Attachment 1

F-119

ITT MEYER INDUSTRIES

A Division of International Telephone and Telegraph Corporation

JOB NAME NORTHEAST UTILITIES SERVICE COMPANY

JOB NO. 3-02-919501

BY M. B. Halbach

DATE March 18, 1977

SHEET 1 OF

ANALYSIS OF 115 KV DOUBLE CIRCUIT STEEL POLES

ROWAYTON JUNCTION - GLENBROOK LINE

MEYER INDUSTRIES

A Division of International Telephone and Telegraph Corporation

JOB NAME Northeast Utilities

JOB NO. 3-02-919501

BY MBH

DATE 3-18-77

SHEET 2 OF

SUMMARY OF ANALYSIS

POLE SHAFT - Following is a list of poles with those load cases which cause stresses in the pole to exceed the minimum yield of 60 ksi. Note that Load Condition 5A is a broken static wire, and Load Condition 5B is a broken conductor.

Structure No.	Load Condition Causing Excessive Stresses
1007 (B388)	1
1008 (B389)	None
1009 (B390)	None
1010 (B391)	None
1011 (B392)	5B
1012 (B393)	5B
1013 (B394)	5B
1014 (B395)	5B
1015 (B396)	5B
	Also 1, 2 & 5B with 1037 Loads
1016 (B397)	5B
1017 (B398)	5B
1018 (B399)	1, 5B
1027 (B419)	1,2,5B
1028 (B420)	None
1034 (B426)	5B
1035 (B427)	5B
1036 (B428)	5B
1037 (B429)	5B

STATIC WIRE ATTACHMENT VANG - The static wire vang on Structure Nos. 1011 thru 1017, 1035 and 1036 is not structurally adequate for Condition No. 5A only. The static wire vang on Structure Nos. 1007 thru 1010, 1018, 1027, 1028, 1034 and 1037 is structurally adequate for all load conditions.

CROSSARMS - The crossarms are structurally adequate for Load Conditions 1 thru 4. None of the arms are adequate for Load Condition 5B, broken conductor.

BASE PLATE AND ANCHOR BOLTS - A base plate and anchor bolt analysis was performed on the 3 most heavily stressed structures (1013, 1015 with 1037 loads, and 1027).

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JOB NAME_____ JOB NO._____

BY_____

DATE_____

SHEET 3 OF_____

The base plate and anchor bolts for Structure No. 1013 are structurally adequate for all load conditions.

The base plate and anchor bolts for Structure No. 1015 are structurally adequate for all load conditions with the exception that the bond length requirements are not met for Condition No. 1 loads (Structure No. 1037 loads). The base plate and anchor bolts are adequate for all load conditions specified for Structure No. 1015 only.

The base plate and anchor bolts are not adequate for Condition No. 1 loads on Structure No. 1027. Also, the bond length requirements are not met for Condition No. 2.

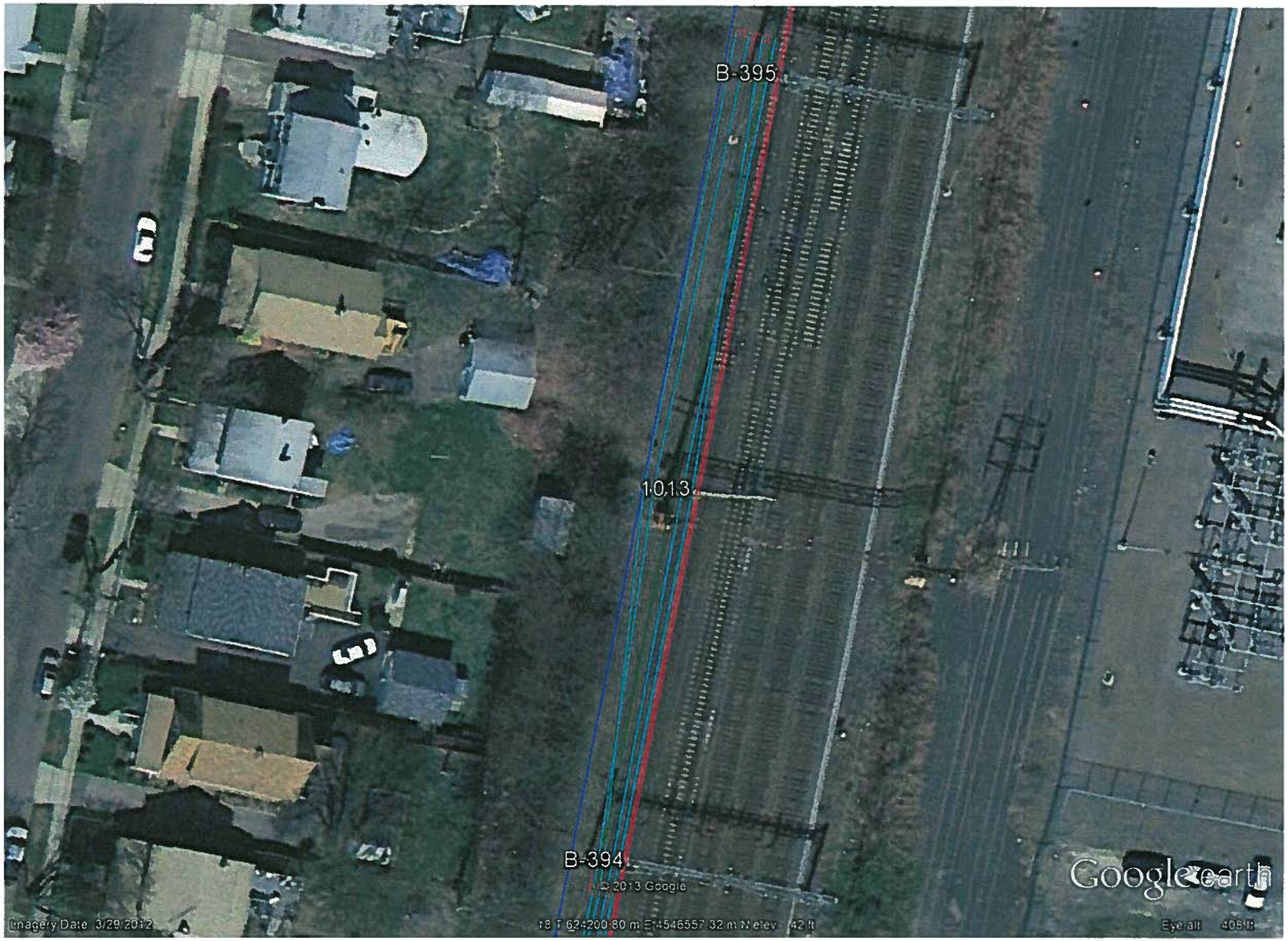
Detailed design analysis data follows.

Location off of Culloden Rd near existing structure 1009. Homes and accessory buildings are very near transmission lines. (Red lines represent 1977 Circuit, Dark blue lines represent new 115-kV circuit, and light blue lines represent railroad supply circuits)

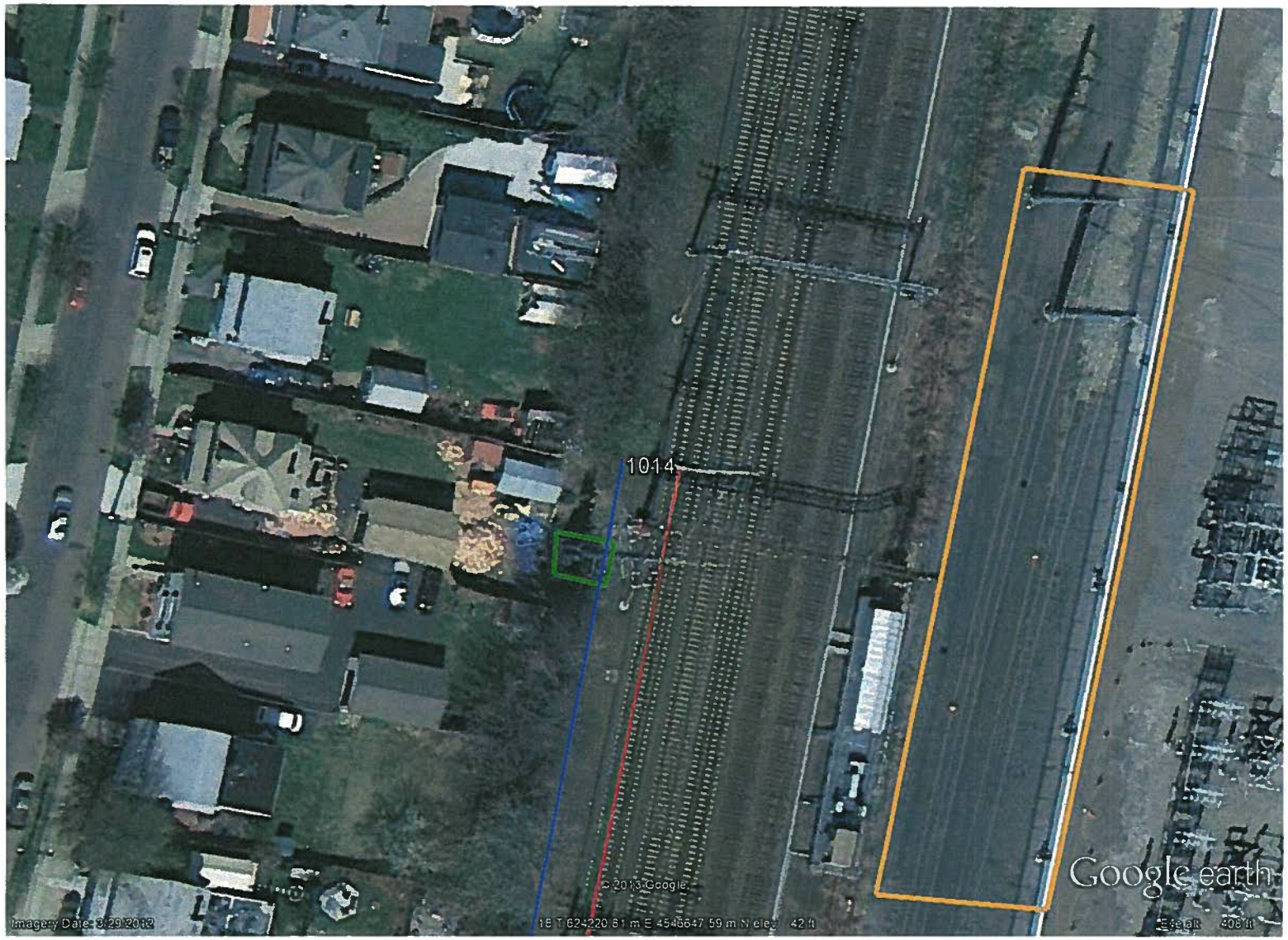
Attachment 2

Location off of Scott Place near structure 1011. Tight construction and heavy side slopes. Large pads and ramps may be required.

Location off of Culloden Rd near structure 1013. Construction Behind Homes and transition area for RR supply circuits.



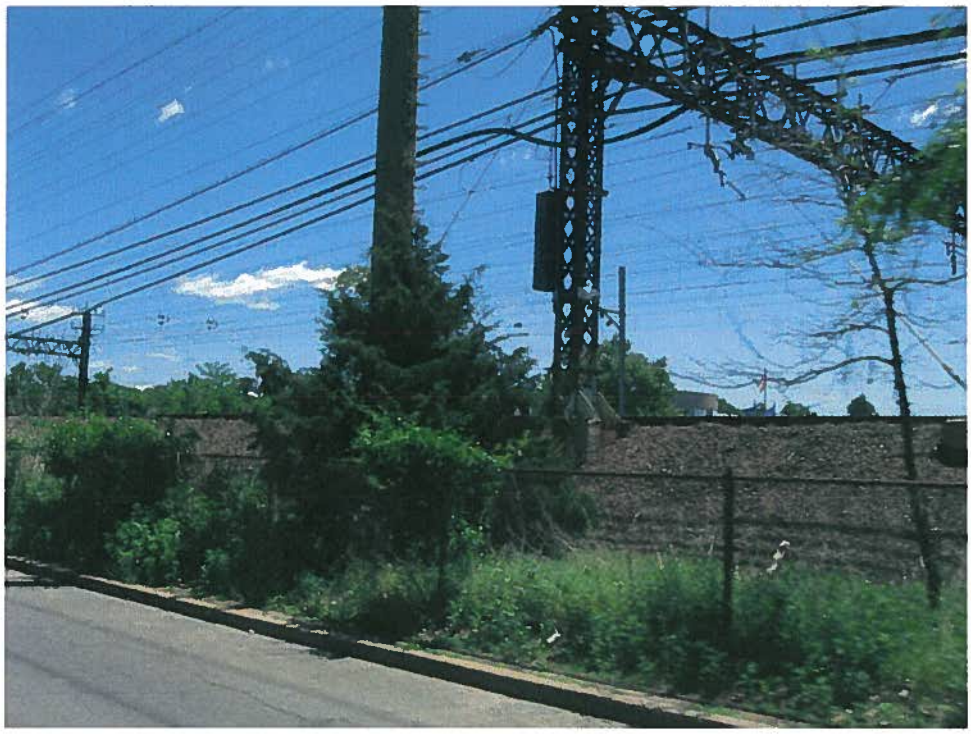
Location off of Culloden Rd across the RR tracks from Glenbrook Substation. Other overhead lines (orange box) prevent OH line entry into station, UG crossing will be required (similar to existing 1977 Line Tap – Green Box)



South State St, RR Retaining Wall

South State St, Traffic Impact

South State St, Narrow Space between RR and roadway



South State St – Lattice Tower at I-95 Crossing

East Main St – Lattice Tower at Greenery

Crystal St – Retaining wall and steep embankment

Culloden Rd – Looking down Scott Place, vegetation to be removed

Culloden Rd – Looking at OH/UG Transition into Glenbrook S/S

Attachment 3

New 115kV Double Circuit Steel Structures 1151/1977 Line			
Estimate Details			
Item Description	Total		
Material	$ 2,506,705	see detail below	
Labor	$ 40,490,000	see detail below	
Engineering/Permitting/PM (incl Co OH & MNRR Force Account)	$ 14,690,178		
Escalation	$ 2,003,798		
AFUDC	$ 2,884,344		
Contingency	$ 7,306,481		
Total Variation Cost	**$ 69,881,506**	Note: Does not include substation upgrades	

Overhead Construction Cost Breakdown			
Item	Material	Labor	Subtotal
Civil / Site Work	$ 980,000	$ 21,130,000	$ 22,110,000
Poles & Foundations	$ 1,278,589	$ 13,360,000	$ 14,638,589
Conductor and Hardware	$ 248,116	$ 6,000,000	$ 6,248,116
Subtotal Construction Material and Labor	**$ 2,506,705**	**$ 40,490,000**	**$ 42,996,705**

General Assumptions:

- Install the new 1151 Line and relocate the 1977 Line on double circuit steel structures and remove existing structures.
- New conductor only for the 1151 Line and 1977 Line conductor would be reused.
- Approximate length is 1.4 miles (24 structures).
- ROW is sufficient for addition of new double-circuit steel structures.
- Conceptual grade estimate (-25% to +50% accuracy).
- One jack and bore installation.

Note: Engineering/Permitting/PM value includes $3M for MNRR Force Account

This cost estimate reflects the unusual costs and work constraints that CL&P would face in reconstructing the 1977 line as a double-circuit structure line within the MNRR ROW. Some of the more significant of these factors include the following:

1. A construction window of only 2.75 hours per day between 2:00 AM and 4:45 AM, which severely restricts the time period for the work; however, the construction crews would need to be paid for a full day of work each day.
2. The construction work would be subject to limitations due to safety requirements associated with nighttime work on an active railway. For example, certain types of work would need to be suspended for any passing trains on adjacent tracks and there would be MNRR staffing requirements associated with track outages and power supply interruptions needed for the work. In addition, MNRR may cancel the scheduled track outages on short notice due to their own priorities.
3. Access to the location for the new structures would be difficult from the rear yards of homes along Culloden Road because all of these properties have very small lots.
4. Twenty-four drill rig platforms would be required, most of them elevated, some to the height of the railroad.
5. There would be other costs and possible schedule delays associated with work coordination requirements with MNRR and ConnDOT.

The cost estimate above is based on the following assumptions regarding availability of work space and the timing of construction work:

1. Minimum of three work crews for 42 weeks of construction.
2. Use of two lanes in South State Street for the duration of the construction.
3. Use of MNRR corridor for elevated drill rig platforms.
4. Monday through Saturday construction.
5. Availability of the expected construction window for 42 continuous weeks (no recalls of the required MNRR track outages).
6. Availability of approximately 12 extended (six-hour) track outages for wire work.