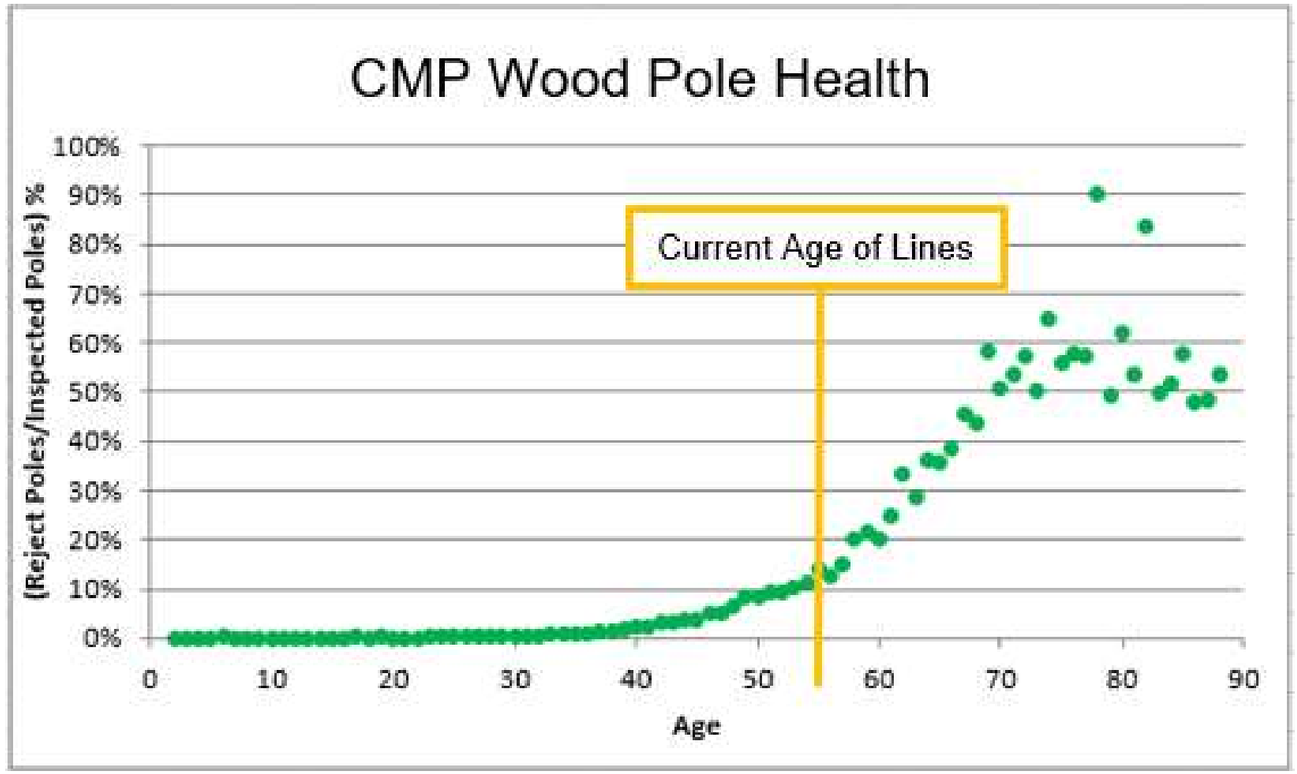
- No identified Operational concerns on S396/S3001

Structural Analysis

- PLS-CADD was used to model the proposed structure replacements only and not the existing condition due to overall “Good” asset health.

Needs

Pole Health



This figure illustrates that wood poles decline exponentially after approximately 60 years of age[1]. The estimated reject rate for a 54-year-old pole is 15%.

(1) The data is a comprised of the historical reject rate of wood poles on CMP's system.

Needs

MEPCO S396/3001 Pole Age

This figure illustrates that regular structure maintenance/replacements started in 2010. The majority of poles date back to the original installation in 1969 (approximately 54 years of age).

Needs

Asset Condition Photos

- These photos represent why patching woodpecker holes are not a long-term solutions.

Needs Summary

- After all asset condition, operational, and planning needs were reviewed, it was determined that the overall condition of the lines are good to fair and there are no immediate needs for a complete line rebuild.

- The following alternatives were analyzed for end-of-life strategy:

1. Rebuild all structures older than 2010[1]
2. Rebuild all structures older than 2010 and install new conductor
3. Rebuild in multiple segments
4. Continue maintenance: 25 structure replacements per year with wood poles
5. Continue maintenance: increased structures per year with steel poles
6. Reconductor after maintenance replacements are complete

(1) Structure replacement criteria was chosen to replace all structures that were not recently replaced, routine replacements started in 2010 (~10% replaced to date). A larger structure replacement project was completed in 2020. These (69) structures are not in the scope of these solutions.

Solution Assessment

Alternative 1: Rebuild all structures older than 2010 as one project. Structures will be replaced in kind utilizing steel poles. ($250k/steel structure replacement)

Line	Cost (Million)	ISD
Section 3001/396	$351.25	2031
Total	**$351.25**	**5 Years**

Alternative 2: Rebuild all structures older than 2010 including conductor, static, & OPGW. Structures will be replaced in kind utilizing steel poles. ($250k/steel structure replacement)

Line	Cost (Million)	ISD
Section 3001/396	$489.66	2031
Total	**$489.66**	**5 Years**

*All costs include an 8% escalation and 20% contingency and a construction start date of 2027. Alternatives with schedule overlap is to allow for continuous construction.

Solution Assessment

Alternative 3: Rebuild all structures older than 2010 in segments. Structures will be replaced in kind utilizing steel poles. ($250k/steel structure replacement)

Line	Miles	Structure Number	Cost (Million)	ISD
Section 3001 Segment 1	17	1-142	$61.38	2032
Section 3001 Segment 2	20.4	143-318	$97.93	2035
Section 3001 Segment 3	13.7	319-428	$76.65	2038
Section 396 Segment 4	31.1	430-694	$230.62	2042
Section 396 Segment 5	19.3	695-860	$200.13	2044
Total			**$666.71**	**18 Years**

Alternative 4: Continue maintenance replacements at 25 structures per year. Structures will be replaced in kind utilizing wood poles. ($225k/wood structure replacement)

Line	Cost (Million)	ISD
Section 3001/396	**$451.17**	**31 Years**

Solution Assessment

Alternative 5: Continue maintenance replacements at an increased rate of 40-50 structures per year. Structures will be replaced in kind utilizing steel poles. ($250k/steel structure replacement)

- This is a more realistic option as structures will start to degrade faster over the next few years and more structures will need to be replaced each year.

Line	Cost (Million)	ISD
Section 3001/396	**$344.38**	**15 Years**

Alternative 6: Reconductor after structure replacements are complete.

Line	Cost (Million)	ISD
Alternative 5	$344.38	15 Years
Reconductor	$348.16	2 Years
TOTAL	**$692.54**	**17 Years**

Recommended Alternative

- **Alternative 5**
- The Maintenance Increased option will utilize steel poles and structure framing will be the same as the existing structures. See appendix B for structure outline drawings.
- All replacements will be performed under energized conditions.
- Replacement structure design will allow for future bundled 1590 Falcon ACSR with 1 7#7 static and 1 OPGW. This will allow for a future reconductor project without having to replace the structures that are replaced under this project.
- **TOTAL COST = $344M with ISD 2040**

Solution Alternative	Description	Net Present Cost (Millions)
Alternative 1:	Rebuild Structures Only	$304
Alternative 2:	Full Rebuild	$424
Alternative 3:	Rebuild Structures in Segments	$433
Alternative 4:	Maintenance at 25 Structures/Year	$227
Alternative 5: (SELECTED)	***Maintenance Increased***	***$225***
Alternative 6:	Maintenance & Reconductor	$464

Recommended Alternative

Alternative 5 – 2024 Details

- Inspection Results
- 2023 climbing inspection data identified “reject” and “fair” poles and arms
- A reasonable set of 53 structures emerged from this data for the year-one package
- The first package will include a long contiguous set of structures (37), plus other individual structures

- 2024 Project Development Plan
- Complete all resource surveys and permitting
- Complete engineering and Geotech
- Secure access
- Execute procurement processes: materials, mats, construction contractor
- Award contract(s)
- Begin mobilization in Q4
- 2024 budget estimate is $4.026M

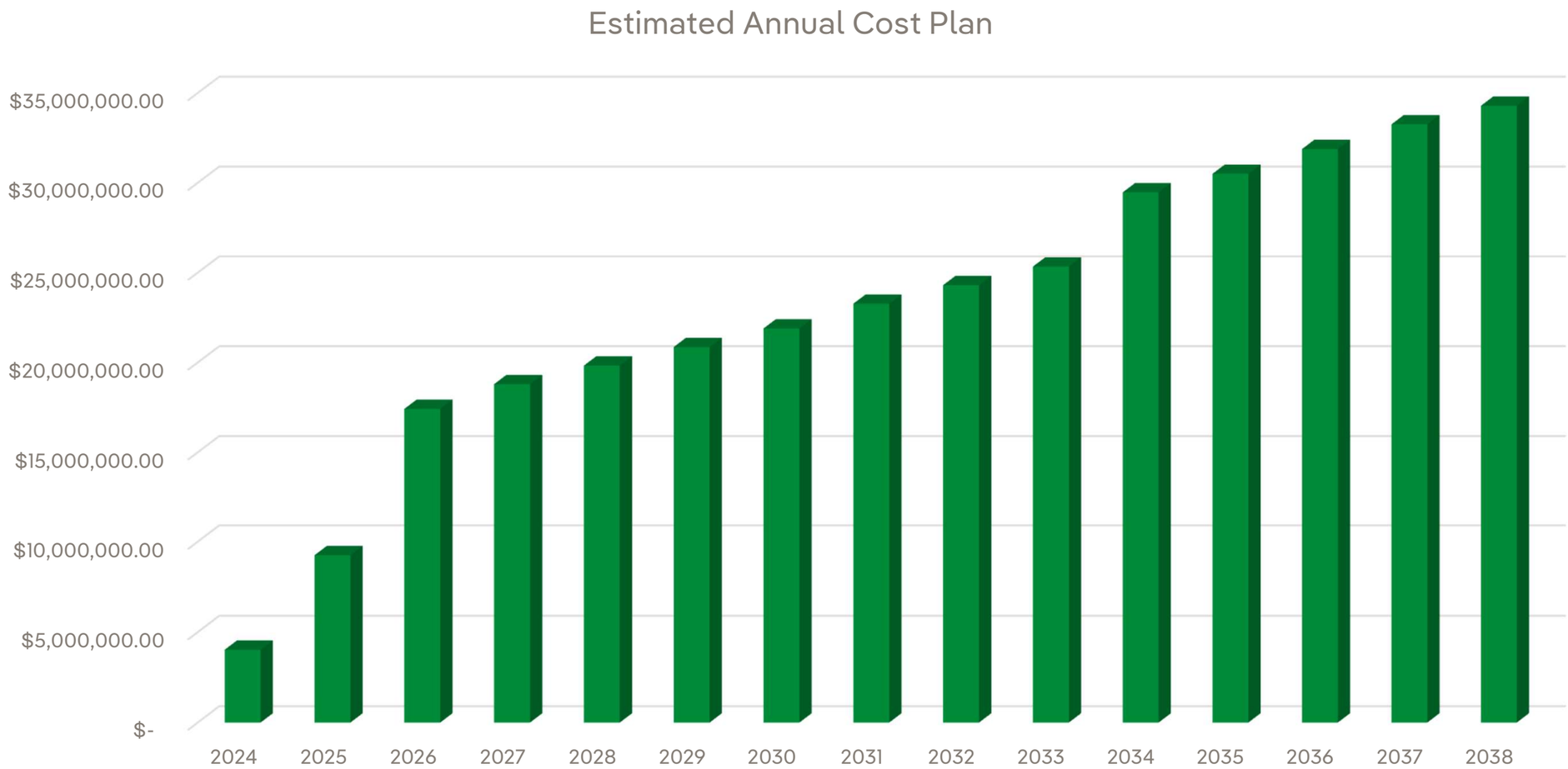
- 2025 Construction Plan
- Ready to start construction in January 2025
- 2025 budget estimate is $9.25M

Central Maine Power
An Avangrid company

MEPCO
MAINE ELECTRIC POWER COMPANY, INC.

VERSANT POWER

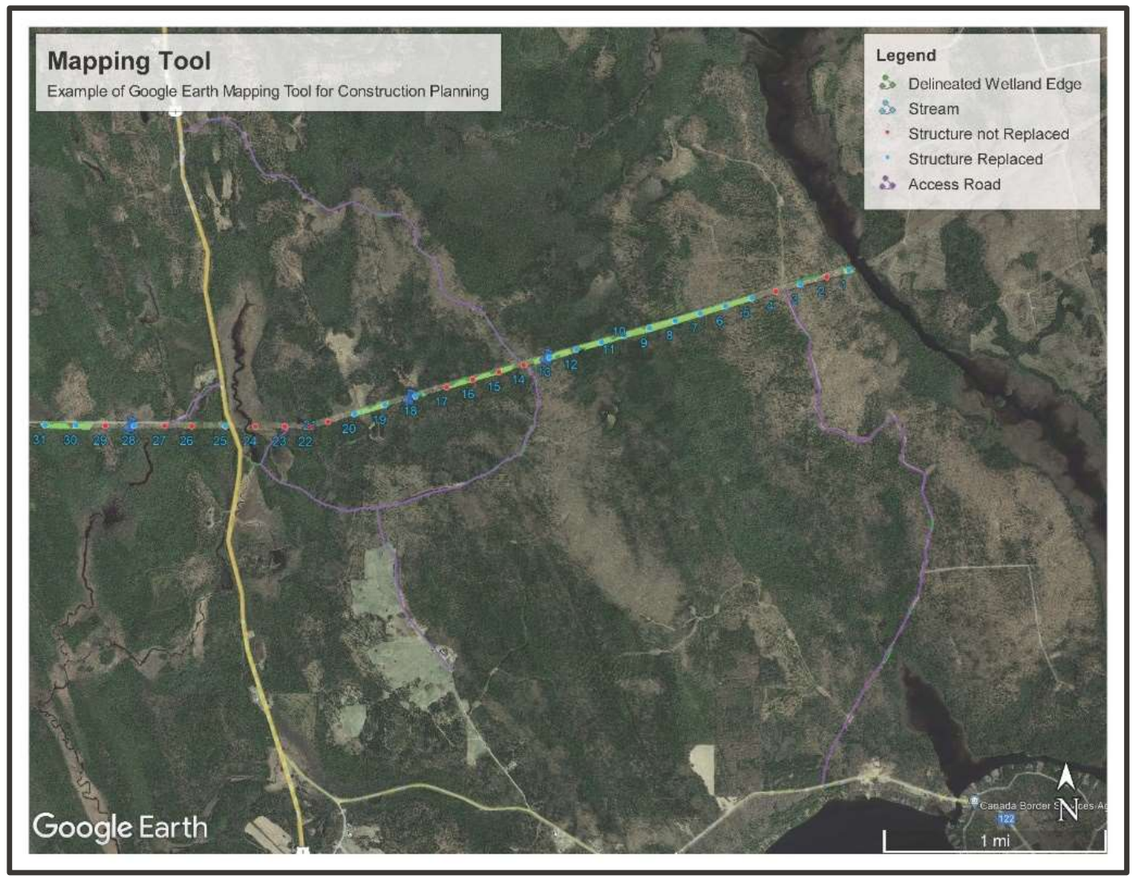
Recommended Alternative

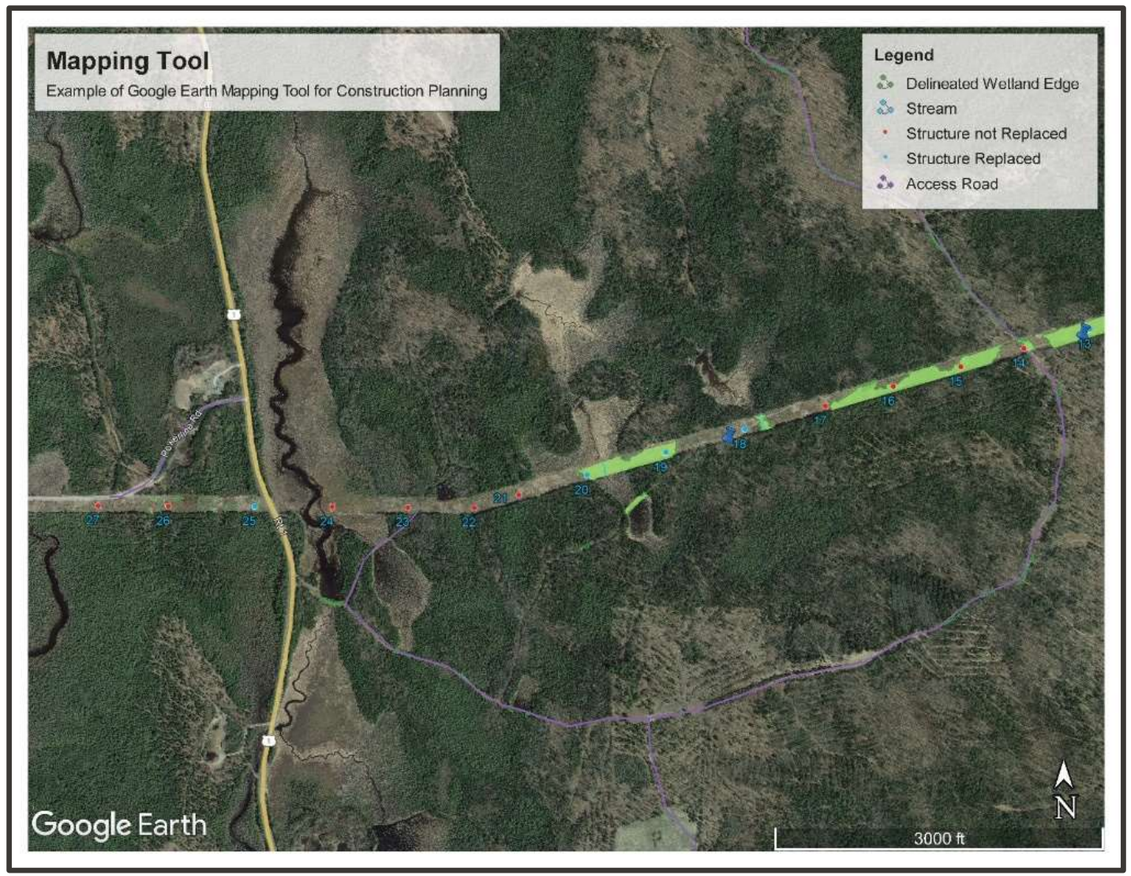


Questions

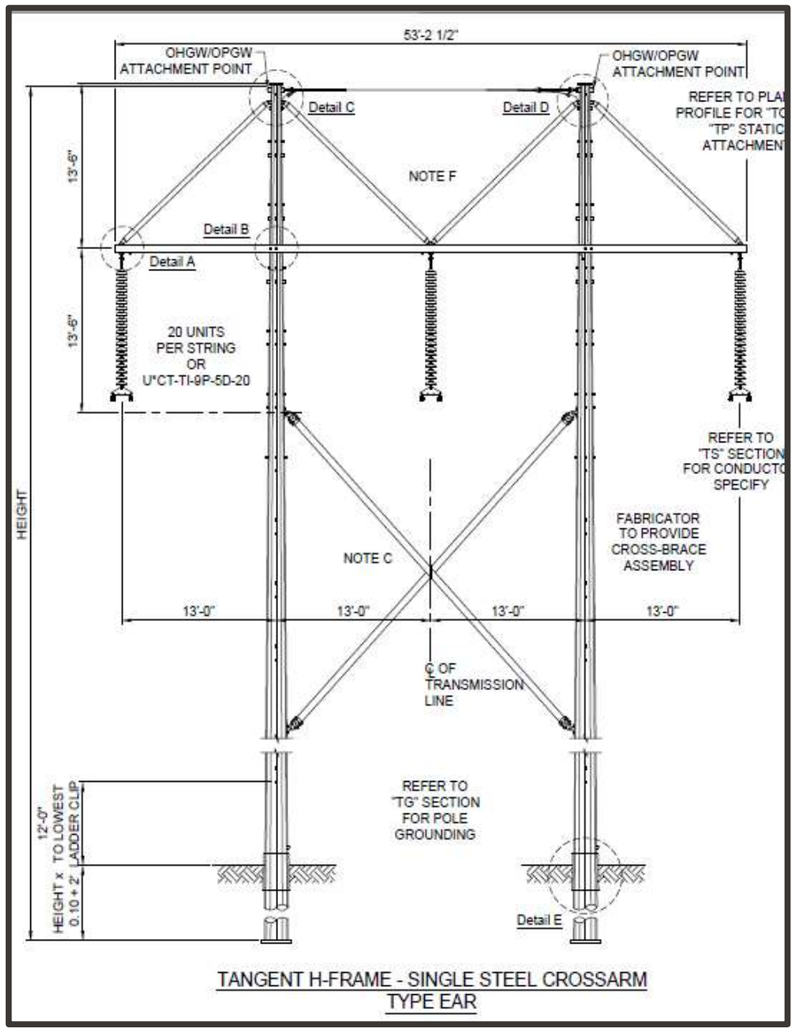
Appendix A

Structure Mapping with Access

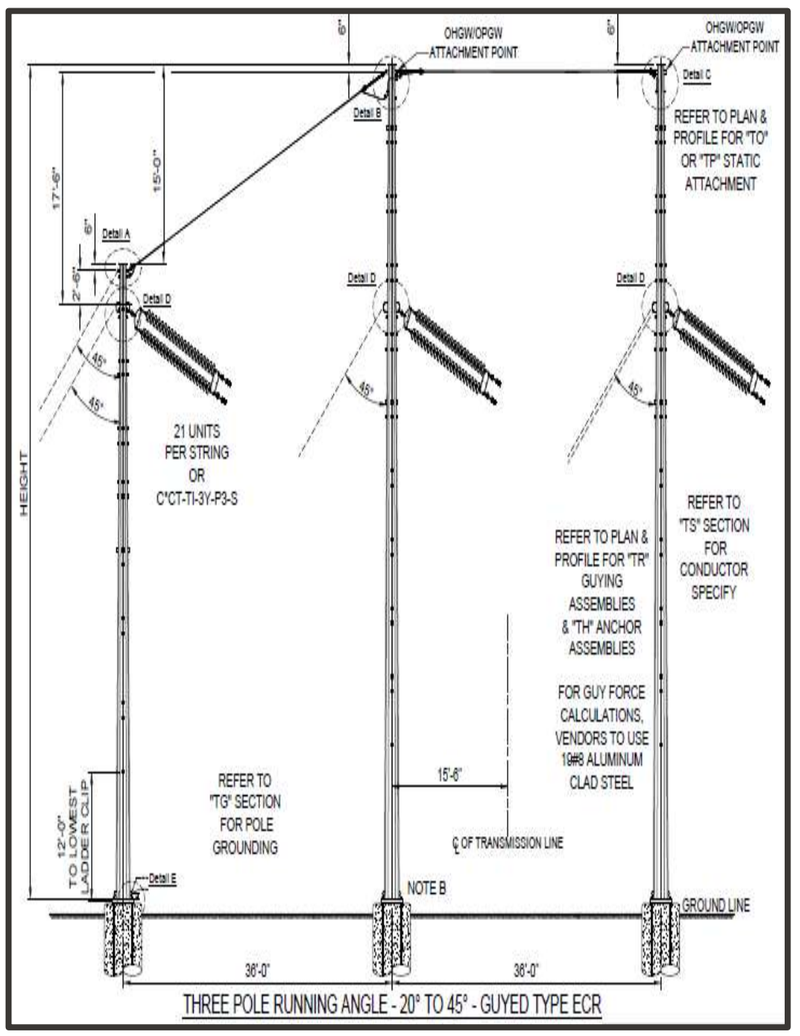




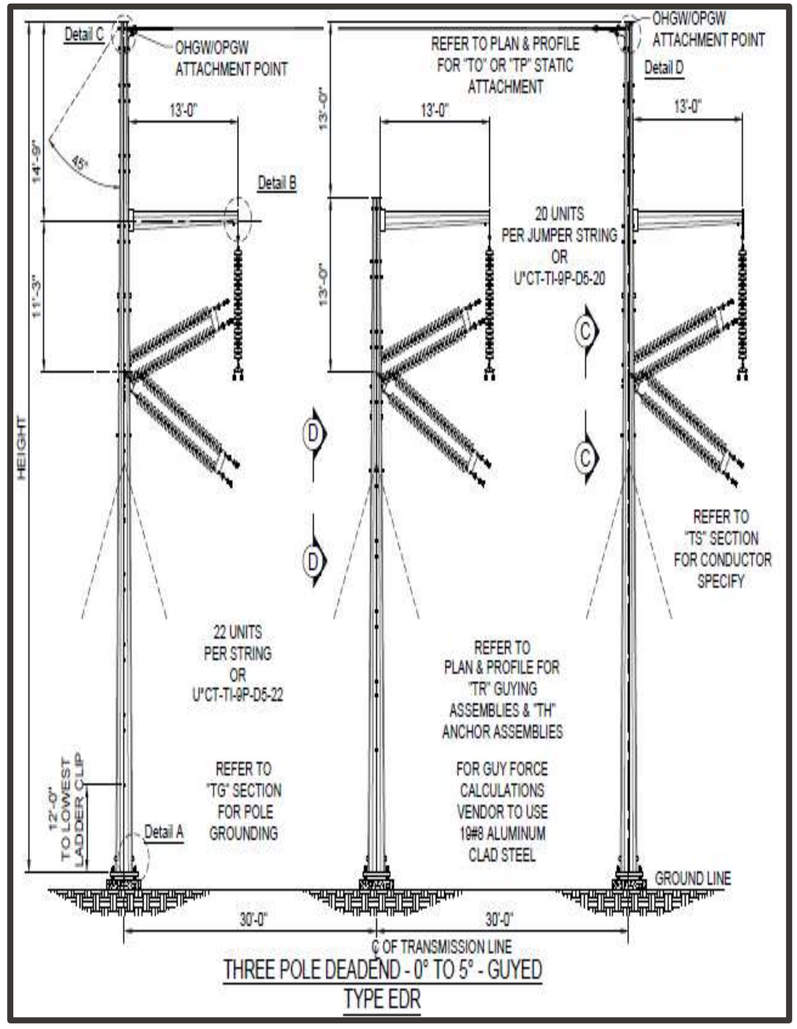
Appendix B – Proposed Structure Framing



TANGENT H-FRAME - SINGLE STEEL CROSSARM
TYPE EAR



THREE POLE RUNNING ANGLE - 20° TO 45° - GUYED TYPE ECR

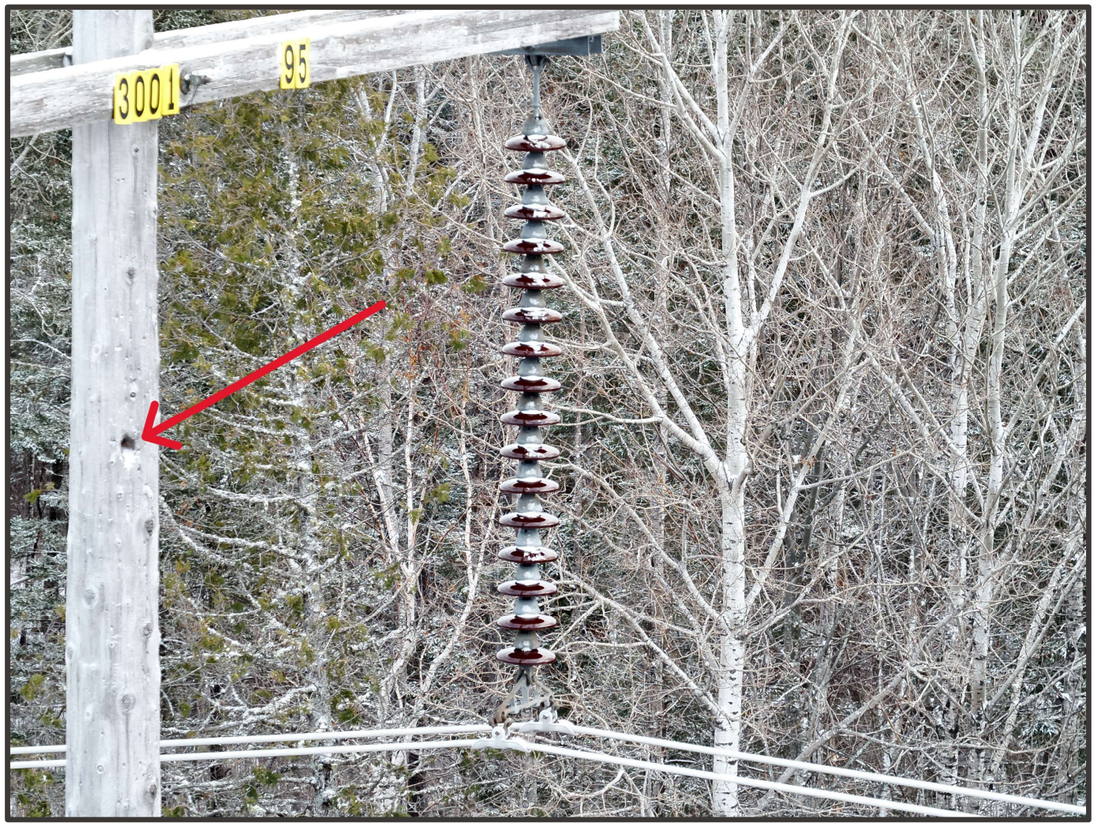


THREE POLE DEADEND - 0° TO 5° - GUYED
TYPE EDR

Appendix C

Drone Inspection Photos

- Drone inspection was used on inaccessible structures and non-climbable structures.
- The following photos are representative of damage caused by woodpeckers, rotting, and splitting.



Appendix C

Drone Inspection Photos Cont.

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