APPENDIX M
Clearance Calculations

Careba Mott MacDonald

CLIENT: NOBLE - WETHERSFIELD | JOB NO. | SHEET 1 OF 13
SUBJECT: 230 kV TRANSMISSION LINE GROUND CLEARANCES | BY RPB | DATE | CKD | REVISION

GROUND CLEARANCES PER NESC C2-2007 RULE 232

DESIGN VOLTAGE: 242 kV

PHASE TO GROUND VOLTAGE: $\frac{242}{\sqrt{3}} = 139.7\ kV \rightarrow 140\ kV$

GRND CLEARANCE PER TABLE 232-1 PLUS 0.4"/kV > 22 kV

INCREASE: 0.4 (140 - 22) = 47.2" → 48" → 4.0'

TABLE 232-1:	CLEARANCE ≤ 22 kV	+ 4.0' INCREASE	REQ'D CLEARANCE
1. Railroad tracks	26.5'		30.5' ← N.A.
2. Roads, streets 3. Driveways, parking lots 4. Cultivated land, grazing, forest	18.5'		22.5'
5. Pedestrians	14.5'		18.5'
6. Waterways (no sailboats)	17.0'		21.0'

In general use design clearance in all areas (except as noted below) to compensate for possible survey errors, site conditions, tolerances, safety factor = 26', min. clearance 22.5'

@ Wethersfield, Quaker Lane & Hermitage Rd for existing/future communications cable alongside of roads use 25' ht. + 9' clearance = 34' clearance ht.
(Electric distribution wires to be underground crossings)

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ft

Table 232-1—
Vertical clearance of wires, conductors, and cables above ground, roadway, rail, or water surfaces[16]

(Voltages are phase to ground for effectively grounded circuits and those other circuits where all ground faults are cleared by promptly de-energizing the faulted section, both initially and following subsequent breaker operations. See the definitions section for voltages of other systems. See Rules 232B1, 232C1a, and 232D4.)

Nature of surface underneath wires, conductors, or cables	Insulated communication conductors and cable; messengers; overhead shield/ surge-protection wires; grounded guys; ungrounded guys exposed to 0 to 300 V [11] [15]; neutral conductors meeting Rule 230E1; supply cables meeting Rule 230C1 (ft)	Noninsulated communication conductors; supply cables of 0 to 750 V meeting Rule 230C2 or 230C3 (ft)	Supply cables over 750 V meeting Rule 230C2 or 230C3; open supply conductors, 0 to 750 V [3]; ungrounded guys exposed to over 300 V to 750 V [14] (ft)	Open supply conductors, over 750 V to 22 kV; ungrounded guys exposed to 750 V to 22 kV [24] (ft)	Trolley and electrified railroad contact conductors and associated span or messenger wires	
					0 to 750 V to ground (ft)	Over 750 V to 22 kV to ground (ft)
Where wires, conductors, or cables cross over or overhang						
1. Track rails of railroads (except electrified railroads using overhead trolley conductors) [2] [4] [22]	23.5	24.0	24.5	26.5	22.0 [4]	22.0 [4]
2. Roads, streets, and other areas subject to truck traffic [23]	15.5	16.0	16.5	18.5	18.0 [5]	20.0 [5]
3. Driveways, parking lots, and alleys [25]	15.5 [7] [10]	16.0 [7] [10]	16.5 [7]	18.5	18.0 [5]	20.0 [5]
4. Other land traversed by vehicles, such as cultivated, grazing, forest, orchards, etc. [26]	15.5	16.0	16.5	18.5	—	—
5. Spaces and ways subject to pedestrians or restricted traffic only [9]	9.5	12.0 [11]	12.5 [9]	14.5	16.0	18.0
6. Water areas not suitable for sailboating or where sailboating is prohibited [21]	14.0	14.5	15.0	17.0	—	—
7. Water areas suitable for sailboating including lakes, ponds, reservoirs, tidal waters, rivers, streams, and canals with an unobstructed surface area of [17] [18] [19] [20] [21]						

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NOTE: The phase and neutral conductors of a supply line are normally considered separately when determining the sag of each due to temperature rise.

B. Clearance of wires, conductors, cables, equipment, and support arms mounted on supporting structures

1. Clearance to wires, conductors, and cables

The vertical clearance of wires, conductors, and cables aboveground in generally accessible places, roadway, rail, or water surfaces, shall be not less than that shown in Table 232-1.

2. Clearance to unguarded rigid live parts of equipment

The vertical clearance above ground, roadway, or water surfaces for unguarded rigid live parts such as potheads, transformer bushings, surge arresters, and short lengths of supply conductors connected thereto, which are not subject to variation in sag, shall be not less than that shown in Table 232-2. For clearances of drip loops of service drops, see Table 232-1.

3. Clearance to support arms, switch handles, and equipment cases

The vertical clearance of switch handles, equipment cases, support arms, platforms, and braces that extend beyond the surface of the structure shall be not less than that shown in Table 232-2. These clearances do not apply to internal structural braces for latticed towers, X-braces between poles, and pole-type push braces.

4. Street and area lighting

a. The vertical clearance of street and area lighting luminaires shall be not less than that shown in Table 232-2. For this purpose, grounded luminaire cases and brackets shall be considered as effectively grounded equipment cases; ungrounded luminaire cases and brackets shall be considered as a rigid live part of the voltage contained.

EXCEPTION: This rule does not apply to post-top mounted luminaires with grounded or entirely dielectric cases.

b. Insulators, as specified in Rule 279A, should be inserted at least 2.45 m (8 ft) from the ground in metallic suspension ropes or chains supporting lighting units of series circuits.

C. Additional clearances for wires, conductors, cables, and unguarded rigid live parts of equipment

Greater clearances than specified by Rule 232B shall be provided where required by Rule 232C1.

1. Voltages exceeding 22 kV

a. For voltages between 22 and 470 kV, the clearance specified in Rule 232B1 (Table 232-1) or Rule 232B2 (Table 232-2) shall be increased at the rate of 10 mm (0.4 in) per kilovolt in excess of 22 kV. For voltages exceeding 470 kV, the clearance shall be determined by the method given in Rule 232D. All clearances for lines over 50 kV shall be based on the maximum operating voltage.

EXCEPTION: For voltages exceeding 98 kV ac to ground or 139 kV dc to ground, clearances less than those required above are permitted for systems with known maximum switching-surge factors (see Rule 232D).

b. For voltages exceeding 50 kV, the additional clearance specified in Rule 232C1a shall be increased 3% for each 300 m (1000 ft) in excess of 1000 m (3300 ft) above mean sea level.

c. For voltages exceeding 98 kV ac to ground, either the clearances shall be increased or the electric field, or the effects thereof, shall be reduced by other means as required to limit the steady-state current due to electrostatic effects to 5 mA rms if the largest anticipated truck, vehicle, or equipment under the line were short-circuited to ground. The size of the anticipated truck, vehicle, or equipment used to determine these clearances may be less than but need not be greater than that limited by federal, state, or local regulations governing the area under the line. For this determination, the conductors shall be at a final unloaded sag at 50 °C (120 °F).

Careba Mott MacDonald

CLIENT: NOBLE-WETHERSFIELD | JOB NO. | SHEET 4 OF 13

SUBJECT: 230 kV TRANSMISSION LINE | BY | DATE

GROUND CLEARANCES | CKD | REVISION

Conditions for clearance check

1. 250 B COMBINED WIND + ICE HEAVY DISTRICT
   1/2" ICE 0°F 40 MPH WIND

2. 250 C EXTREME WIND
   0" ICE 60°F 90 MPH WIND

3. 250 D EXTREME ICE & CONCURRENT WIND
   1 1/4" ICE 15°F 40 MPH WIND

4. MAXIMUM OPERATING
   0" ICE 257°F 0 MPH WIND

SEE FOLLOWING PLS_CADD CRITERIA REPORT SH. 5 TO 8
& PLS_CADD CLEARANCE REPORT SH. 9 TO 13
MAXIMUM SAGS OCCUR @
MAX. OPERATING CONDITION.
PLAN & PROFILES DRAWINGS
PLOTTED WITH CONDUCTORS
@ MAX. OPERATING CONDITION
AND WITH 26' CLEARANCE LINE.
ALL OK.

Criteria notes:
NESC Heavy per Rule 250B, Page 161
Extreme Wind Loading per Rule 250C, Page 161, Coefficients and Gust Response Factors per Equations in Tables 250-2, 250-3
90 MPH Basic Wind Speed, 3 second Gust Wind Speed, Figure 250-2 Beginning on Page 166
Grade B Construction "Method A" per Table 253-1, Page 173 and Table 261-1A, Page 182
Tension Limits per Rule 261H1, Page 179
Insulator Strength Reduction per Rule 277, Page 188 Should be applied to Insulator Strengths when Modeling Insulators
2002 NESC C2 2002 Criteria File for PLS-CADD Created December 21, 2001
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Criteria Report

Weather Cases

WC #	Description	Air Density Factor (psf/mph^2)	Wind Vel. (mph)	Wind Pres. (psf)	Wire Ice Thick (in)	Wire Ice Density (lbs/ft^3)	Wire Ice Load (lbs/ft)	Temp (deg F)	Weather Load Factor	NESC Constant (lbs/ft)	Wire Wind Height Adjust Model	Wire Gust Response Factor
1	NESC Heavy	0.00256	40	4.0	0.50	57.000	0.00	0	1.00	0.30	None	1
2	Extreme Wind	0.00256	90	20.7	0.00	0.000	0.00	60	1.00	0.00	NESC 2002	NESC 2002
3	Extreme Ice	0.00256	40	4.0	1.25	57.000	0.00	15	1.00	0.00	None	1
4	Uplift	0.00256	0	0.0	0.00	0.000	0.00	-20	1.00	0.00	None	1
5	Maximum Operating	0.00256	0	0.0	0.00	0.000	0.00	257	1.00	0.00	None	1
6	NESC Blowout 6PSF	0.00256	48	6.0	0.00	0.000	0.00	60	1.00	0.00	None	1
7	No Wind (SWING 1)	0.00256	0	0.0	0.00	0.000	0.00	60	1.00	0.00	None	1
8	Medium Wind (SWING 2)	0.00256	48	6.0	0.00	0.000	0.00	60	1.00	0.00	None	1
9	High Wind (SWING 3)	0.00256	90	20.7	0.00	0.000	0.00	60	1.00	0.00	None	1
10	GALLOPING (SWING)	0.00256	28	2.0	0.50	57.000	0.00	32	1.00	0.00	None	1
11	GALLOPING (SAG)	0.00256	0	0.0	0.50	57.000	0.00	32	1.00	0.00	None	1
12	-20 Deg F	0.00256	0	0.0	0.00	0.000	0.00	-20	1.00	0.00	None	1
13	0 Deg F	0.00256	0	0.0	0.00	0.000	0.00	0	1.00	0.00	None	1
14	30 Deg F	0.00256	0	0.0	0.00	0.000	0.00	30	1.00	0.00	None	1
15	32 Deg F	0.00256	0	0.0	0.50	57.000	0.00	32	1.00	0.00	None	1
16	60 Deg F	0.00256	0	0.0	0.00	0.000	0.00	60	1.00	0.00	None	1
17	90 Deg F	0.00256	0	0.0	0.00	0.000	0.00	90	1.00	0.00	None	1
18	120 Deg F	0.00256	0	0.0	0.00	0.000	0.00	120	1.00	0.00	None	1
19	167 Deg F	0.00256	0	0.0	0.00	0.000	0.00	167	1.00	0.00	None	1
20	212 Deg F	0.00256	0	0.0	0.00	0.000	0.00	212	1.00	0.00	None	1

Cable Tension Criteria

LC #	WC #	Description	Cable Condition	Allowable %Ultimate	Maximum Tension (lbs)	Maximum Catenary (ft)	Applicable Cable
1	1	NESC Heavy	Initial RS	60.000	0.000	0.000	ALL CABLES
2	15	60 Deg F	Initial RS	35.000	0.000	0.000	ALL CABLES
3	16	60 Deg F	Creep RS	25.000	0.000	0.000	ALL CABLES
4	16	60 Deg F	Load RS	25.000	0.000	0.000	ALL CABLES

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Automatic Sagging Criteria

LC #	WC #	Description	Cable Condition	Allowable %Ultimate	Maximum Tension (lbs)	Maximum Catenary (ft)	Applicable Cable
1	1	NESC Heavy	Initial RS	60.000	0.000	0.000	ALL CABLES
2	16	60 Deg F	Initial RS	35.000	0.000	0.000	ALL CABLES
3	16	60 Deg F	Creep RS	25.000	0.000	0.000	ALL CABLES
4	16	60 Deg F	Load RS	25.000	0.000	0.000	ALL CABLES

Weight Span Criteria (Method 1)

Condition	WC #	Weather Case Description	Cable Condition
Condition 1 (usually Wind)	2	Extreme Wind	Initial RS
Condition 2 (usually Cold)	4	Uplift	Initial RS
Condition 3 (usually Ice)	1	NESC Heavy	Initial RS

Interaction Diagram Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	1	NESC Heavy	Initial RS
2	1	NESC Heavy	Initial RS
3	1	NESC Heavy	Initial RS
4	1	NESC Heavy	Initial RS
5	2	Extreme Wind	Initial RS
6	2	Extreme Wind	Initial RS
7	1	NESC Heavy	Initial RS
8	1	NESC Heavy	Initial RS
9	3	Extreme Ice	Initial RS
10	3	Extreme Ice	Initial RS

Structure Loads Criteria

LC #	WC #	Load Case Description	Cable Condition	Wind Dir.	Bisect Wind Angle	Wire Vert. Load Factor	Wire + Struct. Wind Load Factor	Wire Tension Load Factor	Struct Weight Load Factor	Struct Wind Area Factor	Struct. Wind Load Model	Struct. Ice Thick (in)	Struct. Ice Density (lbs/ft^3)	Pole Tip Deflection Check	Pole Tip Deflect Limit % or (ft)
1	1	RULE 250D NA+	Initial RS	NA+		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
2	1	RULE 250B NA-	Initial RS	NA-		1.50	2.50	1.65	1.50	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
3	1	RULE 250B Uplift	Initial RS	NA+		1.00	2.50	1.65	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
4	1	RULE 250B Uplift	Initial RS	NA-		1.00	2.50	1.65	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
5	2	RULE 250C NA+	Initial RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 NESC 2002	0.00	0.000	No Limit	0.00
6	2	RULE 250C NA-	Initial RS	NA-		1.00	1.00	1.00	1.00	1.00	Pre V7 NESC 2002	0.00	0.000	No Limit	0.00
7	1	RULE 250B Insula	Initial RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
8	1	RULE 250B Insula	Initial RS	NA-		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00
9	3	RULE 250D NA+	Initial RS	NA+		1.00	1.00	1.00	1.00	1.00	Pre V7 Standard	0.00	0.000	No Limit	0.00

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10	3 RULE 250D NA-	Initial RS	NA-	1 00	1 00	1 00	1 00	1 00	Pre V7 Standard	0 00	0 000	No Limit	0 00
11	16 60 Degree	Initial RS	NA-	1 00	1 00	1 00	1 00	1 00	Pre V7 Standard	0 00	0 000	No Limit	0 00

Strength Factors for each Load Case

LC #	WC #	Load Case Description	Strength Factor Steel Poles Tubular Arms Towers	Strength Factor Wood Poles	Strength Factor Concrete Poles Ultimate	Strength Factor Concrete Poles First Crack	Strength Factor Concrete Poles Zero Tension	Strength Factor Guys	Strength Factor Non-Tubular Arms	Strength Factor Braces	Strength Factor Insulators	Strength Factor Foundation
1	1	RULE 250D NA+	1 00	0 65	1 00	0 00	0 00	0 90	0 65	0 65	0 00	1 00
2	1	RULE 250B NA-	1 00	0 65	1.00	0 00	0 00	0 90	0 65	0 65	0 00	1 00
3	1	RULE 250B Uplift	1.00	0 65	1.00	0 00	0 00	0 90	0 65	0 65	0.00	1 00
4	1	RULE 250B Uplift	1 00	0 65	1.00	0 00	0 00	0 90	0 65	0 65	0 00	1 00
5	2	RULE 250C NA+	1 00	0 75	1 00	0 00	0 00	0 90	0 75	0 75	0 00	1 00
6	2	RULE 250C NA-	1 00	0 75	1 00	0 00	0 00	0 90	0 75	0 75	0 00	1 00
7	1	RULE 250B Insula	1 00	0 65	1 00	0 00	0 00	0 90	0 65	0 65	1 00	1 00
8	1	RULE 250B Insula	1 00	0 65	1 00	0 00	0 00	0 90	0 65	0 65	1 00	1 00
9	3	RULE 250D NA+	1 00	0 75	1 00	0 00	0 00	1 00	1 00	1 00	1 00	1.00
10	3	RULE 250D NA-	1 00	0 75	1 00	0 00	0 00	1 00	1 00	1 00	1 00	1 00
11	16	60 Degree	0 60	0 50	1 00	0 00	0 00	0 75	0 50	0.50	0 75	1 00

Vertical Clearance Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	1	NESC Heavy	Max Sag RS
2	5	Maximum Operating	Max Sag RS
3	3	Extreme Ice	Max Sag RS
4	4	Uplift	Initial RS

Horizontal Clearance Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	6	NESC Blowout 6PSF	Max Sag RS

Phase Clearance Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	5	Maximum Operating	Creep RS
2	5	Maximum Operating	Creep RS

Insulator Swing Criteria

Condition	WC #	Weather Case Description	Cable Condition

Condition 1	7	No Wind (SWING 1)	Creep RS
Condition 2	8	Medium Wind (SWING 2)	Creep RS
Condition 3	9	High Wind (SWING 1)	Creep RS
Condition 4	10	GALLOPING (SWING)	Creep RS

Blowout and Departure Angle Report Criteria

LC #	WC #	Weather Case Description	Cable Condition

Galloping Criteria
  Weather Case for swing angle: 10 GALLOPING (SWING) C
  Weather case for Sag 11 GALLOPING (SAG) C
  Loops checked: Single

Weight spans calculated by exact method using catenary in blown out plane

Wind & Weight Span Report

LC #	WC #	Weather Case Description	Cable Condition
1	2	Extreme Wind	Initial RS
2	1	NESC Heavy	Initial RS
3	4	Uplift	Initial RS
4	3	Extreme Ice	Initial RS

Weather case for final after creep '60 Deg F'
Weather case for final after load 'NESC Heavy'
Clearance line voltage (kV) 230, clearance line vertical buffer (ft) 0
Display of centerline and side profile clearance lines turned ON.
Display of spikes for points requiring additional clearance turned ON
 Spikes are drawn for all feature codes (no codes have been excluded)

Maximum tensions calculated using actual section geometry

Terrain:
  Ground profile width (ft) 10
  Display width (ft) 25

Outer aluminum strands do not take compression at high temperature

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PLS-CADD
CLEARANCE REPORT

PLS-CADD Version 8.10 1:52.29 PM Saturday, January 26, 2008
Careba Mott MacDonald
Project Name: 'p:\0567506 careba pc noble wethersfield energy facility\pls_cadd\230kvline rfp\230weth012608 DON'
Criteria notes
NESC Heavy per Rule 250B, Page 161
Extreme Wind Loading per Rule 250C, Page 161, Coefficients and Gust Response Factors per Equations in Tables 250-2, 250-3
90 MPH Basic Wind Speed, 3 second Gust Wind Speed, Figure 250-2 Beginning on Page 166
Grade B Construction "Method A" per Table 261-1, Page 173 and Table 261-1A, Page 182
Tension Limits per Rule 261H1, Page 179
Insulator Strength Reduction per Rule 277, Page 188 Should be applied to Insulator Strengths when Modeling Insulators
2002 NESC C2-2002 Criteria File for PLS-CADD Created December 21, 2001
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Vertical Clearance Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	1	NESC Heavy	Max Sag RS
2	5	Maximum Operating	Max Sag RS
3	3	Extreme Ice	Max Sag RS
4	4	Uplift	Initial RS

Horizontal Clearance Criteria

LC #	WC #	Weather Case Description	Cable Condition
1	6	NESC Blowout 6PSF	Max Sag RS

Terrain Clearances by Span Report

This report includes survey points with all feature codes (not restricted to limited list of feature codes).
This report includes only survey points with offsets from centerline less than 25.00 (ft) that also have a horizontal distance from a wire of less than 50.00 (ft).

Clearances checked at survey points and at 2.00 (ft) increments along centerline ground.

Points simultaneously violating both horizontal and vertical clearance requirements are indicated as "NG" and shown in red. Points violating either horizontal or vertical clearance requirements but not both at the same time are indicated as "??" and shown in blue.

A clearance value of 10000 indicates the program was unable to calculate a clearance (no wires in span, no wires crossing point, unknown ground elevation, no points meeting above criteria...).

NOTE: CLEARANCE SET TO ZERO
∴ EXCESS CLEARANCE = ACTUAL GROUND CLEARANCE

From Structure	To Structure	Type of Clearance Checked	Excess Clearance (ft)	OK	Controlling Weather Case	Controlling Wire Condition	Controlling Point ID	Point Feature Code	Station (ft)	Offset (ft)	X (ft)	Y (ft)	Z (ft)	Height (ft)
1	2	Vertical	39.10	OK	Extreme Ice	Max Sag RS	665001	Spot elevation	75.00	0.00	1244066.56	972963.28	1876.90	0.00
		Horizontal	44.98	OK	Maximum Operating	Max Sag RS	665002	Spot elevation	150.00	-0.00	1244140.41	972976.37	1878.81	0.00
		Horiz+Vert	39.10	OK	Extreme Ice	Max Sag RS	665001	Spot elevation	75.00	0.00	1244066.56	972963.28	1876.90	0.00
		Ground	16.04	OK	Extreme Ice	Max Sag RS	INTERP	Contour minor	0.00	0.00	1243992.71	972950.20	1875.00	0.00
2	3	Vertical	32.98	OK	Maximum Operating	Max Sag RS	664983	Contour minor	421.50	0.00	1244407.75	973023.73	1885.70	0.00
		Horizontal	32.98	OK	Maximum Operating	Max Sag RS	664983	Contour minor	421.50	0.00	1244407.75	973023.73	1885.70	0.00

		Horiz+Vert	32 98	OK	Maximum Operating	Max Sag	RS	664983	Contour minor	421 50	0.00	1244407 75	973023 73	1885.70	0 00	
		Ground	32 98	OK	Maximum Operating	Max Sag	RS	664983	Contour minor	421 50	0.00	1244407 75	973023 73	1885.70	0.00	
3	4	Vertical	30 65	OK	Maximum Operating	Max Sag	RS	8002	Spot elevation	896.48	-4.10	1244874.71	973110 71	1860 00	0 00	
		Horizontal	42 62	OK	NESC Heavy	Max Sag	RS	8003	Spot elevation	1021.40	-5.28	1244997 60	973133.60	1846 00	0.00	
		Horiz+Vert	30 65	OK	Maximum Operating	Max Sag	RS	8007	Spot elevation	896 48	-4 18	1244874 71	973110.71	1860 00	0 00	
		Ground	30.62	OK	Maximum Operating	Max Sag	RS	INTERP	Contour minor	906 00	0 00	1244884 82	973108 26	1858 53	0.00	
4	5	Vertical	52.59	OK	Maximum Operating	Max Sag	RS	8004	Spot elevation	1321 46	-7.93	1245292 52	973168 54	1808 00	0.00	
		Horizontal	64 90	OK	Maximum Operating	Max Sag	RS	664984	Contour minor	1531 60	-9 77	1245499 00	973227 00	1797 00	0.00	
		Horiz+Vert	52.59	OK	Maximum Operating	Max Sag	RS	8004	Spot elevation	1321 46	-7 93	1245292 52	973168 54	1808 00	0.00	
		Ground	50 60	OK	Maximum Operating	Max Sag	RS	INTERP	Contour minor	1242 00	0.00	1245215 66	973166 87	1818 07	0.00	
5	6	Vertical	41 56	OK	Maximum Operating	Max Sag	RS	8006	Spot elevation	1856 43	-4 21	1245819 94	973278.21	1825 00	0.00	
		Horizontal	58 00	OK	NESC Heavy	Max Sag	RS	2	PI my	2102 53	0.00	1246063 00	973317 00	1844.00	0 00	
		Horiz+Vert	41.56	OK	Maximum Operating	Max Sag	RS	8006	Spot elevation	1856.43	4 21	1245819.94	973278 21	1825 00	0.00	
		Ground	40 96	OK	Maximum Operating	Max Sag	RS	INTERP	Contour minor	1900.00	0.00	1245863.57	973281 67	1828 49	0.00	
6	7	Vertical	28.91	OK	Maximum Operating	Max Sag	RS	8008	Spot elevation	2162.53	0.00	1246063 00	973577 00	1840 00	0 00	
		Horizontal	30.92	OK	Maximum Operating	Max Sag	RS	8005	Spot elevation	2362.53	0 00	1246063.00	973577 00	1840.00	0.00	
		Horiz+Vert	28.91	OK	Maximum Operating	Max Sag	RS	8008	Spot elevation	2362.53	0.00	1246063 00	973577.00	1840.00	0.00	
		Ground	28.91	OK	Maximum Operating	Max Sag	RS	8008	Spot elevation	2362.53	0 00	1246063 00	973577 00	1840.00	0.00	
7	8	Vertical	23.95	OK	Maximum Operating	Max Sag	RS	579249	Spot elevation	3170 53	22 00	1246085 00	974385.00	1874.50	0.00	
		Horizontal	52.82	OK	NESC Heavy	Max Sag	RS	583255	Spot elevation	3330.53	12 00	1246075 00	974545 00	1874.58	0.00	
		Horiz+Vert	24 73	OK	Maximum Operating	Max Sag	RS	579249	Spot elevation	3170.53	22 00	1246085 00	974385.00	1874.50	0 00	
		Ground	23 95	OK	Maximum Operating	Max Sag	RS	579249	Spot elevation	3170.53	22 00	1246085 00	974385.00	1874.50	0.00	
8	9	Vertical	29 13	OK	Maximum Operating	Max Sag	RS	592312	Spot elevation	3791 04	13.39	1246245 00	974945.00	1888.50	0.00	
		Horizontal	58.47	OK	NESC Heavy	Max Sag	RS	587246	Spot elevation	3516.52	19 62	1246095 00	974715 00	1886 17	0.00	
		Horiz+Vert	29.17	OK	Maximum Operating	Max Sag	RS	592524	Spot elevation	3782 33	-17 01	1246215.00	974955.00	1888.50	0 00	
		Ground	29.13	OK	Maximum Operating	Max Sag	RS	592312	Spot elevation	3791 04	13.39	1246245 00	974945.00	1888.50	0.00	
9	10	Vertical	37 53	OK	Maximum Operating	Max Sag	RS	599460	Spot elevation	4243 22	18 80	1246505 00	975315 00	1875.50	0.00	
		Horizontal	47 90	OK	Extreme Ice	Max Sag	RS	602338	Spot elevation	4420 43	-5 61	1246585 00	975475 00	1867.33	0 00	
		Horiz+Vert	37.53	OK	Maximum Operating	Max Sag	RS	599460	Spot elevation	4243 22	18.80	1246505 00	975315.00	1875 50	0 00	
		Ground	37 53	OK	Maximum Operating	Max Sag	RS	599460	Spot elevation	4243 22	18.80	1246505 00	975315.00	1875.50	0 00	
10	11	Vertical	27 62	OK	Maximum Operating	Max Sag	RS	631504	Spot elevation	4839 16	-13 65	1246815.00	975825.00	1869.33	0 00	
		Horizontal	38.95	OK	Maximum Operating	Max Sag	RS	634207	Spot elevation	5047 23	-10.72	1246935.00	975995.00	1856 50	0 00	
		Horiz+Vert	27 62	OK	Maximum Operating	Max Sag	RS	631504	Spot elevation	4839 16	-13 65	1246815 00	975825 00	1869 33	0 00	
		Ground	27 62	OK	Maximum Operating	Max Sag	RS	631504	Spot elevation	4839 16	-13 65	1246815 00	975825 00	1869.33	0.00	
11	12	Vertical	37 21	OK	Maximum Operating	Max Sag	RS	637770	Spot elevation	5317 42	-24.84	1247095 00	976215 00	1847 00	0.00	
		Horizontal	43 28	OK	NESC Blowout 6PSF	Max Sag	RS	637775	Spot elevation	5350 56	12.59	1247145 00	976215.00	1843.25	0 00	
		Horiz+Vert	37.21	OK	Maximum Operating	Max Sag	RS	637770	Spot elevation	5317 42	-24 84	1247095.00	976215 00	1847 00	0 00	
		Ground	37 21	OK	Maximum Operating	Max Sag	RS	637770	Spot elevation	5317 42	-24 84	1247095 00	976215 00	1847.00	0.00	
12	13	Vertical	31 77	OK	Maximum Operating	Max Sag	RS	642325	Spot elevation	5749.24	-19 88	1247385 00	976535 00	1820.42	0.00	
		Horizontal	39.63	OK	Extreme Ice	Max Sag	RS	641663	Spot elevation	5691 07	4 93	1247365 00	976475 00	1824.25	0.00	
		Horiz+Vert	31.77	OK	Maximum Operating	Max Sag	RS	642325	Spot elevation	5749 24	-19.88	1247385 00	976535.00	1820 42	0.00	
		Ground	31 77	OK	Maximum Operating	Max Sag	RS	642325	Spot elevation	5749.24	-19.88	1247385 00	976535 00	1820 42	0 00	
13	14	Vertical	26 25	OK	Maximum Operating	Max Sag	RS	498576	Spot elevation	6471.74	-18 53	1247865 00	977075 00	1778 08	0 00	
		Horizontal	49.00	OK	Uplift	Initial	RS	PI	Contour minor	6799.24	0 00	1248096 00	977307 90	1772 00	0 00	
		Horiz+Vert	26.70	OK	Maximum Operating	Max Sag	RS	498352	Spot elevation	6470 88	-4.42	1247875 00	977065 00	1777 57	0.00	
		Ground	26 25	OK	Maximum Operating	Max Sag	RS	498576	Spot elevation	6471.74	-18.53	1247865 00	977075.00	1778.08	0.00	
14	15	Vertical	33.50	OK	Maximum Operating	Max Sag	RS	507880	Spot elevation	6995.87	16 36	1248105.00	977505.00	1770 50	0.00	
		Horizontal	43.17	OK	NESC Blowout 6PSF	Max Sag	RS	509501	Spot elevation	7066 94	-11.00	1248075 00	977575 00	1768 42	0.00	
		Horiz+Vert	33.50	OK	Maximum Operating	Max Sag	RS	507880	Spot elevation	6995.87	16.36	1248105 00	977505.00	1770 50	0.00	
		Ground	33 50	OK	Maximum Operating	Max Sag	RS	507880	Spot elevation	6995.87	16 36	1248105 00	977505.00	1770.50	0 00	
15	16	Vertical	28 76	OK	Maximum Operating	Max Sag	RS	514056	Spot elevation	7266 05	16.46	1248095 00	977775.00	1771 67	0 00	
		Horizontal	35 41	OK	NESC Blowout 6PSF	Max Sag	RS	512940	Spot elevation	7216 09	14.59	1248095.00	977725.00	1771.75	0.00	
		Horiz+Vert	28 76	OK	Maximum Operating	Max Sag	RS	514056	Spot elevation	7266 05	16 46	1248095.00	977775.00	1771.67	0.00	
		Ground	28 76	OK	Maximum Operating	Max Sag	RS	514056	Spot elevation	7266 05	16.46	1248095 00	977775.00	1771.67	0.00	
16	17	Vertical	38.06	OK	Maximum Operating	Max Sag	RS	520728	Spot elevation	7596 20	18.80	1248085.00	978105.00	1755.92	0.00	
		Horizontal	46 73	OK	Extreme Ice	Max Sag	RS	524183	Spot elevation	7777.94	-24 44	1248035.00	978285 00	1737 67	0.00	
		Horiz+Vert	38 06	OK	Maximum Operating	Max Sag	RS	520728	Spot elevation	7596 20	18.80	1248085.00	978105.00	1755 92	0 00	
		Ground	38 06	OK	Maximum Operating	Max Sag	RS	520728	Spot elevation	7596 20	18.80	1248085.00	978105.00	1755 92	0.00	WETHERSFIELD RD
17	18	Vertical	42.82	OK	Maximum Operating	Max Sag	RS	528149	Spot elevation	8068.11	-23 59	1248025.00	978575.00	1736 08	0.00	CROSSING > 34'
		Horizontal	58 00	OK	Uplift	Initial	RS	4	PI my	8217.33	0.00	1248043.00	978725 00	1724.00	0 00	OK
		Horiz+Vert	43.12	OK	Maximum Operating	Max Sag	RS	528149	Spot elevation	8068.11	23 59	1248025 00	978575 00	1736 08	0.00	
		Ground	42 82	OK	Maximum Operating	Max Sag	RS	528149	Spot elevation	8068 11	-23 59	1248025.00	978575.00	1736.08	0.00	
18	19	Vertical	26 49	OK	Maximum Operating	Max Sag	RS	662674	Spot elevation	8506.82	-24.15	1247815 00	978905.00	1725.42	0 00	
		Horizontal	33 76	OK	Extreme Ice	Max Sag	RS	663491	Spot elevation	8597 49	14 30	1247775 00	978995.00	1722.08	0 00	
		Horiz+Vert	27 37	OK	Maximum Operating	Max Sag	RS	662674	Spot elevation	8506.82	-24.15	1247815.00	978905.00	1725.42	0 00	
		Ground	26.49	OK	Maximum Operating	Max Sag	RS	662674	Spot elevation	8506.82	-24.15	1247815.00	978905.00	1725.42	0 00	

19	20	Vertical	33.89	OK	Maximum Operating	Max Sag RS	537690	Spot elevation	8987.85	-21.99	1247465.00	979235.00	1720.67	0.00
		Horizontal	42.55	OK	NESC Blowout 6PSF	Max Sag RS	536824	Spot elevation	8902.57	-10.73	1247515.00	979185.00	1726.00	0.00
		Horiz+Vert	33.89	OK	Maximum Operating	Max Sag RS	537690	Spot elevation	8987.85	-21.99	1247465.00	979235.00	1728.67	0.00
		Ground	33.89	OK	Maximum Operating	Max Sag RS	537690	Spot elevation	8987.85	-21.99	1247465.00	979235.00	1720.67	0.00
20	21	Vertical	27.35	OK	Maximum Operating	Max Sag RS	15293	?UNKNOWN FEATURE CODE?	9512.49	-23.14	1247080.88	979592.35	1759.19	0.00
		Horizontal	48.00	OK	Extreme Ice	Max Sag RS	5	pi my	9824.10	0.00	1246869.00	979822.00	1767.00	0.00
		Horiz+Vert	27.35	OK	Maximum Operating	Max Sag RS	15293	?UNKNOWN FEATURE CODE?	9512.49	-23.14	1247080.88	979592.35	1759.19	0.00
		Ground	27.35	OK	Maximum Operating	Max Sag RS	15293	?UNKNOWN FEATURE CODE?	9512.49	-23.14	1247080.88	979592.35	1759.19	0.00
21	22	Vertical	33.17	OK	Maximum Operating	Max Sag RS	550595	Spot elevation	9956.18	-22.33	1246885.00	979955.00	1760.42	0.00
		Horizontal	49.50	OK	Maximum Operating	Max Sag RS	548509	Spot elevation	9843.94	-21.25	1246895.00	979835.00	1764.25	0.00
		Horiz+Vert	33.17	OK	Maximum Operating	Max Sag RS	550595	Spot elevation	9956.18	-22.33	1246885.00	979955.00	1760.42	0.00
		Ground	33.17	OK	Maximum Operating	Max Sag RS	550595	Spot elevation	9956.18	-22.33	1246885.00	979955.00	1760.42	0.00
22	23	Vertical	40.68	OK	Maximum Operating	Max Sag RS	559047	Spot elevation	10500.21	-16.20	1247045.00	980475.00	1727.67	0.00
		Horizontal	47.88	OK	Extreme Ice	Max Sag RS	559675	Spot elevation	10552.73	20.42	1247095.00	980515.00	1727.67	0.00
		Horiz+Vert	40.68	OK	Maximum Operating	Max Sag RS	559047	Spot elevation	10500.21	-16.20	1247045.00	980475.00	1727.67	0.00
		Ground	40.68	OK	Maximum Operating	Max Sag RS	559047	Spot elevation	10500.21	-16.20	1247045.00	980475.00	1727.67	0.00
23	24	Vertical	37.87	OK	Maximum Operating	Max Sag RS	565635	Spot elevation	10974.29	-2.12	1247245.00	980905.00	1723.50	0.00
		Horizontal	46.23	OK	NESC Heavy	Max Sag RS	562362	Spot elevation	10732.59	11.15	1247125.00	980695.00	1731.92	0.00
		Horiz+Vert	37.87	OK	Maximum Operating	Max Sag RS	565635	Spot elevation	10974.29	-2.12	1247245.00	980905.00	1723.50	0.00
		Ground	37.87	OK	Maximum Operating	Max Sag RS	565635	Spot elevation	10974.29	-2.12	1247245.00	980905.00	1723.50	0.00
24	25	Vertical	35.44	OK	Maximum Operating	Max Sag RS	12261	?UNKNOWN FEATURE CODE?	11333.58	6.19	1247418.86	981219.54	1723.84	0.00
		Horizontal	45.72	OK	NESC Heavy	Max Sag RS	568506	Spot elevation	11180.14	3.09	1247345.00	981085.00	1723.50	0.00
		Horiz+Vert	35.44	OK	Maximum Operating	Max Sag RS	12261	?UNKNOWN FEATURE CODE?	11333.58	6.19	1247418.86	981219.54	1723.84	0.00
		Ground	35.44	OK	Maximum Operating	Max Sag RS	12261	?UNKNOWN FEATURE CODE?	11333.58	6.19	1247418.86	981219.54	1723.84	0.00
25	26	Vertical	35.06	OK	Maximum Operating	Max Sag RS	577876	Spot elevation	11845.02	24.84	1247545.00	981705.00	1752.92	0.00
		Horizontal	44.25	OK	Extreme Ice	Max Sag RS	396430	Spot elevation	11937.24	-9.74	1247505.00	981795.00	1759.92	0.00
		Horiz+Vert	35.06	OK	Maximum Operating	Max Sag RS	577876	Spot elevation	11845.02	24.84	1247545.00	981705.00	1752.92	0.00
		Ground	35.06	OK	Maximum Operating	Max Sag RS	577876	Spot elevation	11845.02	24.84	1247545.00	981705.00	1752.92	0.00
26	27	Vertical	28.95	OK	Maximum Operating	Max Sag RS	390062	Spot elevation	12155.66	23.30	1247525.00	982015.00	1775.08	0.00
		Horizontal	42.29	OK	NESC Heavy	Max Sag RS	392693	Spot elevation	12318.35	-17.10	1247475.00	982175.00	1776.75	0.00
		Horiz+Vert	28.95	OK	Maximum Operating	Max Sag RS	390062	Spot elevation	12155.66	23.30	1247525.00	982015.00	1775.08	0.00
		Ground	28.95	OK	Maximum Operating	Max Sag RS	390062	Spot elevation	12155.66	23.30	1247525.00	982015.00	1775.08	0.00
27	28	Vertical	30.55	OK	Maximum Operating	Max Sag RS	396306	Spot elevation	12536.77	15.94	1247495.00	982395.00	1782.42	0.00
		Horizontal	32.38	OK	Extreme Ice	Max Sag RS	396971	Spot elevation	12576.70	18.32	1247495.00	982435.00	1782.50	0.00
		Horiz+Vert	30.55	OK	Maximum Operating	Max Sag RS	396306	Spot elevation	12536.77	15.94	1247495.00	982395.00	1782.42	0.00
		Ground	30.55	OK	Maximum Operating	Max Sag RS	396306	Spot elevation	12536.77	15.94	1247495.00	982395.00	1782.42	0.00
28	29	Vertical	27.91	OK	Maximum Operating	Max Sag RS	403437	Spot elevation	13025.35	-13.74	1247295.00	982825.30	1789.75	0.00
		Horizontal	38.86	OK	NESC Blowout 6PSF	Max Sag RS	405100	Spot elevation	13147.41	-15.28	1247125.00	982925.30	1791.42	0.00
		Horiz+Vert	27.91	OK	Maximum Operating	Max Sag RS	403437	Spot elevation	13025.35	-13.74	1247295.00	982825.30	1789.75	0.00
		Ground	27.91	OK	Maximum Operating	Max Sag RS	403437	Spot elevation	13025.35	-13.74	1247295.00	982825.30	1789.75	0.00
29	30	Vertical	26.31	OK	Maximum Operating	Max Sag RS	411203	Spot elevation	13534.89	-24.69	1247185.00	983315.00	1787.25	0.00
		Horizontal	41.44	OK	NESC Blowout 6PSF	Max Sag RS	412157	Spot elevation	13593.91	7.20	1247215.00	983375.00	1788.00	0.00
		Horiz+Vert	26.31	OK	Maximum Operating	Max Sag RS	411203	Spot elevation	13534.89	-24.69	1247185.00	983315.00	1787.25	0.00
		Ground	26.31	OK	Maximum Operating	Max Sag RS	411203	Spot elevation	13534.89	-24.69	1247185.00	983315.00	1787.25	0.00
30	31	Vertical	25.91	OK	Maximum Operating	Max Sag RS	417740	Spot elevation	13954.68	-11.40	1247185.00	983735.00	1801.75	0.00
		Horizontal	32.82	OK	NESC Heavy	Max Sag RS	415468	Spot elevation	13874.09	6.06	1247205.00	983655.00	1798.92	0.00
		Horiz+Vert	25.91	OK	Maximum Operating	Max Sag RS	417740	Spot elevation	13954.68	-11.40	1247185.00	983735.00	1801.75	0.00
		Ground	25.91	OK	Maximum Operating	Max Sag RS	417740	Spot elevation	13954.68	-11.40	1247185.00	983735.00	1801.75	0.00
31	32	Vertical	26.08	OK	Maximum Operating	Max Sag RS	425202	Spot elevation	14475.37	-24.93	1247155.00	984255.00	1807.67	0.00
		Horizontal	35.07	OK	NESC Heavy	Max Sag RS	425678	Spot elevation	14504.09	16.00	1247195.00	984285.00	1804.75	0.00
		Horiz+Vert	26.08	OK	Maximum Operating	Max Sag RS	425202	Spot elevation	14475.37	-24.93	1247155.00	984255.00	1807.67	0.00
		Ground	26.08	OK	Maximum Operating	Max Sag RS	425202	Spot elevation	14475.37	-24.93	1247155.00	984255.00	1807.67	0.00
32	33	Vertical	28.74	OK	Maximum Operating	Max Sag RS	432527	Spot elevation	14925.46	-20.69	1247145.00	984705.00	1809.58	0.00
		Horizontal	41.06	OK	NESC Blowout 6PSF	Max Sag RS	436298	Spot elevation	15155.66	-23.40	1247135.00	984935.00	1805.17	0.00
		Horiz+Vert	28.74	OK	Maximum Operating	Max Sag RS	432527	Spot elevation	14925.46	-20.69	1247145.00	984705.00	1809.58	0.00
		Ground	28.74	OK	Maximum Operating	Max Sag RS	432527	Spot elevation	14925.46	-20.69	1247145.00	984705.00	1809.58	0.00
33	34	Vertical	29.47	OK	Maximum Operating	Max Sag RS	440431	Spot elevation	15425.84	-24.86	1247125.00	985205.00	1792.33	0.00
		Horizontal	46.27	OK	Extreme Ice	Max Sag RS	443302	Spot elevation	15604.80	10.82	1247155.00	985385.00	1781.92	0.00
		Horiz+Vert	29.47	OK	Maximum Operating	Max Sag RS	440431	Spot elevation	15425.84	-24.86	1247125.00	985205.00	1792.33	0.00
		Ground	29.47	OK	Maximum Operating	Max Sag RS	440431	Spot elevation	15425.84	-24.86	1247125.00	985205.00	1792.33	0.00
34	35	Vertical	33.09	OK	Maximum Operating	Max Sag RS	447137	Spot elevation	15835.95	-21.88	1247115.00	985615.00	1772.33	0.00
		Horizontal	47.59	OK	NESC Blowout 6PSF	Max Sag RS	450197	Spot elevation	16025.54	-5.87	1247125.00	985805.00	1765.75	0.00
		Horiz+Vert	33.09	OK	Maximum Operating	Max Sag RS	447137	Spot elevation	15835.95	21.88	1247115.00	985615.00	1772.33	0.00
		Ground	33.09	OK	Maximum Operating	Max Sag RS	447137	Spot elevation	15835.95	-21.88	1247115.00	985615.00	1772.33	0.00
35	36	Vertical	25.70	OK	Maximum Operating	Max Sag RS	454703	Spot elevation	16386.31	-24.47	1247095.00	986165.00	1767.17	0.00
		Horizontal	39.18	OK	Maximum Operating	Max Sag RS	452952	Spot elevation	16194.82	19.50	1247145.00	985975.00	1766.33	0.00

		Horiz+Vert	25.70	OK	Maximum Operating	Max Sag RS	454703	Spot elevation	16386.31	-24.47	1247095.00	986165.00	1767.17	0.00		
		Ground	25.70	OK	Maximum Operating	Max Sag RS	454703	Spot elevation	16386.31	24.47	1247095.00	986165.00	1767.17	0.00		
36	37	Vertical	30.71	OK	Maximum Operating	Max Sag RS	342593	Spot elevation	16945.08	23.24	1247125.00	986725.00	1771.58	0.00		
		Horizontal	43.77	OK	NESC Heavy	Max Sag RS	460647	Spot elevation	16755.49	7.23	1247115.00	986535.00	1768.50	0.00		
		Horiz+Vert	30.71	OK	Maximum Operating	Max Sag RS	342593	Spot elevation	16945.08	23.24	1247125.00	986725.00	1771.58	0.00		
		Ground	30.71	OK	Maximum Operating	Max Sag RS	342593	Spot elevation	16945.08	23.24	1247125.00	986725.00	1771.58	0.00		
37	38	Vertical	29.34	OK	Maximum Operating	Max Sag RS	275494	Spot elevation	17356.78	-23.76	1247065.00	987135.00	1775.67	0.00		
		Horizontal	34.00	OK	Extreme Ice	Max Sag RS	274308	Spot elevation	17285.54	11.00	1247105.00	987065.00	1772.17	0.00		
		Horiz+Vert	29.34	OK	Maximum Operating	Max Sag RS	275494	Spot elevation	17356.78	-23.76	1247065.00	987135.00	1775.67	0.00		
		Ground	29.34	OK	Maximum Operating	Max Sag RS	275494	Spot elevation	17356.78	-23.76	1247065.00	987135.00	1775.67	0.00		
38	39	Vertical	34.16	OK	Maximum Operating	Max Sag RS	9259	Paved roads	17898.08	3.17	1247074.79	987676.89	1781.19	0.00	QUAKERTOWN RD.	
		Horizontal	41.68	OK	Maximum Operating	Max Sag RS	284561	Spot elevation	17975.83	15.85	1247085.00	987755.00	1778.00	0.00	CROSSING > 34' OK	
		Horiz+Vert	34.16	OK	Maximum Operating	Max Sag RS	9259	Paved roads	17898.08	3.17	1247074.79	987676.89	1781.19	0.00		
		Ground	34.16	OK	Maximum Operating	Max Sag RS	9259	Paved roads	17898.08	3.17	1247074.79	987676.89	1781.19	0.00		
39	40	Vertical	26.68	OK	Maximum Operating	Max Sag RS	290083	Spot elevation	18368.97	-2.70	1246985.00	988135.00	1784.00	0.00		
		Horizontal	60.00	OK	Extreme Ice	Max Sag RS	294056	Spot elevation	18726.25	-1.11	1246875.00	988495.00	1787.92	0.00		
		Horiz+Vert	26.68	OK	Maximum Operating	Max Sag RS	290083	Spot elevation	18368.92	-2.70	1246985.00	988135.00	1784.00	0.00		
		Ground	26.68	OK	Maximum Operating	Max Sag RS	290083	Spot elevation	18368.92	-2.70	1246985.00	988135.00	1784.00	0.00		
40	41	Vertical	30.71	OK	Maximum Operating	Max Sag RS	656739	Spot elevation	19074.69	17.13	1246795.00	988815.00	1810.50	0.00		
		Horizontal	43.41	OK	Extreme Ice	Max Sag RS	656722	Spot elevation	18938.27	-6.56	1246795.00	988735.00	1805.17	0.00		
		Horiz+Vert	31.10	OK	Maximum Operating	Max Sag RS	297797	Spot elevation	19062.18	23.72	1246805.00	988805.00	1810.50	0.00		
		Ground	30.71	OK	Maximum Operating	Max Sag RS	656739	Spot elevation	19074.69	17.13	1246795.00	988815.00	1810.50	0.00		
41	42	Vertical	33.51	OK	Maximum Operating	Max Sag RS	215704	Spot elevation	19708.68	18.41	1246715.00	989425.00	1851.08	0.00		
		Horizontal	62.08	OK	NESC Heavy	Max Sag RS	659429	Spot elevation	19959.54	17.61	1246735.00	989655.00	1862.42	0.00		
		Horiz+Vert	33.67	OK	Maximum Operating	Max Sag RS	215704	Spot elevation	19708.66	18.41	1246715.00	989425.00	1851.08	0.00		
		Ground	33.51	OK	Maximum Operating	Max Sag RS	215704	Spot elevation	19708.68	18.41	1246715.00	989425.00	1851.08	0.00		
42	43	Vertical	43.94	OK	Maximum Operating	Max Sag RS	661536	Spot elevation	20120.61	21.31	1246755.00	989835.00	1875.58	0.00		
		Horizontal	51.23	OK	NESC Heavy	Max Sag RS	218542	Spot elevation	20150.65	18.60	1246755.00	989865.00	1871.50	0.00		
		Horiz+Vert	43.94	OK	Maximum Operating	Max Sag RS	661536	Spot elevation	20120.61	21.31	1246755.00	989835.00	1875.58	0.00		
		Ground	43.94	OK	Maximum Operating	Max Sag RS	661536	Spot elevation	20120.61	21.31	1246755.00	989835.00	1875.58	0.00		
43	44	Vertical	48.24	OK	Maximum Operating	Max Sag RS	315796	Spot elevation	20891.42	-24.39	1246895.00	990585.00	1911.58	0.00		
		Horizontal	53.31	OK	NESC Heavy	Max Sag RS	315692	Spot elevation	20886.29	11.21	1246905.00	990575.00	1909.67	0.00		
		Horiz+Vert	48.24	OK	Maximum Operating	Max Sag RS	315796	Spot elevation	20891.42	-24.39	1246895.00	990585.00	1911.58	0.00		
		Ground	48.24	OK	Maximum Operating	Max Sag RS	315796	Spot elevation	20891.42	-24.39	1246895.00	990585.00	1911.58	0.00		
44	45	Vertical	46.93	OK	Maximum Operating	Max Sag RS	317989	Spot elevation	21101.57	18.47	1246985.00	990775.00	1913.42	0.00		
		Horizontal	57.03	OK	NESC Heavy	Max Sag RS	319312	Spot elevation	21200.06	-10.07	1247025.00	990865.00	1888.42	0.00		
		Horiz+Vert	46.93	OK	Maximum Operating	Max Sag RS	317989	Spot elevation	21101.57	-10.47	1246985.00	990775.00	1913.42	0.00		
		Ground	46.93	OK	Maximum Operating	Max Sag RS	317989	Spot elevation	21101.57	-18.47	1246985.00	990775.00	1913.42	0.00		
45	46	Vertical	54.33	OK	Maximum Operating	Max Sag RS	326248	Spot elevation	21655.61	10.94	1247295.00	991235.00	1846.58	0.00		
		Horizontal	64.52	OK	Extreme Ice	Max Sag RS	323982	Spot elevation	21539.68	1.72	1247235.00	991135.00	1839.83	0.00		
		Horiz+Vert	54.33	OK	Maximum Operating	Max Sag RS	326248	Spot elevation	21655.61	-10.94	1247295.00	991235.00	1846.58	0.00		
		Ground	54.33	OK	Maximum Operating	Max Sag RS	326248	Spot elevation	21655.61	-10.94	1247295.00	991235.00	1846.58	0.00		
46	47	Vertical	39.42	OK	Maximum Operating	Max Sag RS	334239	Spot elevation	22051.76	14.79	1247555.00	991535.00	1830.92	0.00		
		Horizontal	70.50	OK	NESC Heavy	Max Sag RS	13	PI my	22365.68	0.00	1247733.00	991794.00	1813.00	0.00		
		Horiz+Vert	39.42	OK	Maximum Operating	Max Sag RS	334239	Spot elevation	22051.76	14.79	1247555.00	991535.00	1830.92	0.00		
		Ground	39.42	OK	Maximum Operating	Max Sag RS	334239	Spot elevation	22051.76	14.79	1247555.00	991535.00	1830.92	0.00		
47	48	Vertical	41.57	OK	Maximum Operating	Max Sag RS	29672	Spot elevation	22728.64	-16.32	1248095.00	991825.00	1814.25	0.00		
		Horizontal	60.81	OK	NESC Heavy	Max Sag RS	29393	Spot elevation	22798.18	-3.49	1248165.00	991815.00	1800.00	0.00		
		Horiz+Vert	41.57	OK	Maximum Operating	Max Sag RS	29672	Spot elevation	22728.64	-16.32	1248095.00	991825.00	1814.25	0.00		
		Ground	41.57	OK	Maximum Operating	Max Sag RS	29672	Spot elevation	22728.64	-16.32	1248095.00	991825.00	1814.25	0.00		
48	49	Vertical	44.80	OK	Maximum Operating	Max Sag RS	28840	Spot elevation	22987.22	24.19	1248355.00	991795.00	1798.00	0.00		
		Horizontal	61.37	OK	NESC Blowout 6PSF	Max Sag RS	29128	Spot elevation	23067.55	17.44	1248435.00	991805.00	1791.58	0.00		
		Horiz+Vert	44.80	OK	Maximum Operating	Max Sag RS	28840	Spot elevation	22987.22	24.19	1248355.00	991795.00	1798.00	0.00		
		Ground	44.80	OK	Maximum Operating	Max Sag RS	28840	Spot elevation	22987.22	24.19	1248355.00	991795.00	1798.00	0.00		
49	50	Vertical	44.72	OK	Maximum Operating	Max Sag RS	30038	Spot elevation	23618.32	9.73	1248985.00	991835.00	1796.75	0.00		
		Horizontal	57.03	OK	Extreme Ice	Max Sag RS	30882	Spot elevation	23739.43	-15.38	1249105.00	991865.00	1788.00	0.00		
		Horiz+Vert	44.72	OK	Maximum Operating	Max Sag RS	30038	Spot elevation	23618.32	9.73	1248985.00	991835.00	1796.75	0.00		
		Ground	44.72	OK	Maximum Operating	Max Sag RS	30038	Spot elevation	23618.32	9.73	1248985.00	991835.00	1796.75	0.00		
50	51	Vertical	58.18	OK	Maximum Operating	Max Sag RS	651737	Spot elevation	24328.95	8.51	1249695.00	991865.00	1766.42	0.00		
		Horizontal	67.96	OK	Maximum Operating	Max Sag RS	651723	Spot elevation	24119.12	0.61	1249485.00	991865.00	1767.33	0.00		
		Horiz+Vert	58.18	OK	Maximum Operating	Max Sag RS	651737	Spot elevation	24328.95	8.51	1249695.00	991865.00	1766.42	0.00		
		Ground	58.18	OK	Maximum Operating	Max Sag RS	651737	Spot elevation	24328.95	8.51	1249695.00	991865.00	1766.42	0.00		
51	52	Vertical	46.66	OK	Maximum Operating	Max Sag RS	651993	Spot elevation	24799.78	-2.43	1250165.00	991895.00	1700.75	0.00		
		Horizontal	56.92	OK	NESC Heavy	Max Sag RS	31995	Spot elevation	24980.04	-5.14	1250345.00	991905.00	1696.00	0.00		
		Horiz+Vert	46.66	OK	Maximum Operating	Max Sag RS	651993	Spot elevation	24799.78	-2.43	1250165.00	991895.00	1700.75	0.00		
		Ground	46.66	OK	Maximum Operating	Max Sag RS	651993	Spot elevation	24799.78	-2.43	1250165.00	991895.00	1700.75	0.00		

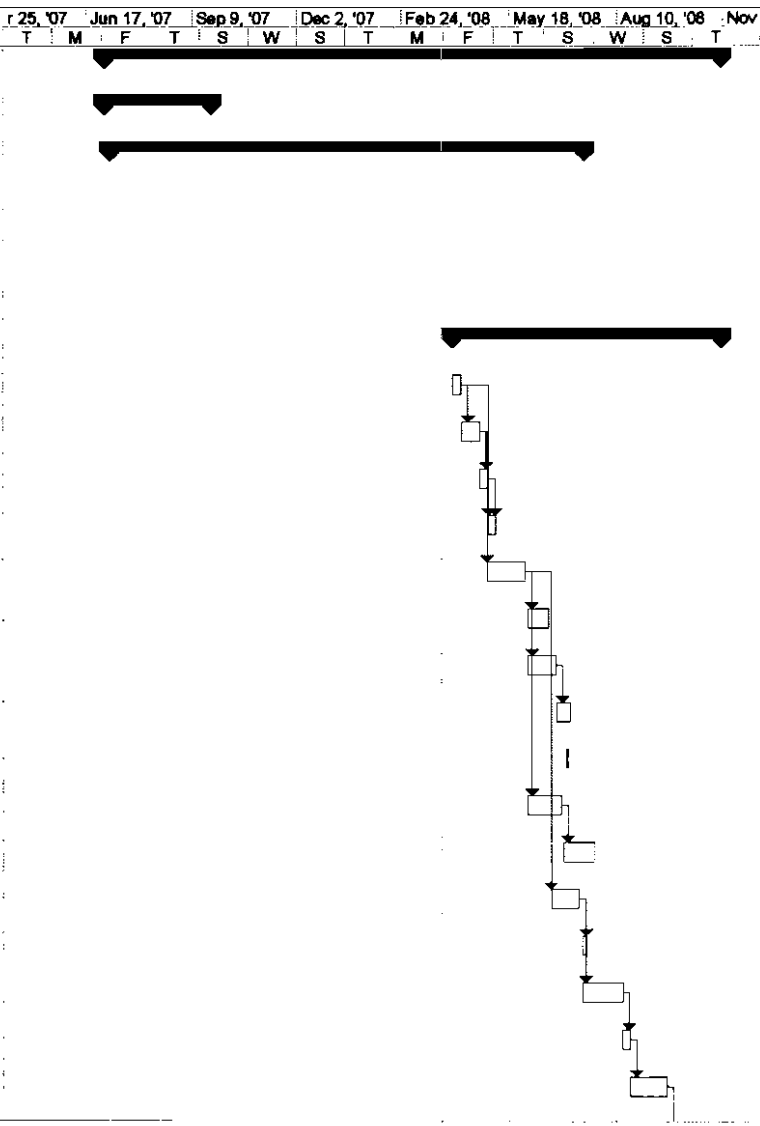
52	53	Vertical	51.04	OK	Maximum Operating	Max Sag	RS	16930	?UNKNOWN FEATURE CODE?	25093.74	1.88	1250458.89	991902.60	1691.46	0.00
		Horizontal	73.81	OK	NESC Heavy	Max Sag	RS	16920	?UNKNOWN FEATURE CODE?	25268.51	4.28	1250633.62	991907.28	1645.09	0.00
		Horiz+Vert	51.04	OK	Maximum Operating	Max Sag	RS	16930	?UNKNOWN FEATURE CODE?	25093.74	1.88	1250458.89	991902.60	1691.46	0.00
		Ground	51.04	OK	Maximum Operating	Max Sag	RS	16930	?UNKNOWN FEATURE CODE?	25093.74	1.88	1250458.89	991902.60	1691.46	0.00
53	54	Vertical	35.76	OK	Maximum Operating	Max Sag	RS	1378	Paved roads	25905.95	19.74	1251271.16	991917.64	1626.57	0.00
		Horizontal	63.22	OK	Maximum Operating	Max Sag	RS	33824	Spot elevation	26101.14	-9.74	1251465.00	991955.00	1614.50	0.00
		Horiz+Vert	35.76	OK	Maximum Operating	Max Sag	RS	1378	Paved roads	25905.95	19.74	1251271.16	991917.64	1626.57	0.00
		Ground	35.76	OK	Maximum Operating	Max Sag	RS	1378	Paved roads	25905.95	19.74	1251271.16	991917.64	1626.57	0.00
54	55	Vertical	24.84	OK	Maximum Operating	Max Sag	RS	7002	Spot elevation	26610.93	0.37	1251974.78	991965.54	1626.00	0.00
		Horizontal	53.50	OK	Uplift	Initial	RS	14	PI my	26835.35	0.00	1252199.00	991975.00	1631.00	0.00
		Horiz+Vert	24.84	OK	Maximum Operating	Max Sag	RS	7002	Spot elevation	26610.93	0.37	1251974.78	991965.54	1626.00	0.00
		Ground	24.84	OK	Maximum Operating	Max Sag	RS	7002	Spot elevation	26610.93	0.37	1251974.78	991965.54	1626.00	0.00
55	56	Vertical	35.02	OK	Maximum Operating	Max Sag	RS	103636	Spot elevation	27290.71	-17.41	1252465.00	992345.00	1639.58	0.00
		Horizontal	49.49	OK	NESC Blowout 6PSF	Max Sag	RS	103598	Spot elevation	27260.90	-6.87	1252455.00	992315.00	1635.33	0.00
		Horiz+Vert	35.15	OK	Maximum Operating	Max Sag	RS	103637	Spot elevation	27296.85	-9.52	1252475.00	992345.00	1640.17	0.00
		Ground	35.02	OK	Maximum Operating	Max Sag	RS	103636	Spot elevation	27290.71	-17.41	1252465.00	992345.00	1639.58	0.00
56	57	Vertical	29.27	OK	Maximum Operating	Max Sag	RS	107017	Spot elevation	27657.34	13.99	1252715.00	992615.00	1653.08	0.00
		Horizontal	38.06	OK	Extreme Ice	Max Sag	RS	105959	Spot elevation	27546.81	-14.02	1252625.00	992545.00	1652.00	0.00
		Horiz+Vert	29.27	OK	Maximum Operating	Max Sag	RS	107017	Spot elevation	27657.34	13.99	1252715.00	992615.00	1653.08	0.00
		Ground	29.27	OK	Maximum Operating	Max Sag	RS	107017	Spot elevation	27657.34	13.99	1252715.00	992615.00	1653.08	0.00
57	58	Vertical	27.90	OK	Maximum Operating	Max Sag	RS	118007	Spot elevation	28297.59	22.46	1253115.00	993115.00	1681.50	0.00
		Horizontal	35.30	OK	Extreme Ice	Max Sag	RS	120069	Spot elevation	28365.11	-4.76	1253135.00	993185.00	1681.75	0.00
		Horiz+Vert	27.90	OK	Maximum Operating	Max Sag	RS	118007	Spot elevation	28297.59	22.46	1253115.00	993115.00	1681.50	0.00
		Ground	27.90	OK	Maximum Operating	Max Sag	RS	118007	Spot elevation	28297.59	22.46	1253115.00	993115.00	1681.50	0.00
58	59	Vertical	34.07	OK	Extreme Ice	Max Sag	RS	131931	Spot elevation	28785.23	-2.33	1253395.00	993515.00	1676.17	0.00
		Horizontal	47.76	OK	NESC Blowout 6PSF	Max Sag	RS	126309	Spot elevation	28605.44	10.91	1253295.00	993365.00	1682.50	0.00
		Horiz+Vert	34.07	OK	Extreme Ice	Max Sag	RS	131931	Spot elevation	28785.23	-2.33	1253395.00	993515.00	1676.17	0.00
		Ground	34.07	OK	Extreme Ice	Max Sag	RS	131931	Spot elevation	28785.23	-2.33	1253395.00	993515.00	1676.17	0.00

HERMITAGE RD. CROSSING > 37' OK.

0 spans with clearance violations OK
0 spans with possible clearance violations OK

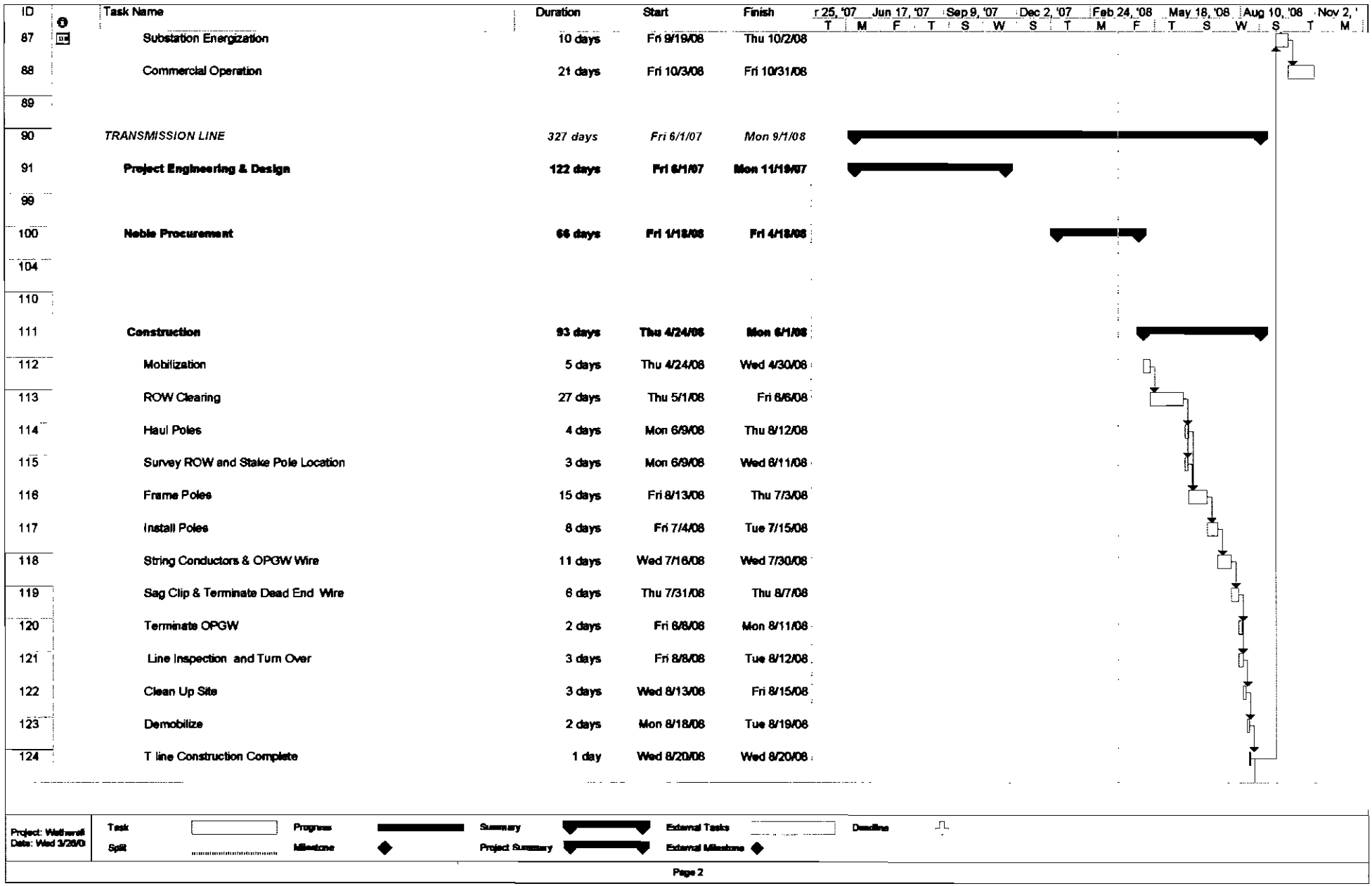
ALL CLEARANCES > 22.5' OK.

ID	Task Name	Duration	Start	Finish
1	*SUBSTATION EPC SCHEDULE*	*350 days*	*Mon 7/2/07*	*Fri 10/31/08*
2	**Project Engineering & Design**	**61 days**	**Mon 7/2/07**	**Mon 9/24/07**
32	**Noble Procurement**	**268 days**	**Fri 7/6/07**	**Tue 7/15/08**
35				
41				
69				
70	**Construction**	**151 days**	**Fri 4/4/08**	**Fri 10/31/08**
71	Mobilization	5 days	Fri 4/4/08	Thu 4/10/08
72	Finish Grade	10 days	Fri 4/11/08	Thu 4/24/08
73	Fencing	5 days	Fri 4/25/08	Thu 5/1/08
74	Final Grading	4 days	Fri 5/2/08	Wed 5/7/08
75	Equipmet Foundations	22 days	Thu 5/1/08	Fri 5/30/08
76	Grounding & Raceways	12 days	Mon 6/2/08	Tue 6/17/08
77	Structural Steel	16 days	Mon 6/2/08	Mon 6/23/08
78	Bus/Insulators	9 days	Tue 6/24/08	Fri 7/4/08
79	Transformers Arrives	1 day	Wed 7/2/08	Wed 7/2/08
80	Major Electrical Equipment Installation	20 days	Mon 6/2/08	Fri 6/27/08
81	Above Ground Raceways	18 days	Mon 6/30/08	Wed 7/23/08
82	Control Building	16 days	Fri 6/20/08	Fri 7/11/08
83	Relay Panel Installation	4 days	Mon 7/14/08	Thu 7/17/08
84	Pull Cable & Terminations	24 days	Mon 7/14/08	Thu 8/14/08
85	Mechanical Completion	4 days	Fri 8/15/08	Wed 8/20/08
86	Testing & Commisioning	21 days	Thu 8/21/08	Thu 9/18/08



Project: Wetherst
Date: Wed 3/26/0

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone



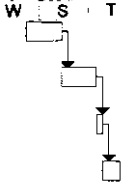
ID	Task Name	Duration	Start	Finish
87	Substation Energization	10 days	Fri 9/19/08	Thu 10/2/08
88	Commercial Operation	21 days	Fri 10/3/08	Fri 10/31/08
89				
90	*TRANSMISSION LINE*	*327 days*	*Fri 6/1/07*	*Mon 9/1/08*
91	**Project Engineering & Design**	**122 days**	**Fri 6/1/07**	**Mon 11/19/07**
99				
100	**Noble Procurement**	**66 days**	**Fri 1/18/08**	**Fri 4/18/08**
104				
110				
111	**Construction**	**93 days**	**Thu 4/24/08**	**Mon 8/1/08**
112	Mobilization	5 days	Thu 4/24/08	Wed 4/30/08
113	ROW Clearing	27 days	Thu 5/1/08	Fri 6/6/08
114	Haul Poles	4 days	Mon 6/9/08	Thu 6/12/08
115	Survey ROW and Stake Pole Location	3 days	Mon 6/9/08	Wed 6/11/08
116	Frame Poles	15 days	Fri 6/13/08	Thu 7/3/08
117	Install Poles	8 days	Fri 7/4/08	Tue 7/15/08
118	String Conductors & OPGW Wire	11 days	Wed 7/16/08	Wed 7/30/08
119	Sag Clip & Terminate Dead End Wire	6 days	Thu 7/31/08	Thu 8/7/08
120	Terminate OPGW	2 days	Fri 8/8/08	Mon 8/11/08
121	Line Inspection and Turn Over	3 days	Fri 8/8/08	Tue 8/12/08
122	Clean Up Site	3 days	Wed 8/13/08	Fri 8/15/08
123	Demobilize	2 days	Mon 8/18/08	Tue 8/19/08
124	T line Construction Complete	1 day	Wed 8/20/08	Wed 8/20/08

ID	Task Name	Duration	Start	Finish
125	Commercial Operation	8 days	Thu 8/21/08	Mon 9/1/08
126				
127	*NYSEG SWITCHYARD*	*278 days*	*Thu 10/11/07*	*Mon 11/3/08*
128	**Project Engineering & Design**	**216 days**	**Thu 10/11/07**	**Thu 8/7/08**
155				
163				
177				
186				
187	**Construction Bid, Evaluation and Award**	**30 days**	**Fri 3/14/08**	**Thu 4/24/08**
192	**Construction**	**137 days**	**Fri 4/25/08**	**Mon 11/3/08**
193	Mobilization	5 days	Fri 4/25/08	Thu 5/1/08
194	Fencing	5 days	Fri 5/2/08	Thu 5/8/08
195	Finish Grade	5 days	Fri 5/2/08	Thu 5/8/08
196	Grounding & Raceways	10 days	Fri 5/9/08	Thu 5/22/08
197	Equipment Foundations	16 days	Fri 5/9/08	Fri 5/30/08
198	Structural Steel	15 days	Mon 6/2/08	Fri 6/20/08
199	Bus/Insulators	8 days	Mon 6/23/08	Wed 7/2/08
200	Major Electrical Equipment Installation	18 days	Mon 6/23/08	Wed 7/16/08
201	Control Building	16 days	Mon 6/2/08	Mon 6/23/08
202	Relay Panel Installation	4 days	Tue 6/24/08	Fri 6/27/08
203	Above Ground Raceways	4 days	Thu 6/5/08	Wed 6/11/08
204	Pull Cable & Terminations	20 days	Thu 7/17/08	Wed 8/13/08
205	Construction Complete	4 days	Thu 6/14/08	Tue 8/19/08

Project: Wetherell
Date: Wed 3/26/08

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

ID	Task Name	Duration	Start	Finish
206	Testing & Commisioning	20 days	Thu 8/21/08	Wed 9/17/08
207	NYSEG Acceptance Testing	20 days	Thu 9/18/08	Wed 10/15/08
208	Substation Energization	3 days	Thu 10/16/08	Mon 10/20/08
209	Commercial Operation	10 days	Tue 10/21/08	Mon 11/3/08



STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

Case 07-T-0140
Application of Noble Wethersfield Windpark, LLC for a Certificate of Environmental Compatibility and Public Need for the Construction and Operation of the Wethersfield to Orangeville 230 kV Transmission Project Pursuant to Article VII of the Public Service Law

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NOBLE WETHERSFIELD WINDPARK, LLC

WETHERSFIELD TO ORANGEVILLE 230 KV TRANSMISSION PROJECT

ENVIRONMENTAL MANAGEMENT AND CONSTRUCTION PLAN (EM&CP)

Volume II: Engineering Details

Revision 1

Dated: April, 2008

NOBLE WETHERSFIELD WINDPARK, LLC

230 kV TRANSMISSION LINE

WETHERSFIELD TO ORANGEVILLE

VOLUME II: Engineering Details

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VOLUME II