

**STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
ENERGY FACILITY SITING BOARD**

In re: The Narragansett Electric :
Company d/b/a National Grid : **Docket No. SB-2012-01**
Interstate Reliability Project :

National Grid's Responses to the
EFSB's 1st Set of Data Requests

REQUEST EFSB 1-7:

In regards to the overhead alternatives detailed in Section 5.6 (pages 5-29 through 5-32), please provide an explanation and comparison of project costs between the use of davit-arm structures and double-circuit davit arm structures versus the proposed H-frame structures. If possible, please provide these cost comparisons in the same format as utilized for Table 4-3 (page 4-22).

RESPONSE:

Provided for reference are the following Attachments:

- Attachment 1 is an outline drawing of a 345 kV davit-arm structure with restrained insulators;
- Attachment 2 is an outline drawing of a 345 kV davit-arm structure with I-string (unrestrained) insulators;
- Attachment 3 is an outline drawing of a 345/115 kV double circuit davit arm structure with restrained insulators; and
- Attachment 4 is an outline drawing of a 345/115 kV double circuit davit arm structure with I-string (unrestrained) insulators.

As noted in Section 5.6.2, the use of double circuit structures for two 345 kV lines would not be acceptable due to non-compliance with applicable transmission planning criteria. Accordingly, only the 345/115 kV double circuit structure option is considered in this response.

Descriptions of how these alternative structure types could be applied on the Interstate Reliability Project in Rhode Island are as follows:

Davit arm structure alternatives

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366 Line from the MA/RI state line to West Farnum Substation. Replacement of the proposed H-frame structures with davit arm structures (see Attachment 1) would result in a reduction of approximately 8 acres of tree clearing and elimination of the need to perform trimming along the ROW edge where clearing is not otherwise required. However, structures would average 25 feet taller than the H-frame structures (see Note 1), and environmental impacts along the ROW would be greater due to the need for more robust access roads to support the significant increase in concrete foundation installations. The estimated 366 line cost would increase from \$26.8M to \$31.5M.

328 Line from West Farnum Substation to Sherman Road Substation. In addition to the new 341 line being installed in this ROW segment, the 345kV 328 line will be rebuilt and reconducted. Use of davit arm (see Attachment 2) instead of H-frame structures would result in no reduction in required tree clearing. Davit arm structures would average 25 feet taller than the H-frame structures, and environmental impacts along the ROW would be greater due to the need for more robust access roads to support the significant increase in concrete foundation installations. The estimated 328 line cost would increase from \$41.6M to \$48.9M.

341 Line from West Farnum to the RI/CT state line. Replacement of the proposed H-frame structures with davit arm structures would result in a reduction of approximately 56 acres of tree clearing. However, structures would average 25 feet taller than the H-frame structures, and environmental impacts along the ROW would be greater due to the need for more robust access roads to support the significant increase in concrete foundation installations. The estimated 341 line cost would increase from \$74.9M to \$95.1M.

Double-circuit davit arm structure alternatives

366 Line from the MA/RI state line to West Farnum Substation. Replacement of the proposed H-frame structures with double circuit davit arm structures (see Attachment 3) would result in a reduction of approximately 13 acres of tree clearing. However, structures would average 50 feet taller than the H-frame structures and therefore would be significantly more visible. Environmental impacts along the ROW would also be greater due to the need for more robust access roads to support the significant increase in concrete foundation installations and larger cranes than otherwise might be required. The 115 kV Q143S and S171N lines, which would remain unchanged with the H-frame alternative, would need to be totally reconstructed in this ROW segment. This would not only increase costs, but would introduce the complexity of coordinating outages on the Q143S and S171N lines, which supply multiple load-serving substations. The estimated 366 line cost would increase from \$26.8M to \$38.8M, which would include Q143S and S171N lines reconstruction.

341 Line from West Farnum to the RI/CT state line. Replacement of the proposed H-frame structures with double circuit davit arm structures would only be feasible in the 3.5 mile ROW segment that is occupied by the 115 kV B23 line between West Farnum and

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Sherman Road. In this ROW segment, a reduction of approximately 22 acres of tree clearing could be achieved. However, structures would average 50 feet taller than the H-frame structures and therefore would be significantly more visible. Environmental impacts along the ROW would also be greater due to the need for more robust access roads to support the significant increase in concrete foundation installations and larger cranes than otherwise might be required. The 115 kV B23 line, which would remain predominantly unchanged with the H-frame alternative, would need to be totally reconstructed. This would not only increase costs, but would introduce the complexity of coordinating outages on the B23 line, which is the sole source of transmission supply to the Nasonville Substation. The estimated 341 line cost would increase from \$74.9M to \$87.0M, which would include B23 line reconstruction.

The increased costs for use of alternative structure types are summarized in the table below:

Project Components	H-frame (\$M)	Davit (\$M)	D.C. Davit (\$M)
New 366 345 kV Transmission Line MA/RI Border to the West Farnum Substation	26.8	31.5	38.8
Removal of Existing 69 kV Towers	0.9	0.9	0.9
Realign Existing 347 345 kV Line at the Sherman Road Switching Station	2.7	2.7	2.7
New 341 345 kV Transmission Line from the West Farnum Substation to RI/CT Border	74.9	95.1	87.0
Reconstruct and Reconductor 328 345 kV Transmission Line	41.6	48.9	41.6
3361 Line Realignment at the Sherman Road Switching Station	3.4	3.4	3.4
333 Line Realignment at the Sherman Road Switching Station	2.9	2.9	2.9
Reconstruction of the Sherman Road 345 kV Switching Station	27.6	27.6	27.6
Total Estimated Cost in RI	180.8	213.0	204.9

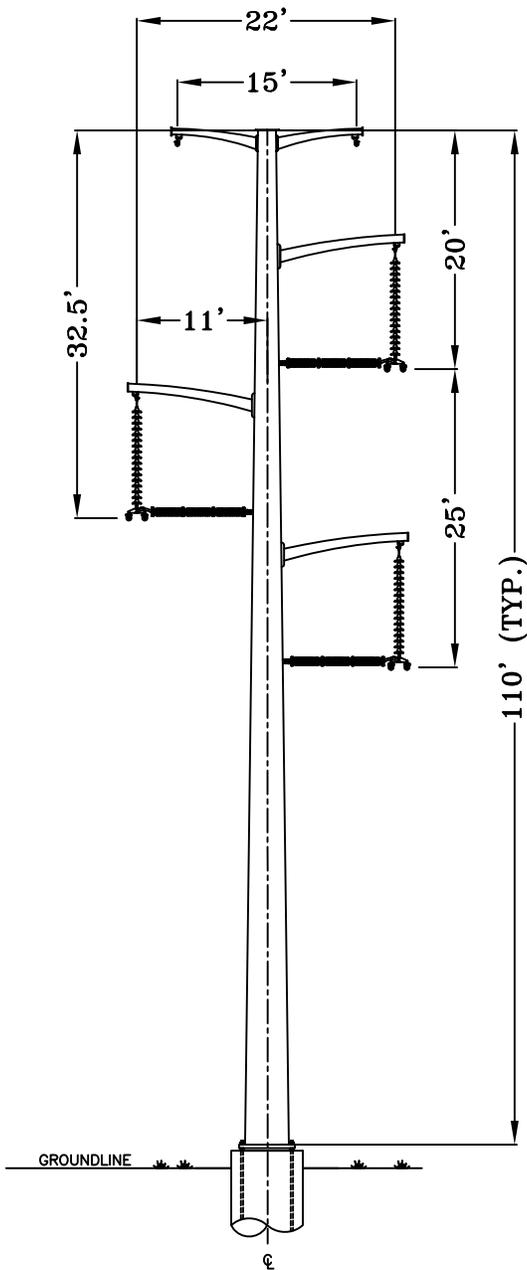
Note 1 - The Petition in Section 5.6.1 incorrectly stated that davit arm structures would be approximately 35 feet taller than H-frame structures. The actual height difference is 25 feet.

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345KV
DAVIT ARM W/ RESTRAINED
INSULATORS

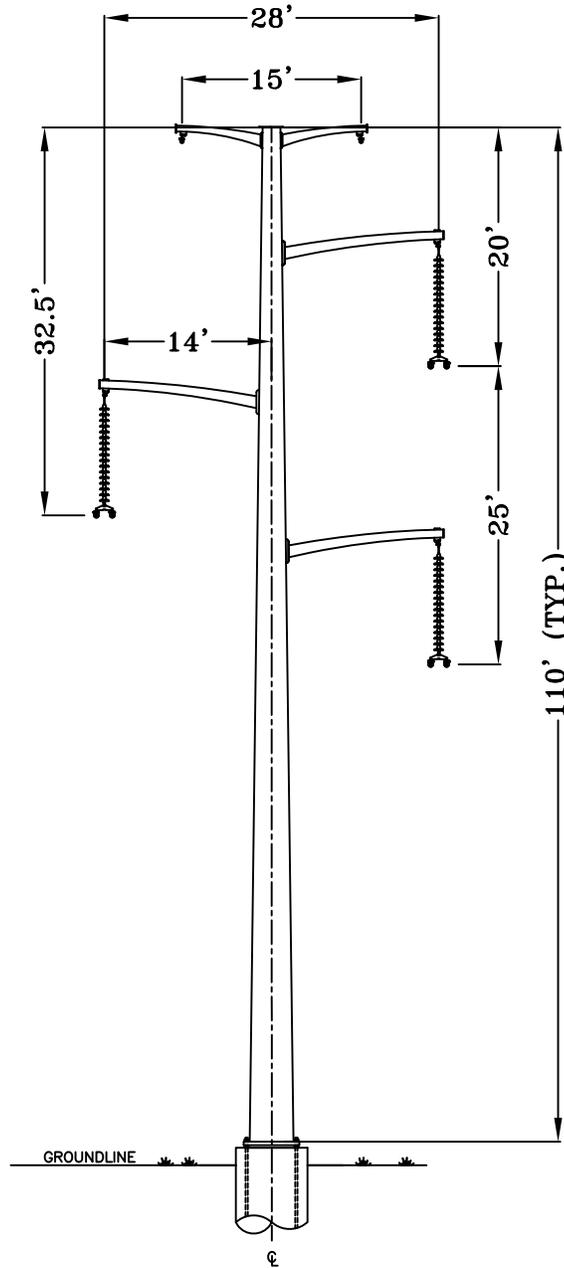
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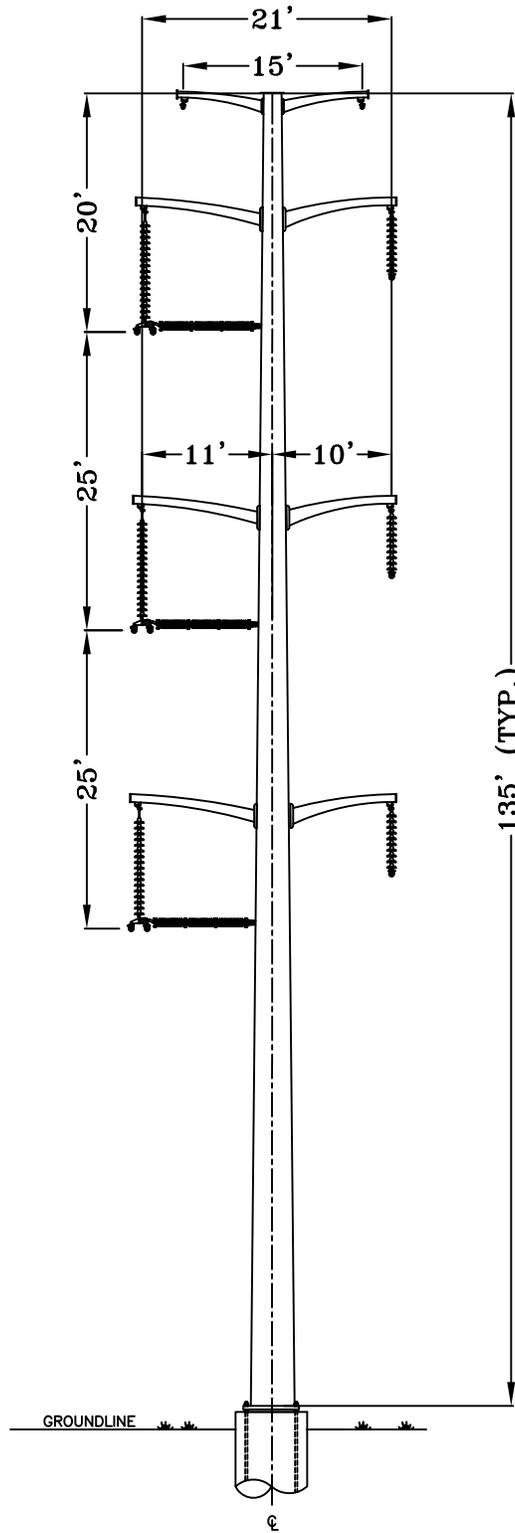
345KV
DAVIT ARM W/ I-STRING
INSULATORS

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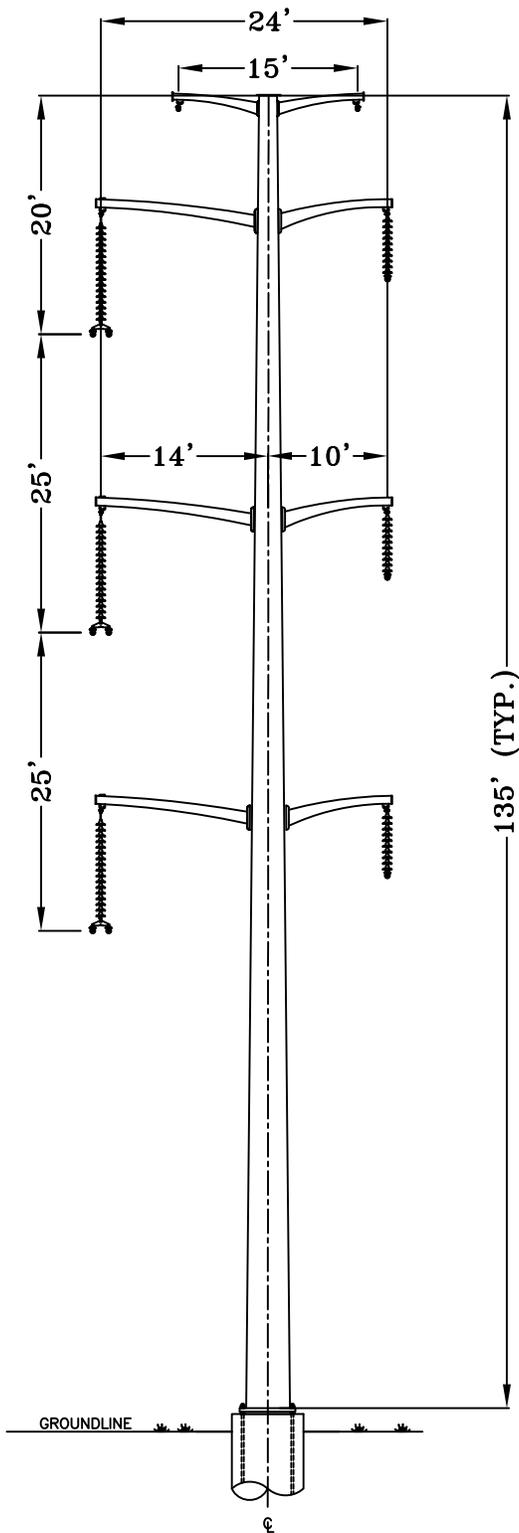
345/115KV
DOUBLE CIRCUIT DAVIT ARM
W/ RESTRAINED INSULATORS

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345/115KV
DOUBLE CIRCUIT DAVIT ARM
W/ I-STRING INSULATORS

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