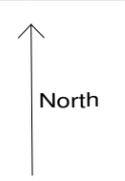
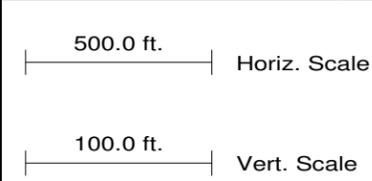
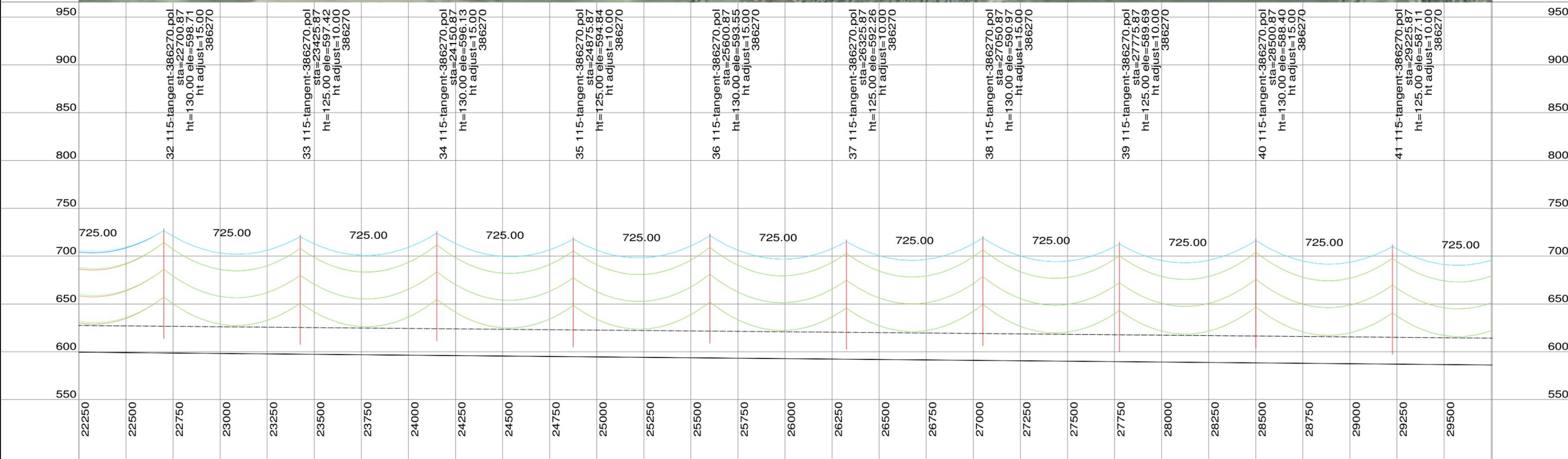


**Tenaska 345kV  
Transmission Line  
Preliminary Layout**

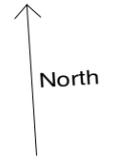
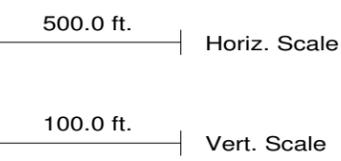
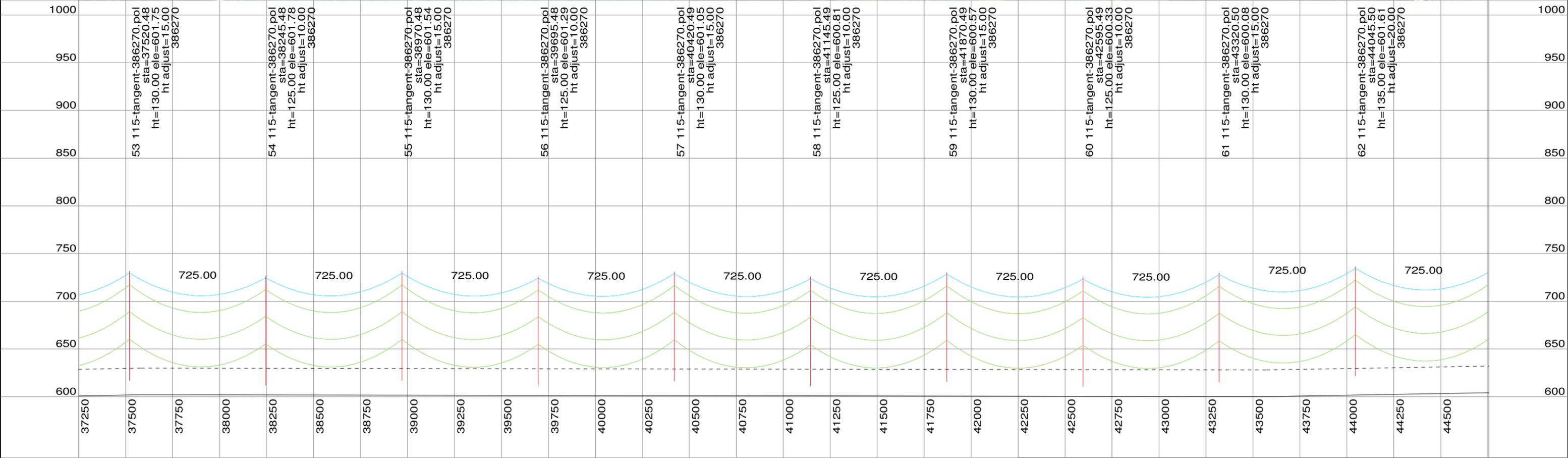
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Page 3/10



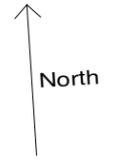
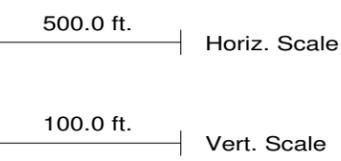
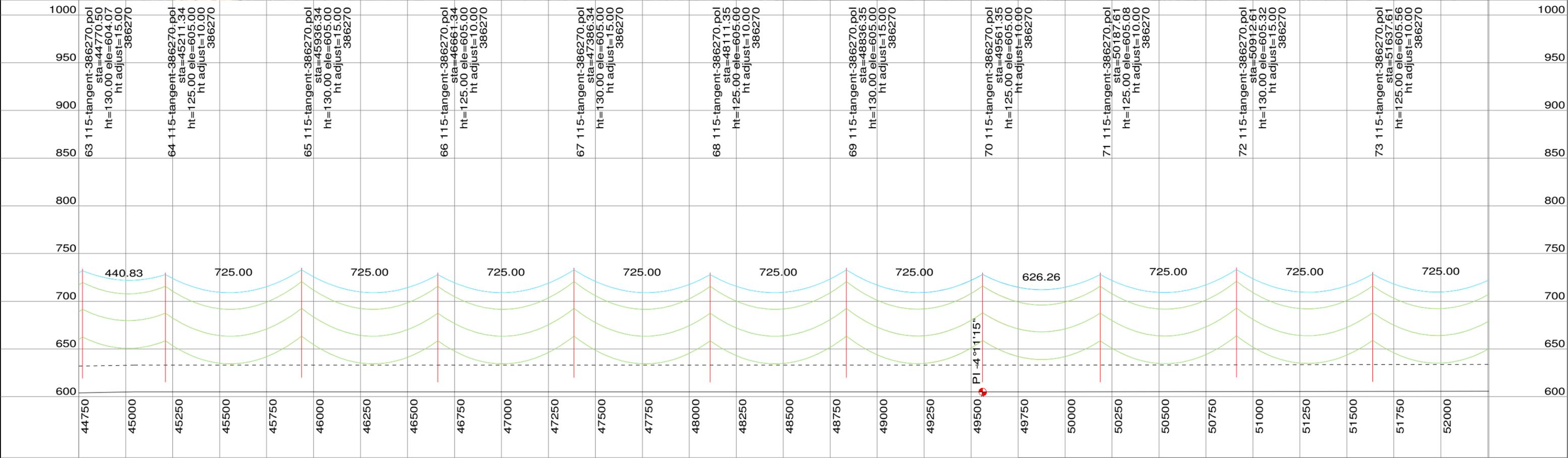
**Tenaska 345kV  
Transmission Line  
Preliminary Layout**

10/27/2009  
Page 4/10

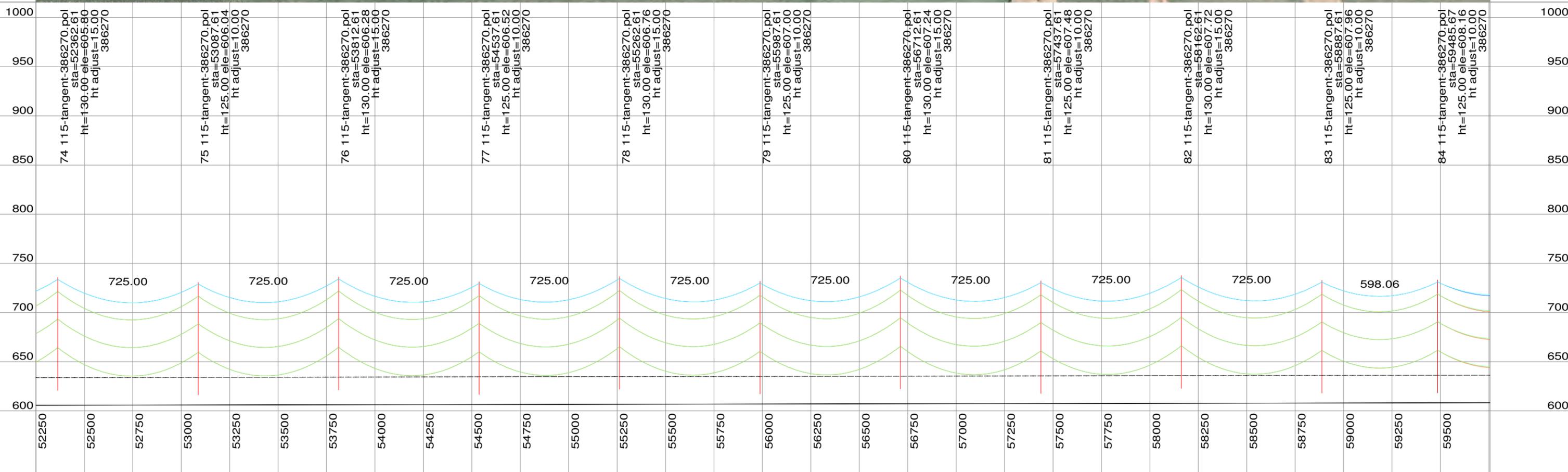




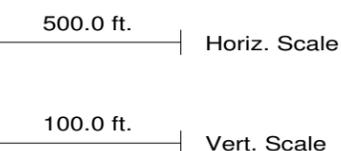
# Tenaska 345kV Transmission Line Preliminary Layout

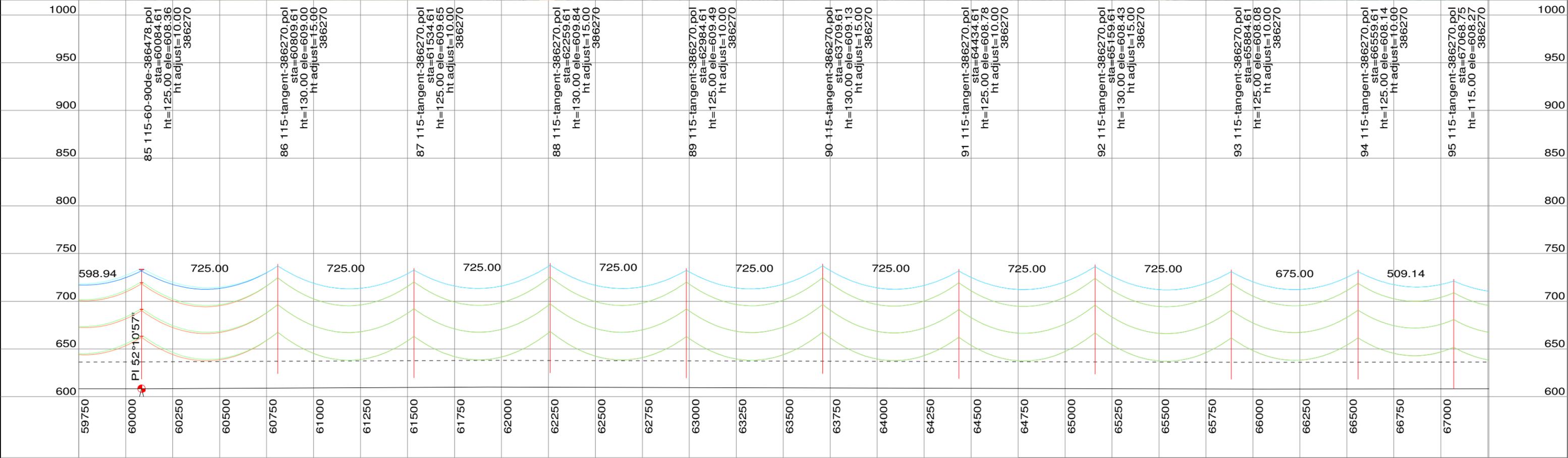


# Tenaska 345kV Transmission Line Preliminary Layout

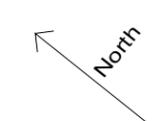
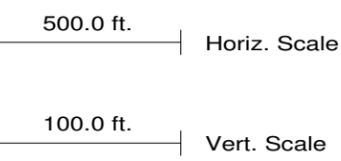


# Tenaska 345kV Transmission Line Preliminary Layout

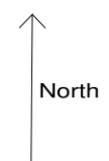
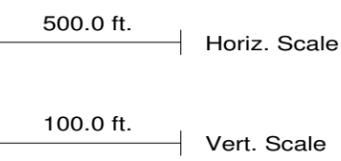




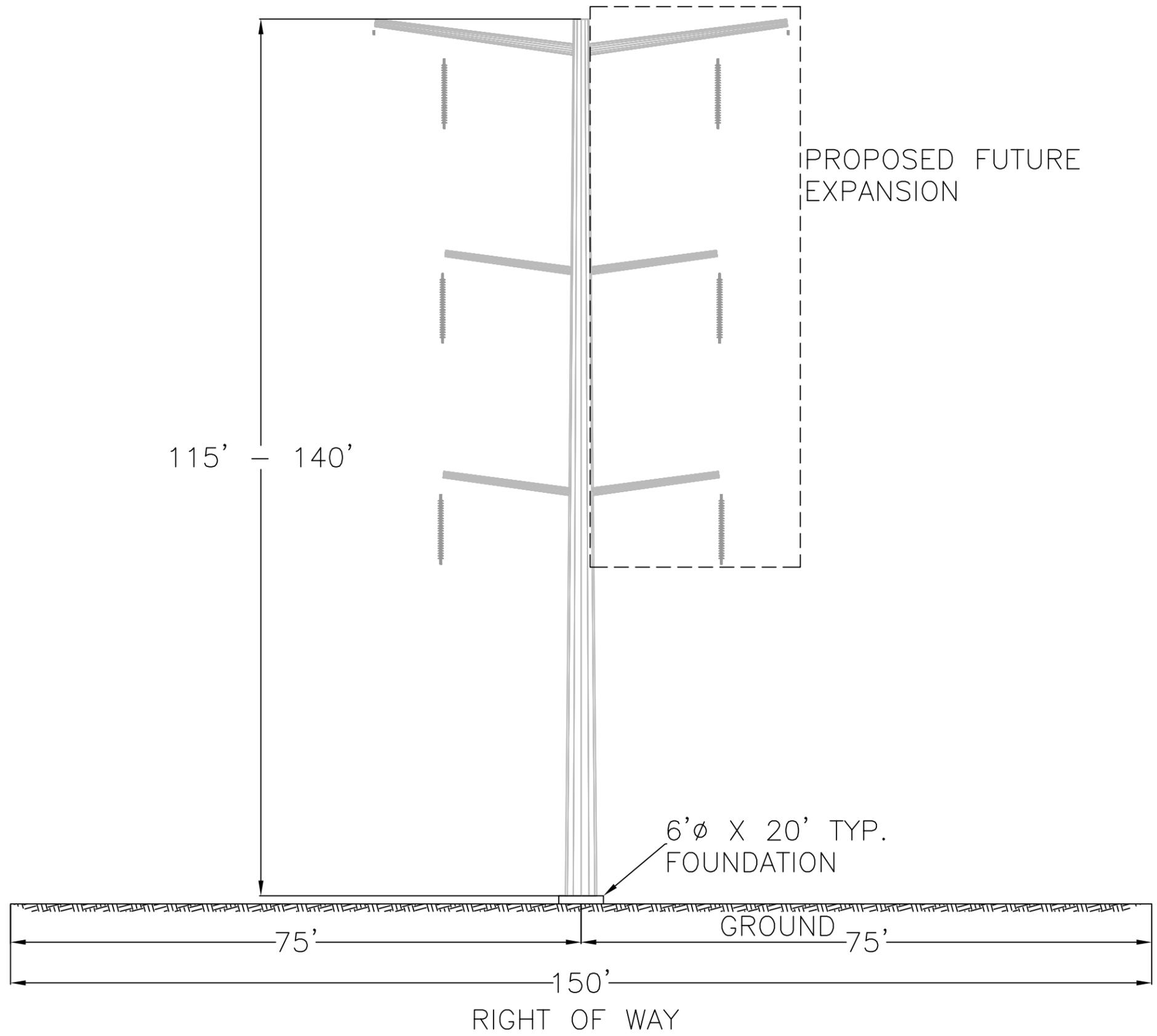
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87	115-tangent-386270.pol sta=61534.61 ht=125.00 ele=609.65 ht adjust=10.00 386270
88	115-tangent-386270.pol sta=62259.61 ht=130.00 ele=609.84 ht adjust=15.00 386270
89	115-tangent-386270.pol sta=62984.61 ht=125.00 ele=609.49 ht adjust=10.00 386270
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93	115-tangent-386270.pol sta=65884.61 ht=125.00 ele=608.08 ht adjust=10.00 386270
94	115-tangent-386270.pol sta=66559.61 ht=125.00 ele=608.14 ht adjust=10.00 386270
95	115-tangent-386270.pol sta=67068.75 ht=115.00 ele=608.27 386270



# Tenaska 345kV Transmission Line Preliminary Layout



# Tenaska 345kV Transmission Line Preliminary Layout



Rev. No.	Date	Description

**PATRICK**  
**ENERGY SERVICES**  
 3950 Orchard Hill Place TEL: (248) 319-0700  
 Novi, Michigan 48375 FAX: (248) 319-0701  
<http://www.patrickesi.com>

Project: <b>TENASKA 345KV TRANSMISSION LINE SECTION VIEW</b>	Date: 10/27/2009
Sheet Title:	Designed: PES
	Drawn: PES
	Sheet 1 of 1

\*\*\*\*\*  
 \* PIER FOUNDATIONS ANALYSIS AND DESIGN - (C) 1995,2002 POWER LINE SYSTEMS, INC.\*  
 \*\*\*\*\*

\*\*\* ANALYSIS IDENTIFICATION : Tenaska 345kV Line  
 NOTES :

\*\*\* PIER PROPERTIES CONCRETE STRENGTH (ksi) = 4.00 STEEL STRENGTH (ksi) = 65.00  
 DIAMETER (ft) = 6.000 DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 1.00

\*\*\* SOIL PROPERTIES

LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
1	S	2.00	0.00	80.0		2.770	28.00
2	S	2.00	2.00	37.6		3.000	30.00
3	S	5.00	4.00	37.6		3.000	30.00
4	S	8.00	9.00	27.6		2.880	28.98
5	S	20.00	17.00	37.6		3.000	30.00

\*\*\* DESIGN (FACTORED) LOADS AT TOP OF PIER MOMENT (ft-k) = 1418.0 VERTICAL (k) = 29.5 SHEAR (k) = 16.6  
 ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 1.00

\*\*\* CALCULATED PIER LENGTH (ft) = 20.000

\*\*\* CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER

TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)
S	1.00	2.00	80.0		2.770	7.98	2.33
S	3.00	2.00	37.6		3.000	21.34	4.06
S	5.00	5.00	37.6		3.000	88.88	7.74
S	10.00	3.92	27.6		2.880	97.04	12.04
S	13.92	4.08	27.6		2.880	-124.25	16.03
S	18.00	2.00	37.6		3.000	-73.61	19.02

\*\*\* SHEAR AND MOMENTS ALONG PIER

DISTANCE BELOW TOP OF PIER (ft)	WITH THE ADDITIONAL SAFETY FACTOR		WITHOUT ADDITIONAL SAFETY FACTOR	
	SHEAR (k)	MOMENT (ft-k)	SHEAR (k)	MOMENT (ft-k)
0.00	17.4	1430.2	17.4	1430.2
2.00	15.4	1464.3	15.4	1464.3
4.00	-0.2	1481.8	-0.2	1481.8
6.00	-25.7	1457.2	-25.7	1457.2
8.00	-59.2	1373.8	-59.2	1373.8
10.00	-100.8	1215.1	-100.8	1215.1
12.00	-147.6	967.7	-147.6	967.7

14.00	-195.7	621.2	-195.7	621.2
16.00	-137.5	287.1	-137.5	287.1
18.00	-73.6	75.0	-73.6	75.0
20.00	0.0	-0.0	0.0	-0.0

\*\*\* TOTAL REINFORCEMENT PCT = 0.38 REINFORCEMENT AREA (in^2) = 15.47  
 \*\*\* USABLE AXIAL CAP. (k) = 29.5 USABLE MOMENT CAP. (ft-k) = 2273.1

\*\*\* US Standard Re-Bars (Select one of the following):

78	BARS #4	(AREA = 0.20 in^2	DIA = 0.500 in)	AT SPACING (in) =	2.50
50	BARS #5	(AREA = 0.31 in^2	DIA = 0.625 in)	AT SPACING (in) =	3.90
36	BARS #6	(AREA = 0.44 in^2	DIA = 0.750 in)	AT SPACING (in) =	5.41
26	BARS #7	(AREA = 0.60 in^2	DIA = 0.875 in)	AT SPACING (in) =	7.49
20	BARS #8	(AREA = 0.79 in^2	DIA = 1.000 in)	AT SPACING (in) =	9.74
16	BARS #9	(AREA = 1.00 in^2	DIA = 1.128 in)	AT SPACING (in) =	12.17
13	BARS #10	(AREA = 1.27 in^2	DIA = 1.270 in)	AT SPACING (in) =	14.98
10	BARS #11	(AREA = 1.56 in^2	DIA = 1.410 in)	AT SPACING (in) =	19.48
7	BARS #14	(AREA = 2.25 in^2	DIA = 1.693 in)	AT SPACING (in) =	27.83

\*\*\* WEIGHT OF CAISSON (kips) = 84.823

\*\*\* PRESSURE UNDER CAISSON DUE TO INPUT DESIGN AXIAL LOAD (psf) = 1043.4

Uplift, I NA+ 1	SWR Suspension	SWR	-0.000	0.022	0.472	0.473
Uplift, I NA+ 1	TOPL Suspension	TOPL	-0.000	-0.022	1.454	1.454
Uplift, I NA+ 1	TOPR Suspension	TOPR	-0.000	0.022	1.458	1.458
Uplift, I NA+ 1	MIDL Suspension	MIDL	-0.000	-0.023	1.453	1.453
Uplift, I NA+ 1	MIDR Suspension	MIDR	-0.000	0.023	1.456	1.457
Uplift, I NA+ 1	BOTL Suspension	BOTL	-0.000	-0.023	1.441	1.442
Uplift, I NA+ 1	BOTR Suspension	BOTR	-0.000	0.023	1.445	1.445

Overturning Moments For User Input Concentrated Loads:

Moments are static equivalents based on central axis of 0,0 (i.e. a single pole).

TANGENT  
STRUCTURE 21

Load Case	Total Tran. Load (kips)	Total Long. Load (kips)	Total Vert. Load (kips)	Transverse Overturning Moment (ft-k)	Longitudinal Overturning Moment (ft-k)
RULE 250B NA+, I NA+	14.707	-0.000	26.821	1277.876	-0.042
RULE 250B NA-, I NA-	-14.709	-0.000	26.821	-1276.537	-0.042
RULE 250B Uplift NA+, I NA+	14.707	-0.000	17.881	1277.620	-0.042
RULE 250B Uplift NA-, I NA-	-14.709	-0.000	17.881	-1276.793	-0.042
RULE 250C NA+, I NA+	15.082	-0.000	10.617	1289.524	-0.034
RULE 250C NA-, I NA-	<del>15.083</del>	-0.000	10.617	<del>-1289.080</del>	-0.035
RULE 250D NA+, I NA+	5.907	-0.000	26.485	524.277	-0.028
RULE 250D NA-, I NA-	-5.908	-0.000	26.485	-522.838	-0.028
RULE 277 Insulators NA+, I NA+	5.882	-0.000	17.881	511.335	-0.025
RULE 277 Insulators NA-, I NA-	-5.884	-0.000	17.881	-510.431	-0.025
Extreme Ice NA+, I NA+	-0.001	-0.000	19.656	0.508	-0.022
Extreme Ice NA-, I NA-	-0.001	-0.000	19.656	0.508	-0.022
Uplift, I NA+	-0.001	-0.000	9.650	0.182	-0.018
RULE 250B NA+, I NA+ 1	5.882	-0.000	17.881	511.335	-0.025
RULE 250B NA-, I NA- 1	-5.884	-0.000	17.881	-510.431	-0.025
RULE 250B Uplift NA+, I NA+ 1	5.882	-0.000	17.881	511.335	-0.025
RULE 250B Uplift NA-, I NA- 1	-5.884	-0.000	17.881	-510.431	-0.025
RULE 250C NA+, I NA+ 1	13.711	-0.000	9.652	1172.295	-0.031
RULE 250C NA-, I NA- 1	-13.712	-0.000	9.652	-1171.891	-0.032
RULE 250D NA+, I NA+ 1	5.370	-0.000	24.078	476.615	-0.025
RULE 250D NA-, I NA- 1	-5.371	-0.000	24.078	-475.307	-0.025
RULE 277 Insulators NA+, I NA+ 1	5.882	-0.000	17.881	511.335	-0.025
RULE 277 Insulators NA-, I NA- 1	-5.884	-0.000	17.881	-510.431	-0.025
Extreme Ice NA+, I NA+ 1	-0.001	-0.000	17.869	0.462	-0.020
Extreme Ice NA-, I NA- 1	-0.001	-0.000	17.869	0.462	-0.020
Uplift, I NA+ 1	-0.001	-0.000	9.650	0.182	-0.018

M 1289.08 \* 1.1 = 1418 ft-k  
 Axial 26.8 \* 1.1 = 29.9 K  
 Shear 15.083 \* 1.1 = 16.6 K

\*\*\* Weight of structure (lbs):  
 Weight of Tubular Davit Arms: 3001.6  
 Weight of Steel Poles: 11444.9  
 Weight of Suspensions: 152.0

Shear      Vert      M

TITLE Tenaska Transmission Lines -  
Current Calculation

## Tenaska 138 kV Transmission Line - Current Calculation

Equation:

$$I = \frac{P}{\sqrt{3} V \cos \theta}$$

Known Values:

$$P = 15 \text{ MW} = 15 \times 10^6 \text{ W}$$
$$V = 138 \text{ kV} = 138 \times 10^3 \text{ V}$$
$$\cos \theta = \text{pf} = 0.9$$

Calculated Current:

$$I = \frac{15 \times 10^6}{\sqrt{3} (138 \times 10^3) (0.9)} = 69.728 \text{ A}$$

ACSR Conductor Chosen: HawkHawk Current Rating: 659 A

## Tenaska 345 kV Dual Circuit Transmission Line - Current Calculation

Equation:

$$I = \frac{P}{\sqrt{3} V \cos \theta}$$

Known Values (one circuit):

$$P = 780 \text{ MW} = 780 \times 10^6 \text{ W}$$
$$V = 345 \text{ kV} = 345 \times 10^3 \text{ V}$$
$$\cos \theta = \text{pf} = 0.9$$

Current Calculation:

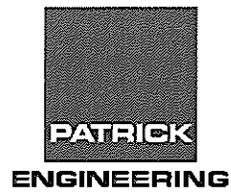
$$I = \frac{780 \times 10^6}{\sqrt{3} (345 \times 10^3) (0.9)} = 1450.349 \text{ A}$$

ACSR Conductor Chosen: T2-BluejayT2-Bluejay Current Rating: 2184 A

<b>TASK NO.</b>	<b>TASK DESCRIPTION</b>	<b>TOTAL HOURS</b>
	<b>PLS CADD</b>	
	Line Design	680
	<b>Structure Design</b>	
	Tangent	56
	Tagent Deadend	56
	Light Angle	56
	Medium Angle DE	56
	Large Angle DE	56
	Special Structure	68
	<b>Foundations</b>	
	Caisson Design	376
	<b>Engineering Documents</b>	
	BOM / Hardware Fitup	432
	Structrue Drawings/Details	696
	L&D Drawings	664
	Foundation Drawings	136
	Staking Reports	76
	Work List	344
	Plan and Profile Drawings - Approx. 10 sheets	1,032
	Vendor Calc/Dwg Check	72
	As-Builts	184
	<b>Project Management</b>	
	Project Management	832
	Construction Support	320
	Vendor Support	128
	Bid Review	104
	Administration	360
	<b>Meetings</b>	
	At Tensaka Offices (Quarterly)	256
	Phone Conferrence (Weekly)	300
	<b>Site Visits</b>	
	Pre-design/Accessibility Walk Through	120
	Staking Review	80
	50% Design Review Meeting	96
	Construction Support/Review	64
	Final Walk Down/As-Built Walk Down	80
	<b>Sub Contracted Work</b>	
	Soil Borings	168
	Survey	168
	<b>Permits</b>	
	Road Crossing	344
	Environmental	216
	<b>TOTAL HOURS/DRAWINGS</b>	8,676
	<b>TOTAL COST</b>	\$907,100

EXPENSE DEVELOPMENT							
TRAVEL					TOTAL ENGINEERING COSTS		
Air fare	28	trips x	1,000	\$/trip =	\$28,000	Employee labor cost (SPR)	\$907,100
Hotel	71	night x	150	\$/day =	\$10,650	Contingency	10%
Car rental	31	day x	65	\$/day =	\$2,015	Labor Revenue	\$997,810
Parking fee:	71	day x	25	\$/day =	\$1,775	Expenses	\$49,095
Meals	71	day x	50	\$/day =	\$3,550	Markup on Expenses	5%
Gas	1,000	gallons	3	\$/gal =	\$2,500	Expense Revenue	\$51,550
Mileage	1,100	miles	0.55	\$/mile =	\$605		
<b>Subtotal - Travel</b>					<b>\$49,095</b>	<b>TOTAL COST</b>	<b>\$1,049,360</b>





# Appendix D

## Aerial Survey Estimates

12 October 2009

Mr Nicholas Link  
PATRICK ENERGY SERVICES  
39500 Orchard Hill Place - Suite 200  
Novi MI 48375

Re: NEW TRANSMISSION LINE – PHOTOGRAMMETRY PROPOSAL  
Taylorville, Christian County, IL

Dear Mr Link:

We are pleased to submit the following proposal for photogrammetric services covering the above-referenced project, as outlined on the map provided to us.

**Aerial Photography:**

New aerial photography will be flown as soon after your authorization to proceed as weather and ground conditions permit. The photography will be taken with black-and-white film at a 1"=330' negative scale suitable for mapping with 1' contours. On completion of the photography, the film will be processed, checked, and annotated; and one set of contact prints will be furnished for your files.

**Ground Control:**

It is our understanding that the ground control will be furnished to us. The approximately 47 control locations should be targeted prior to flight. The horizontal control required for the mapping should consist of a coordinate system (State Plane or assumed), and the vertical control should be established on NGVD-29 or NAVD-88 datums.

**Analytical Triangulation:**

Using the established horizontal and vertical control, analytical triangulation will be performed using the softcopy process to supplement the ground control.

In the softcopy analytical triangulation process, the aerial negatives are scanned and image correlation technology is used to perform passpoint selection, numbering and measurement as an automated process. The ground control locations and additional passpoint locations are measured interactively. A fully analytical bundle adjustment is performed using INPHO MATCH-AT software to produce final X Y Z coordinates for all points.

**Topographic Mapping:**

On completion of the analytical triangulation, planimetric detail and contours, (for a 150' wide corridor), will be collected in digital form at 1"=50' to cover the project consisting of approximately 14 miles. Mass points and breaklines will be collected in locations that will define the terrain in a manner that 1' contours can be accurately generated through terrain modeling software.

---

[REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

[REDACTED] [REDACTED]

NEW TRANSMISSION LINE – PHOTOGRAMMETRY PROPOSAL

Page 2 of 3

10.12.2009

As the data is collected, it will be transferred to an interactive graphic station for editing and the enhancement of cartographic quality. The edited digital mapping will be furnished to you on CD-ROM in AutoCAD DWG format containing planimetric features, contours, and spot elevations. The point and breakline data used to generate the contours will also be furnished.

**Standards:**

All of the work will be performed in accordance with established practices and procedures of the profession, and in conformity with accepted mapping standards. Areas obscured by foliage, vegetation, or shadows will be defined to indicate that detail in these areas are approximated and may not be reliable. It is recommended that they be supplemented or checked with field surveys.

***Our fees for these services will be:***

Aerial Photography:	\$ 3,955.00
Aerial Triangulation and Topographic Mapping:	<u>20,500.00</u>
<b>Total:</b>	<b>\$ 24,455.00</b>

Thank you for the opportunity to submit this proposal. Should you have any questions, or require additional information, please feel free to contact us.

Sincerely,

[Redacted signature]

[Redacted text]

---

NEW TRANSMISSION LINE – PHOTOGRAMMETRY PROPOSAL

Page 3 of 3

10.12.2009

**Acceptance / Payment Terms:**

If the above is satisfactory, please formalize your acceptance by signing in the space provided, and faxing the signed copy to us at [REDACTED]

[REDACTED] payment terms are Net 30 Days. Should *Patrick ESI* require a "pay when paid" project, and not be able to fulfill those terms, *Patrick ESI* shall pay to [REDACTED] the amounts agreed upon herein within 14 days of *Patrick ESI's* receipt of payment from its Client, or within 90 days of *Patrick ESI's* receipt of *Aerocon's* invoices, whichever comes first.

Any third-party billings are to be disclosed before work commences on the project.

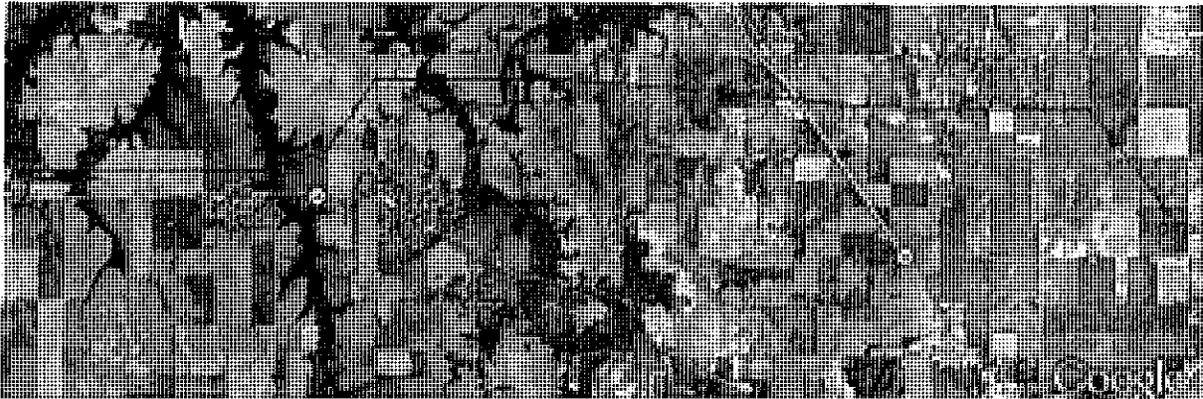
-----  
**Accepted by:**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

**Project Limits**



[REDACTED]

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

October 9, 2009

Mr. Nicholas Link  
Patrick Energy Services  
39500 Orchard Hill Place, Suite 200  
Novi, MI 48375

Dear Nicholas

The following is [REDACTED] proposal for a) airborne LIDAR (laser-scan), b) airborne color digital imagery, c) airborne digital video, d) airborne "Happy Snap" digital still images of existing transmission line structures and substations, e) continuous overlapping oblique right-of-way imagery (if requested), f) continuous overlapping vertical right-of-way imagery (if requested), g) preparation of LIDAR intensity imagery (if requested), h) preparation of a PLS-CADD model, i) preparation of a digital terrain model, and j) preparation of plan/profile or planimetric drawings (if requested) for the approximately 14miles-long Tenaska 345KV Transmission Line near Taylorville, Illinois.

The transmission line mileage is approximate; therefore, total mileage and total price contained in this estimate will be adjusted for actual transmission line, right-of-way, or corridor mileage when actual mileage information becomes available. The unit prices per mile contained in this estimate are valid for increases or decreases in total transmission line mileage.

Certain information contained in this proposal is considered by [REDACTED] and its subcontractors to be proprietary and confidential. [REDACTED] requests that Patrick Energy Services treat this information as confidential, just as Patrick Energy Services treats its own confidential information.

[REDACTED] and its subcontractors understand the project scope to be defined as follows.

**Project Scope:**

Collect airborne LIDAR (laser-scan), digital video, weather, and airborne color digital imagery (digital aerial photography) data and prepare color imagery maps, LIDAR intensity imagery (if requested), digital video, digital "Happy Snap" still images of transmission line structures and substations, continuous overlapping oblique right-of-way imagery (if requested), continuous overlapping vertical right-of-way imagery (if requested), a digital terrain model, a PLS-CADD model, and plan/profile or planimetric drawings (if requested) of the transmission line listed above. All data capture work will be performed by [REDACTED] employees using [REDACTED]-owned aircraft and remote sensing equipment, unless otherwise

*LASER-SCAN / DIGITAL IMAGERY  
Survey - Mapping - Analytics*

specified by ██████████ and agreed to by the customer or client. All data processing, engineering model preparation, and drawing preparation will be performed by ██████████ employees located in ██████████ Bessemer, Alabama office or ██████████ Picayune, Mississippi office, unless otherwise specified by ██████████ and agreed to by the customer or client. The work is described as follows:

1. Collect airborne LIDAR (laser-scan) and associated modeling data, using LIDAR remote sensing platform, that will provide the following:
  - Three-dimensional LIDAR (laser-scan) point coordinates
    - Horizontal point coordinates will be referenced to the appropriate State Plane Coordinate System-North American Datum 1983 (NAD83), and vertical point elevations will be referenced to the North American Vertical Datum of 1988 (NAVD88).
    - The units of measurement will be US survey feet.
    - Point data collected will be a) filtered, b) reduced in volume (to remove redundant and otherwise unnecessary points), and c) classified as
      - Ground,
      - Man-made structures, and
      - Vegetation and Other.
    - Data capture swath width for LIDAR (laser-scan) of the transmission line corridor or right-of-way will be at least 400 feet, as specified by Patrick Energy Services, to ensure complete coverage for a digital terrain model, features, and obstacles of the entire 300'-wide corridor or right-of-way. The laser-scan coverage will be uniform, consistent, and continuous over the land areas to be modeled.
    - The point accuracy of TopEye Mark II LIDAR System is the following:
      - Absolute positional accuracy at 95% confidence: (Horizontal: 5 cm; Vertical: 5 cm)
      - Relative (point-to-point) accuracy = (+/-) 2 cm
    - The point accuracy of ██████████ LIDAR data, taking into consideration features such as grass, brush, conductor attach points, atmospheric conditions, etc., is the following:
      - LIDAR vertical data accuracy is 0.50 feet:1000 feet ranging distance RMSE at 2 sigma (95% probability) or better for critical design points such as:
        - Conductor attachment points
        - Shield wire attachment points
        - Conductor and shield wire impingement points
        - Aerial obstacles and features
      - LIDAR vertical data accuracy is 0.25 feet:1000 feet ranging distance RMSE at 1 sigma (68% probability) or better for non-critical design points such as:
        - Ground obstacles
        - Vegetation
        - Ground features



- Up to four (4) coordinate points will be collected for each laser pulse, using multiple return signals from a single laser pulse. *This capability ensures that "ground" return signals are captured, even when penetrating vegetation.*
- The return signal strength (e.g., LIDAR intensity) will be captured for each coordinate point collected. LIDAR intensity is used to generate LIDAR intensity imagery, a LIDAR dot portrait of the geographic area, transmission line, features, and obstacles that are scanned by the LIDAR system. Signal intensity is also used as part of the classification/filtering process and the obstacle digitization process to identify objects in the laser-scan data.
- Laser scan-rate: Adjustable to 50 Hz; Laser scan-angle = (+/-) 20 degrees
- Laser pulses per second: Adjustable to 50,000
- Laser point density: 26-40/ sq. meter (Avg.), 15/sq. meter (Min.)
- Elliptical scan pattern (advantageous for capturing wire-crossings)
  - Forward scan angle = 20 degrees
  - Side-to-side scan angle = 20 degrees
  - Aft scan angle = 14 degrees
- Number data points captured per second (approximate): Up to 200,000
  - Note: Laser-scan data (including the return signal intensity values) will be used to establish horizontal position and to determine height of obstacles and features identified using color digital imagery during the obstacle digitization process.
- FDA-certified **binocular eye-safe distance = 60 meters**, with automatic shutdown feature (**SAFETY REQUIREMENT**)
- Two full-motion, color, high-resolution digital videos (broadcast quality), if requested.
  - Orientations – vertical & oblique (45 degrees declination from horizontal)
  - Edited to remove extraneous aircraft flight path maneuvers
  - Geo-referenced to support playback using ~~XXXXXX~~ PLS-CADD Image/Video Player software
  - Video cameras are NOT gyro-stabilized.
  - Delivered as **MPEG** or **AVI** file(s) on DVD or external hard disk drive.
- Continuous, overlapping, high resolution oblique right-of-way color digital imagery that operates in ~~XXXXXX~~ PLS-CADD video player, if requested.
- Continuous, overlapping, high resolution vertical right-of-way color digital imagery that operates in ~~XXXXXX~~ PLS-CADD video player, if requested.

- Color, geo-referenced, high-resolution (16 MPixel resolution) digital ("Happy Snap") images of transmission structures, major obstacles, and construction difficulties, if requested:
  - Camera orientation: **30 to 60 degrees declination** from horizontal, depending on structure spacing and aircraft altitude required by the LIDAR data capture operations
  - Photo format = **portrait**
  - Camera resolution = **12Mpixel**
  - **Entire structure** captured in photograph
  - Geo-referenced to support playback using ~~XXXXXXXXXX~~ **PLS-CADD Image/Video Player** software (also provided as a MS/Excel spreadsheet with each photograph linked to spreadsheet by structure ID name/number)
  - Indexed to structure ID name/number - structure ID name/number to be supplied by Patrick Energy Services
  - Delivered as geo-referenced images (**jpg**) on DVD.
  
- 2. Capture and process airborne color, high-resolution (12 MPixel) digital imagery of the transmission line corridor or right-of-way. The color digital imagery will be suitable for the production of strip maps of the transmission line corridor or right-of-way, including:
  - Full color, geo-referenced, orthorectified high-resolution digital imagery (digital aerial photography) that has been edge-matched and color-balanced to produce a continuous geo-mosaic map of the entire transmission line corridor or right-of-way.
    - The swath width of the geo-mosaic imagery strip maps of transmission line corridor or right-of-way will be approximately 500 feet (e.g., approximately 250 feet on either side of the corridor or right-of-way centerlines), subject to image cropping requirements.
    - The imagery will have a ground-pixel size resolution of approximately 6 inches.
    - The imagery will be ortho-rectified using LIDAR digital elevation models for the width of the LIDAR data that is collected and will be ortho-rectified to a USGS digital elevation model outside the boundaries of the LIDAR data capture.
  
  - Full color geo-mosaic map sheets with digitized obstacles for use by ground obstacle verification personnel or crews to assist them in identifying obstacles and features that have not been digitized located and identified using laser-scan and color digital imagery.
  
  - Full color, digital, geo-referenced, orthorectified geo-mosaic imagery maps of the transmission line corridor or right-of-way in ECW compressed electronic format.

- Full color strip map backgrounds on transmission line plan/profile or planimetric drawings, if requested.
  - Full color strip map backgrounds for the plan-view of the PLS-CADD model.
3. Capture and process survey control data and weather data for use in data processing and modeling.
- Survey control monumentation associated with each ground control (GPS) reference point used in support of the airborne laser-scan activities. To provide GPS ground control for the LIDAR and color digital imagery (aerial photography) data capture and post processing, [REDACTED] typically sets up GPS recording stations on USGS monuments and records the GPS reference information for the entire duration of all data capture flights. Trimble R7 5700 GPS units are used for setup over USGS monuments.
  - [REDACTED] requires that airborne data collection flights occur within 15 miles of the (ground control) recording GPS units (ground reference stations) that are set up on stable, high-quality USGS monuments.
  - If there are no useable USGS monuments within 15 miles of all points along a data capture flight line, [REDACTED] will (with concurrence of the transmission facilities owner) either
    - Engage a licensed land surveyor to set new first-order quality survey ground control monuments (using available CORS stations) or
    - Baseline to a new ground control point in the vicinity of the data capture flight path. To accomplish the baseline operation, [REDACTED] would set up a recording GPS unit over a known USGS monument and then set up a second GPS station at the baseline point to be established. The GPS recording units record GPS data for a minimum of one hour for every 7 miles (straight-line distance) away from the occupied USGS monument that the baseline monument is located. This procedure is necessary to properly establish the location of the baseline GPS. Subsequently, the new baseline GPS location can be used successfully as a new ground control point.
  - To document the USGS monument that was used as the initial ground control, [REDACTED] does the following on site:
    - Makes a "pencil rub" of the inscribed lettering on the USGS monument and
    - Takes pictures of the USGS monument and its surroundings.

- Weather conditions report, indicating wind speed, wind direction, ambient temperature, and sun conditions in 5-minute intervals at time of laser-scan data capture for the transmission line corridor or right-of-way. Weather data will be captured at multiple sites near the existing transmission line.
4. Prepare Basic Product Set that includes the following:
- Transmission line plan/profile or planimetric drawings per Patrick Energy Services drawing specifications (ie. Patrick Energy Services drawing borders, title block, line widths, line colors, text sizes, text colors, etc.) in AutoCAD or Microstation format at data capture ambient conditions, if requested by Patrick Energy Services. The drawings will be prepared at a vertical scale of 1"=20' and at a horizontal scale of 1"=200', as applicable, or as otherwise specified by Patrick Energy Services, and will be delivered in electronic form on DVD and as hardcopy prints.
  - PLS-CADD model of transmission line, corridor, and/or right-of-way at data capture ambient conditions with features and obstacles that are located and identified by laser-scan and color digital imagery, with a digital terrain model of the corridor or right-of-way, and with color digital imagery as a background for the plan views.
  - LIDAR intensity imagery in PLS-CADD format, if requested. The LIDAR intensity imagery is composed of LIDAR points with location attributes and with the gray-scale color defined by the LIDAR reflection intensity generated by the object within the transmission line rights-of-way or corridors which produced the LIDAR reflection. Due to the accuracy of the LIDAR intensity imagery, it is extremely beneficial for lines routing and pole spotting along roadways and city streets.
  - Color digital imagery geo-mosaic map sheets with digitized features and obstacles that are located and identified by laser-scan and color digital imagery.
  - Color digital video at 45 degrees and 90 degrees in MPEG format.
  - Continuous, overlapping, high resolution oblique right-of-way color digital imagery that operates in [REDACTED] PLS-CADD video player, if requested.
  - Continuous, overlapping, high resolution vertical right-of-way color digital imagery that operates in [REDACTED] PLS-CADD video player, if requested.
  - Color "Happy Snap" still digital images of individual transmission structures and substations, if requested.

## **Project Planning/Coordination/Data Capture**

Project planning, coordination, and data capture include the following:

1. Mission planning: [REDACTED] will initiate mission-planning activities immediately on completion of a contract or a work authorization document. Activities associated with the preparation of mission plans will include:
  - Acquisition of existing maps and information from Patrick Energy Services.
  - Acquisition of topographical feature codes or other identifiers from Patrick Energy Services for preparation of PLS-CADD model.
  - Identification by Patrick Energy Services of the exact start/end points and PI's (turn points) for the transmission line corridor or right-of-way.
  - Preparation of pilot navigation and instrument control data for project.
  - Identification of emergency services.
  - Identification and qualification of ground (GPS) control.
  - Preparation of mission plans (includes **Safety Plan**).
2. Data capture coordination: [REDACTED] will coordinate its data capture activities as follows to ensure successful and uneventful mission.
  - Coordination with local law enforcement, civil aviation, and emergency service providers, as required.
  - Coordination with Tenaska's Transmission Line Engineering Department for access to the transmission line corridor or right-of-way.
  - Coordination with Tenaska's "Control Center" for data-capture flights over the transmission line corridor or right-of-way.
  - Coordination with FAA and local airport authorities regarding permits, licenses, and access to controlled airspace.
  - Assignment of ground-air-ground radio frequencies to facilitate ground-based mission control of all airborne data capture activities. **This is a flight-safety requirement.**
3. Data capture:
  - Airborne data capture: The following equipment and crews may be used for airborne laser-scan and color digital imagery data capture for transmission lines, generating plants, and substations:



- Helicopter(s)/TopEye laser-scan instrument/color digital imagery equipment: The following primary and backup helicopters may be used for laser-scan and color digital imagery data capture:
  - Primary: N350BA, American Eurocopter AS350B/A helicopter (turbine engine, blue and white with gray trim), TopEye Mark II laser system, color digital still camera, vertical/oblique digital video, crew (flight operations manager, pilot, instrument operator, ground control station operator(s), geomatics engineer or technician).
- Fixed-wing aircraft/color digital imagery equipment: The following primary fixed-wing aircraft may be used for color digital imagery data capture:
  - Primary: N14XT, Partenavia high-wing airplane (twin reciprocal engines, white with blue and red trim), color high-resolution digital camera, crew (pilot and camera/ground reference station operator).
- Ground-based data capture: The following equipment and crews may be used for ground-based weather data capture and ground-based GPS data capture for land areas, transmission lines, generating plants, and substations:
  - Weather instruments: Multiple Davis Instruments Weather Wizard III portable weather stations with recording equipment in vinyl container (marked with ████████ logo and telephone numbers) and with weather probes mounted on telescopic masts.
    - Temperature accuracy: +/- 1 degree F
    - Temperature range: -50 degrees F to 140 degrees F
    - Wind speed accuracy: +/- 5%
    - Wind speed range: 2 mph to 150 mph (2.9 ft/sec to 220 ft/sec)
    - Wind direction accuracy: +/- 7 degrees
  - Ground-based GPS instruments: Multiple Trimble 5700 survey grade GPS units that are set up at survey monuments and USGS monuments to collect GPS data for dual frequency, differential GPS coordinate calculations.

## **Project Deliverables**

The following are the project deliverables:

1. Color digital imagery of transmission line, corridor, and right-of-way (GIS-compatible).
  - Full color digital imagery ground obstacle verification map sheets with digitized obstacles that are located and identified by laser-scan and color digital imagery for use by ground obstacle verification personnel or crews, if requested.
  - Full color, digital, geo-referenced, orthorectified geo-mosaic imagery maps of the transmission line corridor or right-of-way in ECW electronic format on DVD, accompanied by the appropriate ECW-viewer software.



- Full color strip map backgrounds for electronic transmission line plan/profile or planimetric drawings at a scale of 1"=200', if requested.
  - Full color strip map backgrounds for plan-view of PLS-CADD model.
2. ASCII data files (GIS-compatible) of laser-scan coordinate point data (X, Y, Z, Intensity), if requested.
  3. Survey monument information (documentation) for transmission line corridor or right-of-way.
  4. Weather conditions data report for transmission line, corridor, and/or right-of-way, including:
    - Location of monitoring instruments
    - Recorded data at 5-minute intervals during laser-scan data capture
      - Date/time of data acquisition
      - Ambient temperature
      - Wind speed
      - Wind direction
      - Sun conditions
  5. Full-motion vertical and oblique color digital video of corridor or right-of-way flown transferred to DVD, if requested.
  6. LIDAR intensity imagery of transmission line right-of-way or corridor in PLS-CADD format, if requested.
  7. Color digital imagery "Happy Snaps" of transmission line structures, obstacles, substations, and construction difficulties, if requested. "Happy Snap" imagery will be geo-referenced to support playback using [REDACTED] PLS-CADD Image/Video Player software and also will be provided as an MS/Excel spreadsheet with each photograph linked to spreadsheet by structure ID name/number.
  8. Continuous, overlapping, high resolution oblique right-of-way color digital imagery that operates in [REDACTED] PLS-CADD video player, if requested.
  9. Continuous, overlapping, high resolution vertical right-of-way color digital imagery that operates in [REDACTED] PLS-CADD video player, if requested.
  10. PLS-CADD model and plan/profile (or planimetric) drawings of transmission line, corridor, and/or right-of-way.
    - PLS-CADD model of transmission line, corridor, and/or right-of-way at data capture ambient conditions, which include:



- Ground profiles with center, \_\_\_' left offset, and \_\_\_' right offset profiles, as specified by Patrick Energy Services.
  - Digital terrain model.
  - Existing transmission structure locations and numbers.
  - Station numbers.
  - Existing transmission overhead shieldwire 3D laser data points and attachment points for shieldwires that are located and identified by laser-scan and color digital imagery.
  - Existing transmission conductor 3D attachment points.
  - Existing transmission conductor 3D laser data points.
  - Existing distribution poles that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
  - Existing distribution conductor 3D laser data points.
  - Existing distribution conductor 3D attachment points on existing transmission structures.
  - Existing communication poles that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
  - Existing communication cable 3D laser data points.
  - Existing communication cable 3D attachment points on existing transmission structures.
  - Utility line crossings that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
  - Support structures on each side of the transmission line centerline for all line crossings, with crossing conductor's attachment heights, for all line crossings.
  - Obstacles and features, including other overhead utility structures and conductors, within the transmission line corridor or right-of-way, that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
  - Color digital imagery strip maps of transmission line corridor or right-of-way in the PLS-CADD plan view.
  - Geo-referenced Happy Snap (close-up) digital photographs, if purchased by Patrick Energy Services.
- Plan/profile drawings or planimetric drawings of transmission line, corridor, and/or right-of-way in AutoCAD or Microstation format on DVD at a vertical scale of 1"=20' and at a horizontal scale of 1"=200', if requested. The plan/profile drawings will include the following or planimetric drawings will include applicable items from the following:
    - Ground profiles with center, \_\_\_' left offset, and \_\_\_' right offset profiles, or as otherwise specified by Patrick Energy Services.
    - Existing transmission structure locations and numbers.
    - Station numbers, per Patrick Energy Services specifications.



- Existing transmission overhead shieldwire laser data points and attachment points for shieldwires that are located and identified by laser-scan and color digital imagery.
- Existing upper transmission conductor laser data points.
- Existing lowest transmission conductor catenary.
- Existing transmission conductor attachment points.
- Existing distribution poles that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
- Existing distribution conductor 3D laser data points.
- Existing distribution conductor 3D attachment points on transmission structures.
- Existing communication poles that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
- Existing communication cable 3D laser data points.
- Existing communication cable 3D attachment points on transmission structures.
- Utility line crossings that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
- Support structures on each side of the transmission line centerline for all line crossings, with crossing conductor's attachment heights, for all line crossings.
- Obstacles and features, including other overhead utility structures and conductors, within the transmission line corridor or right-of-way that are located and identified by laser-scan and color digital imagery, with feature codes, locations, and heights.
- Color digital imagery strip map of transmission line corridor or right-of-way to depict 500' of property, or more where specified (e.g., 250' on each side of the transmission line centerline).

## Pricing

The pricing estimates for this transmission line are presented in the following table. The transmission line mileage is approximate. Actual pricing will be based on actual transmission line mileage.

### Pricing Estimate: Patrick Energy Services

Item	Task Description	Units	Unit Price	Quantity	Price
1	Mobilization *				
	Helicopter/Crew	Flt. Hrs.	\$850	9.50	\$8,075
	Fixed-wing/Crew	Flt. Hrs.	\$325		\$0
	Ground Support Crew	Days	\$450	2.50	\$1,125
	Task Subtotal				<u>\$9,200</u>

2 Tenaska 345KV T.L.

Color Orthophoto Imagery \*\* (400' Swath)

Data Capture	Miles	\$165	14.00	\$2,310
Image Processing	Miles	\$125	14.00	\$1,750
Color Imagery Plots (Est.)	Each	\$45	13.00	\$585

Subtask Subtotal \$4,645

LIDAR (Laser-scan 400' Swath)

Data Capture	Miles	\$400	14.00	\$5,600
Filter & Format Ckt. 1	Miles	\$300	14.00	\$4,200
Filter & Format Ckt. 2	Miles	\$150		\$0
PLS-CADD Model Ckt. 1	Miles	\$175	14.00	\$2,450
PLS-CADD Model Ckt. 2	Miles	\$125		\$0
PLS-CADD Mth.1 Str.&Sag Cond. Ckt. 1	Miles	\$100		\$0
PLS-CADD Mth.1 Str.&Sag Cond. Ckt. 2	Miles	\$100		\$0
Overlapping Oblique R/W Imagery	Miles	\$185	14.00	\$2,590
Overlapping Vertical R/W Imagery	Miles	\$65		\$0
LIDAR Intensity Imagery	Miles	\$55	14.00	\$770
Color Video of Right-of-Way	Miles	\$50	14.00	\$700

Subtask Subtotal \$16,310

Additional Tasks and Deliverables

Digital Terrain Model (ROW-width) (within right-of-way)	Miles	\$85	14.00	\$1,190
Contour Map From DTM	Miles	\$75		\$0
Digitize Topo. Features/Obstacles (Urban /suburban from laser/digital imagery)	Miles	\$250		\$0
Digitize Topo. Features/Obstacles (Rural from laser/digital imagery)	Miles	\$200	14.00	\$2,800
Happy Snap Imagery (Estimated) ***	Each	\$15		\$0
Ground Obstacle Verification ****	Days	\$1,900	16.00	\$30,400
LIDAR Accuracy Assessment Per Site	Each	\$1,000		\$0
P/P or Planimetric Drawings Ckt. 1	Miles	\$200	14.00	\$2,800
P/P or Planimetric Drawings Ckt. 2	Miles	\$150		\$0
Thermal Rating Ckt. 1(with DTA)	Miles	\$350		\$0
Thermal Rating Ckt. 2(with DTA)	Miles	\$350		\$0
Vegetation Analysis (with Thermal Anal.)	Miles	\$460		\$0

Subtask Subtotal \$37,190

Task Subtotal \$58,145

<b>Total Cost with Planimetric Dwgs. &amp; With Ground Obstacle Verification</b>	<b>\$67,345</b>
<b>Total Cost with Planimetric Dwgs. &amp; w/o Ground Obstacle Verification</b>	<b>\$36,945</b>
<b>Total Cost w/o Planimetric Dwgs. &amp; w/o Ground Obstacle Verification</b>	<b>\$34,145</b>
<b>Total Cost with Planimetric Dwgs. &amp; w/o Video &amp; Ground Obstacle Verification</b>	<b>\$36,245</b>
<b>Total Cost w/o Planimetric Dwgs., Video, &amp; Ground Obstacle Verification</b>	<b>\$33,445</b>
<b>Total Cost w/o Plan. Dwgs., Video, Gnd. Obs. Ver., &amp; LIDAR Intensity Imagery</b>	<b>\$32,675</b>



Pricing Notes:

\* NTE: Invoiced at-cost but Not-to-Exceed. **If data collection for this project can be performed on the same mobilization as other projects in the same general area, the stated mobilization costs may be reduced.**

\*\* Color digital imagery must be purchased for the project in order to digitize (locate and identify) obstacles and features from laser-scan and color digital imagery.

\*\*\* Optional color Happy Snaps for certain structures, obstacles, environmental hazards, construction difficulties, etc.

- The number of "Happy Snaps" in the pricing table above is estimated based on an anticipated number of structures per mile.
- If "Happy Snaps" are purchased by Patrick Energy Services, the actual price associated with this item will be computed to account for the actual number used, as based on the stated unit price.

**Ground Obstacle Verification:**

Although [REDACTED] TopEye Mark II LiDAR Systems detect most features and obstacles, some materials (e.g., particularly black polyethylene-covered CATV service drops, telephone wires that are not lashed to a messenger, and all-dielectric/self-supported fiber-optic cable) may not reflect enough laser light to be easily detected. Therefore, these and other obstacles with extremely low reflectivity may not be located and identified using laser-scan and color digital imagery. To ensure that all obstacles and features that may affect the operation of the transmission line are located and identified, a ground obstacle verification of the transmission line corridor or right-of-way is recommended by [REDACTED]

If requested by Patrick Energy Services, [REDACTED] will perform ground obstacle verification of the transmission line right-of-way or corridor that is mapped and/or modeled. The ground obstacle verification can be a right-of-way or corridor walk-through by qualified technicians or engineers, or it can be a ground obstacle verification survey by a small ground survey crew.

- If purchased by Patrick Energy Services, [REDACTED] personnel or an [REDACTED] sub-contractor ground obstacle verification survey crew will perform the ground obstacle verification with the aid of [REDACTED] digitized obstacles map product.
- Alternatively, Patrick Energy Services may elect to have its own ground survey crew or other personnel perform the ground obstacle verification, with or without the aid of [REDACTED] digitized obstacles map product.
- **A ground obstacle verification for the transmission line right-of-way or corridor is included as an option in the pricing estimate. The price for a**



**ground obstacle verification of the transmission line right-of-way or corridor included in this proposal is \$1900 per survey crew day, which has been added to the total Pricing Estimate Cost above. If Patrick Energy Services elects to have its own survey crews or its sub-contractor ground survey crew perform the ground obstacle verification of the transmission line right-of-way or corridor, the ground obstacle verification cost will not be included in the total project cost.**

### **Invoice Schedule:**

1. The mobilization price and the data collection price will be invoiced when the data capture activity is completed.
2. The price associated with the ground verification, if requested, will be invoiced when the ground verification is completed.
3. The price of the color digital imagery, plan/profile drawings (if requested), and PLS-CADD model of each transmission line corridor will be invoiced when final products are delivered for each line.
4. Payments are due 30 days after date of invoice. Invoices that are unpaid after 30 days after the date of the invoice are subject to a 1½% per month delinquent fee.

### **Project Schedule**

The schedule for this project will be as follows:

1. Color digital imagery and laser-scan data will be captured within two to three weeks (subject to acceptable weather conditions) or less after Patrick Energy Services
  - [REDACTED] the proposal,
  - Executes a contract or provides a work authorization for the work, and
  - Provides transmission line P.I. (Point-of-Intersection) information necessary for the preparation of the flight mission plans.
2. Color digital imagery maps with digitized features and obstacles for the transmission line to be used for the ground obstacle verification will be prepared by [REDACTED] within two weeks after the laser-scan and color digital imagery data capture flights have been completed for the line.
3. Ground obstacle verification work, if requested by Patrick Energy Services from [REDACTED], will be completed within two to three weeks (subject to acceptable weather conditions) after [REDACTED] conducts data capture operations and prepares color digital imagery maps with digitized obstacles that are located and identified by laser-scan and color digital imagery.
4. Color digital imagery maps, digital terrain model, PLS-CADD model, digital video, Happy Snaps, continuous overlapping vertical imagery, continuous overlapping oblique imagery, and plan/profile or planimetric drawings for the transmission line corridor or right-of-way will be delivered within two weeks after the ground obstacle verification has been completed, or before. Therefore, all deliverables for the transmission line should be provided to Patrick Energy Services within six weeks to seven weeks after the data capture flights have been completed, or within eight weeks to ten weeks after



Patrick Energy Services accepts the proposal and provides the necessary information for flight planning and data processing. If a ground obstacle verification is not required of [REDACTED] but will be provided by Patrick Energy Services' ground survey crew or other personnel, all deliverables for the transmission line will be delivered to Patrick Energy Services within six to seven weeks after Patrick Energy Services accepts the proposal and provides the necessary information for flight planning and data processing.

### Subcontractors

[REDACTED] subcontractors who may perform ground obstacle verification work for this project are:

[REDACTED]

### Insurance

[REDACTED] at its expense, shall procure and maintain in effect policies of insurance providing the coverages and limits specified below:

1. Worker's Compensation in statutory amounts and Employer's Liability with a minimum limit of \$1,000,000 per person.
2. Commercial General Liability Insurance on an Occurrence Basis, with the following coverages and limits:
3. General Aggregate \$2,000,000
4. Products-Completed Operations-Aggregate \$2,000,000
5. Personal & Advertising Injury \$1,000,000
6. Each Occurrence \$2,000,000
7. Fire Damage (any one fire) \$ 50,000
8. Medical Expense (any one person) \$ 5,000
9. Business Automobile Liability, including owned, hired and non-owned automobiles, for Bodily Injury and Property Damage with a combined single limit of \$1,000,000 per occurrence.
10. Excess Liability in Umbrella Form with a limit of \$3,000,000 each Occurrence, \$3,000,000 Aggregate.
11. Commercial Aviation Liability Insurance, including coverage for Bodily Injury and Property Damage, with a limit of \$10,000,000 combined single limit including passengers, \$1,000,000 each person.
12. [REDACTED] insurance shall be primary insurance with respect to the Work and insurance of Patrick Energy Services shall be in excess of [REDACTED] insurance and shall not contribute with it.



13. [REDACTED] insurance carrier will have an A. M. Best's Insurance Guide rating of A VIII or better.

### **[REDACTED]/Subcontractor Rates and Additional Charges for "Out-of-Scope" Work**

1. [REDACTED] will provide additional electronic copies of LIDAR (laser-scan) data or PLS-CADD models for \$25 per DVD plus the time required to compose the data at a rate of \$75/hour.
2. [REDACTED] will provide additional electronic copies of the "Happy Snap" imagery for \$25 per DVD plus the time required to compose the imagery to be stored to the DVD at a rate of \$75/hour.
3. [REDACTED] will provide additional electronic copies of the color geo-mosaic map imagery, continuous overlapping oblique right-of-way imagery, continuous overlapping oblique right-of-way imagery, and/or digital vertical and oblique video for \$25 per DVD plus the time required to compose the imagery to be stored to the DVD at a rate of \$75/hour.
4. [REDACTED] will provide additional hardcopy plots of ground obstacle verification sheets, plan/profile drawings, or planimetric drawings at a rate of \$45/drawing sheet.

Please call me at [REDACTED] or [REDACTED] with any questions or comments regarding this Proposal. Thank you for allowing us to offer this proposal.

Sincerely,

[REDACTED]

**Link, Nicholas**

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**From:** [REDACTED]  
**Sent:** Thursday, October 15, 2009 2:58 PM  
**To:** Link, Nicholas  
**Cc:** LaRiviere, Randy; Bromley, Pat; Frank Taylor  
**Subject:** RE: LiDAR Estimate Request.

**Categories:** Green Category

Nicholas,

Providing processed LiDAR data with Bare Earth classification for the below referenced project would be in the range of \$15,000 to \$18,000, and we could deliver final data within 30 days from LiDAR acquisition. Additionally, we will need as many as 8 ground control points – Patrick Engineering could collect these, or we could for an additional fee of \$2500.

If you would like a more detailed and final quote/proposal from us, please just let us know and we can provide that. Feel free to call or email if you have any questions or comments. Thanks again for contacting us on this, and we look forward to hearing from you.

Regards,

[REDACTED]

---

[REDACTED]

[REDACTED]

\*\*\*new address\*\*\*

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

---

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Thursday, October 08, 2009 3:15 PM  
**To:** [REDACTED]  
**Cc:** LaRiviere, Randy; Bromley, Pat  
**Subject:** Lidar Estimate Request.

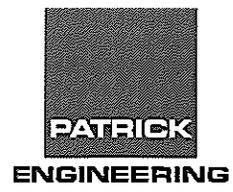
[REDACTED]

Patrick Energy Services is requesting an estimate to perform Lidar Survey for the approximately 14 mile route just north of Taylorville, Ill. We would like it to have elevation in foot increments (as we discussed on the phone). We would like a corridor width of 150 feet. I have attached a picture of our route which is the black line from the substation to our site. I also included a .kmz file per your request. We would like this estimate within 25% accuracy by Friday October 16<sup>th</sup>. If you have any questions or need more information please feel free to contact me.

Thank you,

**Nicholas Link**  
**Staff Civil Engineer**





# Appendix E

## Site Survey Estimates

## Link, Nicholas

---

**From:** [REDACTED]  
**Sent:** Friday, October 16, 2009 4:27 PM  
**To:** Link, Nicholas  
**Cc:** LaRiviere, Randy; Bromley, Pat; [REDACTED]  
**Subject:** RE: Ground Survey Request

**Categories:** Green Category

Nick,

I have a cost estimate. If you want a proposal, let me know, but I think this is for budgeting. Our estimated fee is on the order of \$99,000.00 +/- 25%.

To summarize, the scope is the following:

- Real-estate investigation
- Survey and determine property lines & owners
- New easement exhibits for the owners
- Verification of aerial obstacles.
- Staking activities for the right of way as well as two occasions of construction staking.
- Staking out 100 poles.

Some assumptions are:

- 14 miles of corridor
- 30 property owners / parcels
- 5 significant rights of way to determine
- 16 Land Sections to survey and solve.

Let me know if you need this as a formal document from PEI.

Sincerely,

**PATRICK**

[REDACTED]  
[REDACTED]

Patrick Engineering, Inc.  
4970 Varsity Drive  
Lisle, IL 60532  
(630) 795-7377 (office)  
(630) 817-0371 (mobile)

**From:** Link, Nicholas  
**Sent:** Friday, October 09, 2009 11:28 AM  
**To:** [REDACTED]



**Link, Nicholas**

---

**From:** [REDACTED]  
**Sent:** Thursday, October 15, 2009 2:19 PM  
**To:** Link, Nicholas  
**Subject:** Ground Survey Quote - 345 KV line  
**Categories:** Green Category

Nick:

Following is our quotation for the above referenced work:

Assumptions:

- 1) The line will be flown for topography and contours.
- 2) The number of easements for pricing purposes was based on 36. Included are courthouse research, corner tie-in, description, and plat of easement.
- 3) Staking for right-of-way and structures was figured. (one stake at centerline of structure)
- 4) A Route Survey Plat is included.

[REDACTED] proposes to furnish all labor, equipment, and supervision necessary to perform a ground survey on approximately fourteen miles of new 345kv transmission line North and West of Taylorville, IL.

The work shall include real estate investigation with any necessary property lines located; easement plat and description; and a route survey plat.

Overhead obstacles will be located with x, y & z coordinates.

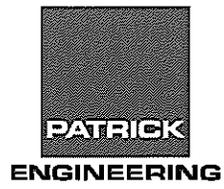
Centerline control, staking of the right-of-way and two occasions of construction staking are included.

Our lump sum price for the above, based on the assumptions made, is \$169,940.00.

If you have any questions, I'll be in the office in the morning after 9:00 A.M.

Sincerely,

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]



# Appendix F

## Geotechnical Services

**Link, Nicholas**

---

**From:** [REDACTED]  
**Sent:** Tuesday, October 20, 2009 6:58 AM  
**To:** [REDACTED]; Link, Nicholas  
**Subject:** RE: Geotech Services for Tenaska 345kV Line

**Categories:** Green Category

Nicholas,

I have estimated a cost of approximately \$100,000.00 for 100 test borings to a depth of 50 ft over the length of the 14 miles. This includes lab testing and geotechnical report based on the foundation type described below. This is based on the following assumptions as well:

- The client will have a surveyor mark the test boring locations in the field
- The client will arrange for right-of-entry onto private property
- No traffic control will be required.
- No rock coring will be required
- All test borings locations are accessible to an ATV mounted drill rig without any clearing or bulldozer work.

Hopefully this will help the planning. If you have any questions or would like a formal proposal for the scope of work, please let me know.

Thanks so much,

[REDACTED]  
[REDACTED] | [REDACTED] | [REDACTED] | [REDACTED]  
312-207-0000  
[REDACTED]  
[REDACTED]

PLEASE NOTE This message, including any attachments, may include privileged, confidential and/or inside information. Any distribution or use of this communication by anyone other than the intended recipient is strictly prohibited and may be unlawful. If you are not the intended recipient, please notify the sender by replying to this message and then delete it from your computer.

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**From:** [REDACTED]  
**Sent:** Friday, October 16, 2009 12:22 PM  
**To:** 'Link, Nicholas'  
**Cc:** Tom Struewing  
**Subject:** RE: Geotech Services for Tenaska 345kV Line

Thanks Nicholas

I will forward this info. on to [REDACTED] who will be the one to put together the overall costs, including the [REDACTED]

[REDACTED]  
[REDACTED]



## PROJECT DESCRIPTION and OBJECTIVES

The proposed project includes the construction of a 345 kV transmission line to extend from Taylorsville, Illinois to about Sicily, Illinois. We understand that the proposed transmission line will be supported by one-hundred (100) mono-pole type structures, which will extend approximately 120 to 140 feet in height.

The objectives of this geotechnical engineering investigation will be to assess the subsurface conditions at each of the proposed mono-pole locations along the alignment of the proposed transmission line and to provide recommendations to aid in the design and construction of the proposed transmission line.

## PROPOSED WORK PLAN

Per the Client's request, [REDACTED] will drill a total of one-hundred (100) soil borings, each to a depth of 50 feet; for a total of 5,000 lineal feet of drilling. We understand each of the proposed borings locations will be marked by a surveyor and will be referenced on a map or plan sheets; which will be provided to [REDACTED] prior to the start of our field activities. [REDACTED] will visit the project alignment prior to drilling to observe and note ground cover, existing structures, pavement, site access and topographic conditions. If site conditions require that borings be relocated from previous agreed-upon locations, the Client will be advised.

**[REDACTED] understands that access to the proposed boring locations and coordination with any property owners will be the responsibility of the Client. Additionally, the "clearing of utilities" within and outside of the public domain shall be the responsibility of the Client and coordinated with [REDACTED] prior to the start of any subsurface exploration.**

The typical drilling method will utilize hollow-stem augers to advance the borings to the required depths. Split-spoon samples and Standard Penetration Tests values (commonly referred to as the blow-count or N-value) will be obtained in advance of the augers at 2.5 foot intervals to a depth of 10 feet, and 5-foot intervals thereafter per ASTM Method D-1586.

Shelby tube samples may be obtained in cohesive soil strata-of-interest. Each boring will be monitored for the presence of groundwater during and immediately following the completion of the boring.

Upon completion of the borings, the boreholes will be backfilled with auger cuttings prior to demobilization for safety considerations. *It should be noted that it is standard practice in drilling test borings to backfill with the auger cuttings. However, sometimes the backfill will settle after the borings have been completed, requiring a return trip to backfill again. If this takes place, an additional fee will be charged for the return trip. As an alternative, for an additional fee, the holes can be backfilled with bentonite or grout to reduce the potential settlement.*

After the fieldwork is completed, we will return samples to ~~XXXX~~ soils laboratory to perform the appropriate laboratory testing. The laboratory testing may include unconfined compressive strengths, natural moisture contents, Atterberg Limits and grain size determinations and other tests as requested and applicable. All laboratory testing will be performed in accordance with applicable ASTM methods.

Based on the results of the fieldwork and laboratory testing, we will prepare a Geotechnical Engineering Report. The report will present all field, test boring logs and laboratory test data. The report will include recommendations for foundation design, as well as providing a discussion regarding any potential construction difficulties due to soil and groundwater conditions.

### **ESTIMATED PROJECT COST**

Based upon the information provided and as outlined in our attached work plan, along with our experience with similar projects, we estimate the project cost to be **\$59,650.00**. An itemized Cost Estimate is provided below. Work performed outside the Scope of Work discussed in this proposal will be performed at a unit rate basis for the actual work performed. Such work will be considered a change in scope. The *Client* will be provided with a budget for this work modification for approval and authorization prior to proceeding with the work.

#### **Itemized Cost Estimate**

1. Drilling Services	<b>\$42,000.00</b>
Includes mobilization of two (2) drill rigs and the completion of one-hundred (100) test borings totaling 5,000 lineal feet of drilling.	
2. Engineering and Laboratory Services	<b><u>\$17,650.00</u></b>
Includes engineering field services, laboratory soil analysis and preparation of the geotechnical investigation report.	
<b><i>Estimated Total Cost</i></b>	<b><i>\$59,650.00</i></b>

## SCOPE OF WORK LIMITATIONS

*In preparation of this proposal, we have assumed that the alignment is accessible to ATV-mounted drilling rigs. If "clearing" or "grading" of the alignment is required (i.e. trees, brush, crops etc...), an additional charge will be assessed. Additionally, supplemental costs will also be incurred if obstructions are encountered in the borings requiring additional offset borings to be performed, rock coring to be completed, or if the subsurface conditions require the use of wash rotary or other methods to help prevent soils from heaving up into the augers.*

If the borings reveal inconsistent and/or marginal soil conditions requiring additional borings, deeper borings, additional samples, or additional laboratory testing, the Client's Project Manager will be consulted immediately with regard to the possibility of modifying the proposed subsurface investigation program. Such a modification may be considered a change in scope of the Proposed Work Plan, thereby requiring a possible adjustment to the budget of this Geotechnical Engineering Investigation.

The subsurface investigation outlined in this proposal assumes that there are no hazardous materials in the soil or in the groundwater underlying the site. This investigation is not designed to detect or identify such materials. If it becomes apparent during the field investigation that hazardous materials are present, field operations will temporarily cease. The field investigation could be resumed only after the appropriate health and safety issues are addressed and the scope of our investigation modified to address this change in condition.

## WORK SCHEDULE

~~██████████~~ will initiate project activities upon receipt of the attached Proposal Acceptance Agreement, authorizing us to begin work. The field drilling work should take 12 to 15 days to complete, based on mobilizing two (2) drill rigs for completion of the field activities. We would expect to issue our engineering report within approximately 2 to 3 weeks of completing the fieldwork. However, verbal results can be provided shortly after the fieldwork is completed.

### **AUTHORIZATION TO PROCEED**

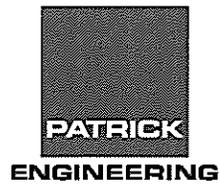
As our formal authorization to proceed, please complete and sign the Proposal Acceptance Agreement form included with this proposal, indicating proper billing instructions, and return an executed copy of this acceptance agreement for our files. Also, please note the Terms and Conditions included with this proposal, which is an integral part of this proposal. Alternatively, this work may be authorized by a written purchase order or a letter instructing us to proceed, which provides for the Terms and Conditions herein.



**ATTACHMENT A**

**Fee Schedule**

	<u>Unit</u>	<u>Unit Cost</u>
<b><u>PROFESSIONAL SERVICES</u></b>		
Principal Engineer, P.E.	Hour	\$170.00
Senior Project Engineer, P.E.	Hour	\$125.00
Project Engineer, P.E.	Hour	\$100.00
Senior Engineer/Geologist	Hour	\$85.00
Geotechnical Engineer/Geologist	Hour	\$75.00
Draftsperson/CAD Technician	Hour	\$68.00
Senior Engineering Technician	Hour	\$52.00
Word Processor	Hour	\$58.00
<b><u>LABORATORY TESTING</u></b>		
Water Contents (oven dried)	Each	\$4.85
Hand Penetrometer Test	Each	\$9.25
Atterberg Limits (LL & PL)	Each	\$62.00
Grain Size Distribution	Each	\$108.00
Sieve Analysis only	Each	\$51.00
Minus #200 Sieve only	Each	\$32.00
Hydrometer only	Each	\$59.00
Natural Density	Each	\$28.00
Organic Content	Each	\$31.00
pH Determination	Each	\$28.00
Extrude & Log Shelby Tube Samples	Each	\$25.00
Standard Proctor	Each	\$130.00
Modified Proctor	Each	\$150.00
CBR Test	Each / Point	\$140.00
Unconfined Compressive Strength	Each	\$52.00
Test for pH, organic matter, soluble salts	Each	\$103.00
Triaxial Tests (CU - 3 circles)	Each	\$900.00
Consolidation Test	Each	\$410.00
Permeability Test (Cohesive Soils)	Each	\$295.00
<b><u>DRILLING SERVICES</u></b>		
Mobilization of drill rig and crew (Local)	Lump Sum	\$450.00
*plus \$4.00 per mile over 50 miles from a Patriot office		
Minimum Charge for drill rig, crew and equipment	Lump Sum	\$1,000.00
Drilling with 3.25" and 4.25" hollow stem augers with standard splitspoon sample intervals		
Under 50 feet depth and under 50 blows per foot	Foot	\$9.50
50 to 75 feet depth and under 50 blows per foot	Foot	\$11.00
Over 75 feet depth or over 50 blows per foot	Foot	\$13.90
Additional splitspoon samples beyond standard intervals	Each	\$13.25
ATV Drilling, Add	Foot	\$1.45
Mud Drilling, Add	Foot	\$2.05
Drilling without splitspoons	Foot	\$8.30
Bulk Samples (50 lb. bag)	Each	\$57.00
Rock Coring.	Foot	\$31.00
Equipment, set-up for rock coring	Hole	\$89.00
Shelby Tube Samples (3 in. O.D.)	Each	\$46.50
Standby Time requested by Client or Hauling Water	Hour	\$155.00
Rental of Dozer (to assist drill rig under adverse site conditions)	Cost + 15%	
Asphalt or Concrete Plug of Drill Holes	Hole	\$26.00
Per Diem for Drill Crew per man	Per Day	\$105.00
Grouting Holes	Foot	\$7.75
Concrete Coring Through 6 to 8 inches of Floor Slab	Hole	\$242.00
Monitoring Well Installation	Foot	\$31.00
Monitoring Well Flush Manhole & Cover	Each	\$237.00
<b><u>GENERAL EXPENSES</u></b>		
Transportation by Company or Personal Car	Mile	\$0.59
Subcontractor Costs / Special Costs (i.e., film, FedEx, etc.)	Cost + 15%	
Additional Copies of Report (above 3 copies)*plus time	Page	\$0.42
Out-of-Town Living Expenses	Cost + 15%	



# Appendix G

## Material Supplier Estimates

Tenaska 345KV  
Transmission Line Project

Patrick Engineering  
Attn: Nicholas Link

QTY	UNIT	UNIT DESCRIPTION	DELIVERY	Unit Cost	Total
211,700	ft	1113-T2 ACSR Bluejay ( 10,745' reels)	7-9 weeks	\$6.96	\$1,473,432.00
70,700	ft	DNO-XXXX 24 Fiber OPGW	12-14 weeks	\$2.28	\$161,196.00
86	EA	115' Anchor Based Steel Structure Tangents Double Circuit ( weight 27,670 lbs)	20-22 weeks	\$39,007.00	\$3,354,602.00
14	EA	115' Anchor Based Steel Structure Dead End Double Circuit ( weight 79,439 lbs)	20-22 weeks	\$91,800.00	\$1,285,200.00
		<b>Structures</b>			
		<b>Insulators &amp; Hardware</b>			
258	EA	345 KV Polymer Suspension Insulators 30Kip (Tangents and Angles)	8-10 weeks	\$132.00	\$34,056.00
84	EA	345 KV Polymer Suspension Insulators 50Kip (Dead Ends)	8-10 weeks	\$185.00	\$15,540.00
42	EA	345 KV Polymer Jumper Line Post	8-10 weeks	\$522.00	\$21,924.00
258	EA	CFS Suspension Clamps for 1113-T2 ACSR with socket	6-8 weeks	\$87.00	\$22,446.00
168	EA	HES-XXX Compression Dead Ends for 1113-T2	6-8 weeks	\$210.00	\$35,280.00
84	EA	YPD-XX Yoke Plates for Dead End Assembly	8-10 weeks	\$135.00	\$11,340.00
42	EA	Hot Line Y- Ball Clevis for Jumper Post	8-10 weeks	\$29.00	\$1,218.00
86	EA	4301XXXX Fiberlign Suspension Assembly for OPGW Shield	6-8 weeks	\$57.00	\$4,902.00
28	EA	289XXXX Fiberlign Dead End Assembly for OPGW Shield	6-8 weeks	\$115.00	\$3,220.00
Advise	EA	5050XXXX OPGW Spiral Vibration Dampers	6-8 weeks	\$8.00	\$0.00
Advise	EA	1701-XXX 1113-T2 Stockbridge Type Dampers	6-8 weeks	\$55.00	\$0.00
		<b>Grounding</b>			
100	EA	3/4 x 10 Ground Rods Copper Clad with Clamps	2-4 weeks	\$20.00	\$2,000.00
1,000	Ft	#2 BCSD Ground Wire Stranded	2-4 weeks	\$1.00	\$1,000.00
100	EA	Connecting Hardware to Structures	4-6 weeks	\$17.00	\$1,700.00
		<b>Splicing</b>			
Advise	EA	1113-T2 ACSR Bluejay Splices	2-4 weeks	\$95.00	\$0.00
Advise	EA	OPGW Splice Kits	2-4 weeks	\$565.00	\$0.00
		<b>Total</b>	<b>Total</b>		<b>\$6,429,056.00</b>

**Link, Nicholas**

---

**From:** [REDACTED]  
**Sent:** Thursday, October 22, 2009 3:46 PM  
**To:** Link, Nicholas  
**Cc:** [REDACTED]  
**Subject:** Re: Tenaska 345kV steel pole estimate  
**Attachments:** ATT121537.jpg  
  
**Categories:** Green Category

Nicholas,

Structure weights and pricing are based on the following assumptions:

1. 345 kV double circuit single pole structures
2. Approximate height of 120-130'
3. Galvanized finish
4. Delivery mid-2010

345 kV Double Circuit Tangent Structure: 41,000 lbs. @ \$1.65/lb = \$67,650  
345 kV Double Circuit Deadend (0-30) Structure: 75,000 lbs. @ \$1.65/lb = \$123,750  
345 kV Double Circuit Deadend (30-60) Structure: 78,000 lbs. @ \$1.65/lb = \$128,700  
345 kV Double Circuit Deadend (60-90) Structure: 109,000 lbs. @ \$1.65/lb = \$179,850

86 tangents @ \$67,650 /ea = \$5,817,900  
14 deadends @ (see above) = \$1,732,500-\$2,517,900 (this is a range of all light angle deadends to all heavy angle deadends)  
Total = \$7,550,400-\$8,335,800

Also, please keep in mind these are strictly budgetary estimates based upon a fairly recent project, and the final cost will be dependent upon final load trees and other factors. In addition, the price per pound is also a budgetary estimate that can be higher or lower based upon the steel market at the time of RFQ and most importantly delivery of the structures. One potential way to minimize the cost of the deadend structures (especially with the foundation costs) would be to use a single deadend structure for each circuit. For instance, the bolt circle would be 108" for the 345 kV Double Circuit Deadend (60-90) Structure.

Let me know if you need anything else, and please keep [REDACTED] informed as/if this project comes to fruition. Thanks again.

[REDACTED]  
[REDACTED] go  
[REDACTED]  
[REDACTED]  
10716 [REDACTED] Way  
D. Wayne Hill 48820  
C. Hill (515) 202-8231  
C. Hill (515) 668-0138  
[REDACTED]  
[REDACTED]

**Link, Nicholas**

---

**From:** [REDACTED]  
**Sent:** Tuesday, October 27, 2009 10:31 AM  
**To:** Link, Nicholas  
**Cc:** [REDACTED]  
**Subject:** Tenaska Budgetary pricing

**Categories:** Green Category

Nick, based on the ground line moment you gave me of 1418 kip/ft I have estimated your 120 tangent will weight 10,375#. Current pricing per lb on this type of pole is approximately \$1.30 per lb. I estimate a price per structure of \$13,488. Pricing per lb for the large dead ends may be approximately 10 cents per lb cheaper. I hope this quick estimate is what you are looking for. Thanks

---

**Pole  
Calculator**

---

**Utility :** Patrick Engineering  
**Project :** Tenaska  
**Subject :** 120' Tangents

**File :** 7700  
**Date :** 10/27/2  
**Time :** 9:15:05  
**Eng. :** rms

---

Input  
Data:

<b>Structure Height Above Ground:</b>	<b>120</b>	ft
<b>Embedment Length:</b>	<b>0</b>	ft
<b>Groundline Moment:</b>	<b>1418</b>	ft-k

Estimated Output  
Data:

<b>Estimated Pole + Base Plate Weight:</b>	<b>10,375</b>	lbs
<b>Estimated Anchor Bolt Weight:</b>	<b>963</b>	lbs

<b>Shaft Thickness:</b>	<b>0.3125</b>	in
<b>Shaft Base Diameter:</b>	<b>32.82</b>	in
<b>Anchor Bolt Circle:</b>	<b>40.5</b>	in
<b># of Anchor Bolts:</b>	<b>8</b>	
<b>Shaft Deflection:</b>	<b>137</b>	in.
<b>Shaft Stress:</b>	<b>62.7</b>	ksi

Notes:

- 1 Galvanized
- 2 Climbing Not Included
- 3 Camber Not Included
- 4 Deflection Limit Not

**Accessories for AFL OPGW**

Ref: EE09-23657

Specification Number: DNO-5484

**Lead Time: 5 - 7 Weeks ARO**

<u>Quantity</u>	<u>Item Description</u>	<u>Part Number</u>	<u>Unit Price</u>
44	<b>Deadend</b> Used at the terminal structures and structures with line angle changes over 30 degrees. The part number and price shown are for a single deadend (tension) located on one side of the structure.	ODE12/62552G7	\$202.17
44	<b>10 inch Link Plate</b> For use with bolted deadend.	ODELP10	\$19.10
44	<b>Anchor Shackle</b>	ANSH30L	\$4.03
44	<b>Chain Link</b>	CL-4	\$6.03
51	<b>Suspension</b> For structures with line angle changes up to and including 30 degrees	SUME528/555	\$60.97
51	<b>Y-Clevis Eye 90 for Single Suspension</b>	YC90E-750-1750	\$14.11
95	<b>Bonding Wire Assembly</b> Used for grounding deadends and suspensions to towers. 60" long, Two 1/2" terminals with hardware included for one side. Other variations are available. Contact AFL for additional information.	BWAL50/50H-60	\$21.18
107	<b>Vibration Damper</b>	OVD461/570	\$22.68
95	<b>1 Bolt Ground Clamp</b> Customer to specify diameter of grounding tap diameter ("YYY") in decimal inches.	OBCF2YYYI	\$14.51
50	<b>Down Lead Clamp</b> Part number shown assumes the use of same size cable in both grooves. Different cable diameters can be used and will require a different part number.	FDOA-B5B5	\$23.56
50	<b>Down Lead Clamp with Banding Adapter</b> Part number shown assumes the use of same size cable in both grooves. Different cable diameters can be used and will require a different part number.	FDOA-B5B5A	\$23.54
50	<b>Down Lead Clamp with Lattice Web Adapter</b> (for web thicknesses up to 0.75") Part number shown assumes the use of same size cable in both grooves. Different cable diameters can be used and will require a different part number.	FDOA-B5B5B	\$23.54
50	<b>Down Lead Clamp with Lattice Web Adapter</b> (for web thicknesses between 0.75" and 1.25") Part number shown assumes the use of same size cable in both grooves. Different cable diameters can be used and will require a different part number.	FDOA-B5B5C	\$27.71
50	<b>Down Lead Clamp with Lag Bolt</b> Part number shown assumes the use of same size cable in both grooves. Different cable diameters can be used and will require a different part number.	FDOA-B5B5D	\$18.22
18	<b>Splice Protector Sleeve - 60 mm length</b> Supplied in packages of ten (10).	SPS60	\$11.80
6	<b>Splice Enclosure</b> includes trays for up to 72 fibers	SB01-72	\$565.46
10	<b>Connector Kit for OPT-GW Cable</b> Dielectric cable connector kits, if required in addition to OPT-GW connectors, to be ordered separately.	OCK12/62552	\$47.93

<u>Quantity</u>	<u>Item Description</u>	<u>Part Number</u>	<u>Unit Price</u>
2	<b>Connector Kit for Loose Tube Cable</b> Specify diameter of loose tube cable ("XXX") in decimal inches, center strength member diameter ("YYY") in decimal inches.	LCKXXXYYY	\$52.27
6	<b>Coil Bracket for SBO1 and Opti-Guard</b> OPT-GW and ADSS Storage bracket	CB-44	\$189.00
6	<b>Comealong</b> Comealongs are not intended for use as deadends and are not recommended to hold conductors at sag and tension limits for longer than 6 hours. Maximum tension limit is 50% of the rated breaking strength of the OPT-GW to 5,000 pounds, whichever is smaller.	OCA550/559	\$391.04

Quantities are based on the following assumptions:

Total Quantity (feet)	70,700
Average Ruling Span (feet)	1,000
Average Reel Length (feet)	15,000
Average Tower Height (feet)	75

# QUOTATION

REFERENCE: EE09-23657.0

WE ARE PLEASED TO SUBMIT THE FOLLOWING QUOTATION AT TODAY'S PRICES BASED ON THE QUANTITIES INDICATED BEING RELEASED FOR MANUFACTURE AND SHIPMENT AT ONE TIME, SUBJECT TO PARAGRAPH 1 OF THE TERMS AND CONDITIONS. FOR A COPY OF OF THESE TERMS AND CONDITIONS, PLEASE VISIT OUR WEBSITE AT [REDACTED]

**PAYMENT TERMS:** UNLESS OTHERWISE NOTED NET CASH 30 DAYS FROM DATE OF INVOICE, SUBJECT TO THE APPROVAL OF AFL'S TREASURER.

[REDACTED]	FOB	FOB Plant, PPD and ADD
	SHIPMENT	See Below
	ESTIMATE	
	PACKING	

Line Number	Product Identification	Quantity	Unit Price (US Dollars)	Extended Price
01	Item: DNO-5484	21,550 meters	6.234/m	134,340.34
	AC-12/62/552 OPT-GW Cable with 24 Single-mode fibers	70,701 feet	1.900/ft	
	Wood reels with flex-wrap			
	Lead Time: 8-10 weeks ARO			
	Max length on wood reels: 6560 meters			
	Max length on non-returnable steel reels: 7000 meters		1,250 /reel	
<b>TOTAL</b>				<b>134,340.34</b>

## PLEASE NOTE THE FOLLOWING:

Unless otherwise noted , the billable tolerance for OPT-GW items is -0%, +2%.

Ordered lengths should include a distribution of lengths. All reels cannot be ordered at the maximum nor all at the same length. A typical length distribution would be:

- 6000m – 7000m ~ 15%
- 4500m – 6000m ~ 55%
- 2500m – 4500m ~ 25%
- <2500m ~ 5%

Lead times quoted are estimates only, and are based on receipt of a valid purchase order and drum lengths. Actual lead time may vary due to availability of raw materials or plant loading at time of order receipt.

For OPT-GW items, orders with shipping lengths less than 1 km are subject to an additional cutting charge of \$200 per cut.

For [REDACTED] Loose Tube and OPT-GW items, prices shown are for the quantities quoted. Minimum order is 1km for manufactured items and 300 meters for inventory items.

[REDACTED] recommends purchasing steel reels for long-term storage. Please refer to [REDACTED]'s Reel Handling document available at [REDACTED] for additional handling and storage details.

# QUOTATION

REFERENCE: EE09-23657.0

WE ARE PLEASED TO SUBMIT THE FOLLOWING QUOTATION AT TODAY'S PRICES BASED ON THE QUANTITIES INDICATED BEING RELEASED FOR MANUFACTURE AND SHIPMENT AT ONE TIME. SUBJECT TO PARAGRAPH 1 OF THE TERMS AND CONDITIONS FOR A COPY OF THESE TERMS AND CONDITIONS, PLEASE VISIT OUR WEBSITE AT [REDACTED] FOR A COPY.

PAYMENT TERMS: **UNLESS OTHERWISE NOTED** NET CASH 30 DAYS FROM DATE OF INVOICE, SUBJECT TO THE APPROVAL OF AFL'S TREASURER.

[REDACTED]	FOB	FOB Plant, PPD and ADD
	SHIPMENT	See Below
	ESTIMATE	
	PACKING	

Line Number	Product Identification	Quantity	Unit Price (US Dollars)	Extended Price
-------------	------------------------	----------	-------------------------	----------------

NOTE. THIS QUOTATION IS NEITHER A CONTRACT NOR AN OFFER. ALL ORDERS ARE SUBJECT TO ACCEPTANCE BY [REDACTED] AT ITS PRINCIPAL OFFICE IN SPARTANBURG, SOUTH CAROLINA. ORDERS RESULTING FROM THIS QUOTATION WHICH ARE ACCEPTED WILL BE SUBJECT TO THE TERMS AND CONDITIONS OF THIS QUOTATION.

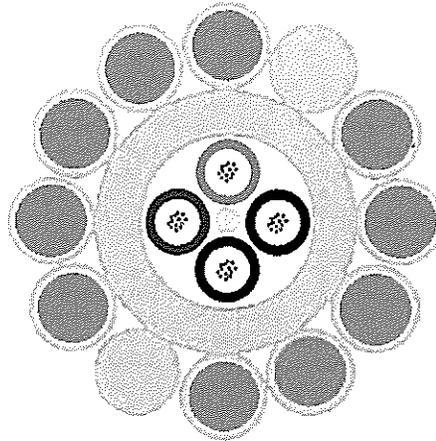
DATE  
16-Oct-09

QUOTATION VALID THROUGH  
18-Nov-09

[REDACTED]  
BY [REDACTED]  
[REDACTED]

# Specification DNO-5484

## AlumaCore Optical Ground Wire



### AC-12/62/552

Component Details						
	Component	#	OD		Area	
<b>CENTER</b>	Aluminum Pipe	1	8.42 mm	0.3315 in	33.62 mm <sup>2</sup>	0.0521 in <sup>2</sup>
<b>LAYER 1 - LEFT HAND LAY</b>						
	Aluminum Clad Steel (20.3% IACS)	10	2.80 mm	0.1102 in	61.58 mm <sup>2</sup>	0.0954 in <sup>2</sup>
	Aluminum Alloy 6201	2	2.80 mm	0.1102 in	12.32 mm <sup>2</sup>	0.0191 in <sup>2</sup>

Standards	
<b>Designed and Manufactured in accordance with the following:</b>	
Cable	<i>IEEE 1138, IEC 60794-4</i>
Fiber	<i>IEC 60793, ITU-T G.65x Series</i>
Color Code	<i>ANSI/EIA 359-A, 598-A, IEC 60304</i>
Aluminum Pipes	<i>ASTM B483</i>
Aluminum Alloy Wires	<i>ASTM B398, IEC 60104</i>
Aluminum Clad Steel Wires	<i>ASTM B415</i>

# Specification DNO-5484

Mechanical / Electrical Details		
Calculated Breaking Load	8,440 kg	18,606 lbs
Maximum Cable Design Tension	6,372 kg	14,049 lbs
Approximate Cable Diameter	14.02 mm	0.552 in
Total Cross-Sectional Area	107.51 mm <sup>2</sup>	0.1666 in <sup>2</sup>
Approximate Cable Weight	553 kg/km	1,962 lbs/mile
Modulus of Elasticity	11,893 kg/mm <sup>2</sup>	16,915 kpsi
Coefficient of Linear Expansion	1.51E-05 1/°C	8.39E-06 1/°F
Sag10™ Chart Number	1-1166	1-1166
Calculated DC Resistance (20°C)	0.4516 Ohms/km	0.7268 Ohms/mile
Short Circuit Rating	87 (kA) <sup>2</sup> -sec	87 (kA) <sup>2</sup> -sec
Short Circuit Ambient Temperature	40 °C	104 °F
Short Circuit Duration 1 sec	9.3 kA	9.3 kA
Short Circuit Max Cable Temperature	210 °C	410 °F

## Optical Details

### Attenuation Characteristics for Single-mode Fiber

Max Individual

0.40 dB/km 1310 nm  
0.30 dB/km 1550 nm

24 Fiber Loose Tube Design (4 - 6 fiber units)			Fiber Count
Unit	Fiber Type		
Blue	Single-mode		6
Orange	Single-mode		6
Green	Single-mode		6
Brown	Single-mode		6
<b>Total Fiber Count</b>			<b>24</b>

### Standard Fiber Color Code

Fiber	1	2	3	4	5	6	7	8	9	10	11	12
Color	Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Rose	Aqua

Designs with more than 12 fibers per tube will use the standard color code and binders for identification of the fibers.

### Installation and Handling Recommendations

Installation and cable preparation procedures are outlined in the [redacted] documents listed below. Contact [redacted] to request copies.

*Recommended Installation Procedures for Composite Optical Ground Wire*

*Installation Instructions for Installing Optical Ground Wire in an [redacted] Splice Enclosure*

*Fiber Optic Cable Receiving, Handling and Storage. Document ACS-WI-809*

# Specification DNO-5484

Quick Reference Installation Notes		
Approximate Cable Diameter	14.02 mm	0.552 in
Maximum Stringing Tension (at tensioner)*	1,688 kg	3,721 lbs
Minimum Bull Wheel Diameter	99 cm	39 in
Stringing Sheave Diameter**	56 cm	22 in
Minimum Bending Radius		
Cable		
Static (No load)	21 cm	9 in
Dynamic (under tension)	28 cm	11 in
Fiber		
Static (No load)	3.8 cm	1.5 in
Buffer Tube		
Static (No load)	8.0 cm	3.0 in
<p>* - The stringing tension is always measured at the tensioner side. In general the maximum stringing tension should be approximately half of the maximum sagging tension and should never exceed 20% RBS of the OPT-GW.</p> <p>** - The value indicated is for the first and last structures of the pull and is based on 40 times the diameter of the OPT-GW. Smaller diameters can be used at tangent structures. Reference [REDACTED] installation instructions for more details.</p> <p>Reference [REDACTED] "Recommended Installation Procedures for Composite Optical Ground Wire" for detailed installation instructions.</p>		

Shipping Reels												
Reel Type	FL	TR	DR	OW	Tare	FL	TR	DR	OW	Tare	Capacity	
			(cm)		(kgs)		(in)			(lbs)	(meters)	(feet)
Wood	147	81	71	97	200	58	32	28	38	441	4,460	14,630
Wood	168	91	91	107	260	66	36	36	42	573	6,000	19,680
Wood	183	91	91	107	300	72	36	36	42	662	6,560	21,520
Wood	213	86	89	104	385	84	34	35	41	849	6,560	21,520
Steel	152	81	81	97	345	60	32	32	38	761	4,420	14,500
Steel	183	91	102	107	540	72	36	40	42	1,191	7,000	22,960
Steel	213	114	107	130	773	84	45	42	51	1,704	7,000	22,960
<p>FL - Flange Diameter; TR - Inside Traverse Width; DR - Drum Diameter; OW - Outside Overall Width Arbor Hole Diameter: Wood: 3-1/4in (7.9cm) Steel: 3in (7.6cm)</p> <p>Maximum lengths shown are the longest lengths that [REDACTED] offers. Longer lengths may be possible. Ordered lengths should include a distribution of lengths, i.e., all reels cannot be ordered at the maximum. A typical reel length distribution is as follows: 6000m – 7000m ~ 15% of reels 4500m – 6000m ~ 55% of reels 2500m – 4500m ~ 25% of reels &lt;2500m ~ 5% of reels</p> <p>Wood reels with flex-wrap covering are standard. Non-returnable steel reels and/or wood lagging are available upon request. Additional reel sizes may be available upon request. Steel reels are recommended for long term storage. Reference [REDACTED] "Fiber Optic Cable Receiving, Handling and Storage" document for additional information.</p>												

## Specification DNO-5484

Electrical Characteristics					
Composite DC Resistance		[20°C]	0.4516 Ohms/km	0.7268 Ohms/mile	
Geometric Mean Radius			0.55 cm	0.0179 feet	
Inductive Reactance		[60 Hz frequency]	0.3033 Ohms/km	0.4881 Ohms/mile	
[one foot (0.3048 meter) spacing]					
		[50 Hz frequency]	0.2527 Ohms/km	0.4067 Ohms/mile	
Capacitive Reactance		[60 Hz frequency]	0.1801 MOhms·km	0.1119 MOhms·mile	
[one foot (0.3048 meter) spacing]					
		[50 Hz frequency]	0.2161 MOhms·km	0.1343 MOhms·mile	
Composite Coefficient of Thermal Resistance			0.00366 (1/°C)		
Temperature		DC Resistance		AC Resistance	
(°C)	(°F)	(Ohms/km)	(Ohms/mile)	(Ohms/km)	(Ohms/mile)
20	68	0.4516	0.7268	0.4606	0.7413
25	77	0.4599	0.7401	0.4691	0.7549
30	86	0.4681	0.7534	0.4775	0.7684
35	95	0.4764	0.7666	0.4859	0.7820
40	104	0.4846	0.7799	0.4943	0.7955
45	113	0.4929	0.7932	0.5027	0.8091
50	122	0.5011	0.8065	0.5112	0.8226
55	131	0.5094	0.8198	0.5196	0.8362
60	140	0.5177	0.8331	0.5280	0.8497
65	149	0.5259	0.8464	0.5364	0.8633
70	158	0.5342	0.8597	0.5449	0.8769
75	167	0.5424	0.8730	0.5533	0.8904
80	176	0.5507	0.8862	0.5617	0.9040
85	185	0.5589	0.8995	0.5701	0.9175
90	194	0.5672	0.9128	0.5785	0.9311
95	203	0.5755	0.9261	0.5870	0.9446
100	212	0.5837	0.9394	0.5954	0.9582
105	221	0.5920	0.9527	0.6038	0.9717
110	230	0.6002	0.9660	0.6122	0.9853
115	239	0.6085	0.9793	0.6207	0.9989
120	248	0.6167	0.9926	0.6291	1.0124
125	257	0.6250	1.0058	0.6375	1.0260
130	266	0.6333	1.0191	0.6459	1.0395
135	275	0.6415	1.0324	0.6543	1.0531
140	284	0.6498	1.0457	0.6628	1.0666
145	293	0.6580	1.0590	0.6712	1.0802
150	302	0.6663	1.0723	0.6796	1.0937

# Specification DNO-5484

## PLS-CADD Inputs

Use simplified elastic cable model (no creep, no coefficient)

Name: \_\_\_\_\_

Description: **OPGW DNO-5484 AC-12/62/552**

Cross section area (in<sup>2</sup>): 0.1666    Unit weight (lbs/ft): 0.372

Outside diameter (in): 0.552    Ultimate tension (lbs): 18,606    Number of independent wires: 1

Temperature at which strand data below obtained (deg F): 70    (above should be 1 unless cables are separated by spacers)

Outer Strands					Core Strands (if different from outer strands)						
Final Modulus of elasticity (psi/100)	<u>22000</u>				Final Modulus of elasticity (psi/100)	<u>160000</u>					
Thermal expansion coeff. (/100 deg)	<u>0.001280</u>				Thermal expansion coeff. (/100 deg)	<u>0.000640</u>					
Polynomial coefficients (all strains in %)					Polynomial coefficients (all strains in %)						
	A0	A1	A2	A3	A4		A0	A1	A2	A3	A4
Stress-strain	<u>-77.1</u>	<u>27658.7</u>	<u>-30993.3</u>	<u>-36131</u>	<u>64018</u>	Stress-strain	<u>614.5</u>	<u>141862.3</u>	<u>91338.6</u>	<u>-298530</u>	<u>200314</u>
Creep	<u>-77.1</u>	<u>27658.7</u>	<u>-30993.3</u>	<u>-36131</u>	<u>64018</u>	Creep	<u>3378</u>	<u>93505.4</u>	<u>256968.4</u>	<u>-488551</u>	<u>262053</u>

**Thermal Rating Properties**

Resistance at two different temperatures	Emissivity coefficient	<u>0.5</u>
Resistance (Ohm/mile) <u>0.7401</u> at (deg F) <u>77</u>	Solar absorption coefficient	<u>0.5</u>
Resistance (Ohm/mile) <u>0.8730</u> at (deg F) <u>167</u>	* Outer strands heat capacity (Watt-s/ft-deg F)	<u>          </u>
	* Core heat capacity (Watt-s/ft-deg F)	<u>          </u>

Generate Coefficients from points on stress-strain OK    Cancel

\* These two fields do not need to be entered for OPGW - intentionally left blank.

C.

Date Oct 19, 2009	Page 1
Order Number QT009315	
Quote Valid To 11/18/2009	

Quotation

Chicago, IL  
USA

NAME

DELIVERY DATE 8-10 Weeks ARO

Reference  
Quote #kw1012

Delivery Terms  
Delivered

Payment Terms  
NET 30 DAYS

Qty. Ord.	Item Number	Description	Unit Price	UOM	Extended Price
45	KL345HB7S776D	345 kV Sil Rub Trans Susp Ball/Socket Section Length 111.5" Leakage Distance 332.7"	308.00	ea	13,860.00

**NOTATIONS:**

Drawing included

K-LINE INSULATORS LIMITED

Per: \_\_\_\_\_

Subtotal	13,860.00
Total sales tax	0.00
<b>Total order</b>	<b>13,860.00</b>
	USD \$



# Appendix H

## Construction Estimates

October 16, 2009

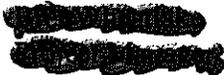
Nicholas Link  
Patrick Energy Services

Re: Labor Estimate for Tenaska 345kV Line

		QTY	Unit Price	Total
Foundations				
6' x 20'	Tangent	92	\$ 13,000	\$1,196,000
8' x 45'	Deadend	8	\$ 60,000	\$ 480,000
Pole Hauling	(Assuming one staging area)			
	Structures	100	\$ 6,900	\$ 690,000
Pole Framing				
	Structures	100	\$ 4,875	\$ 487,500
Pole Setting	(Assuming an average of 130' structures)			
	Structures	100	\$ 40,000	\$4,000,000
Wire Install				
14 Miles	Bluebird	14	\$ 190,000	\$2,660,000
14 Miles	Static	14	\$ 20,000	\$ 280,000
Deadend		42	\$ 18,800	\$ 789,600
			Total	\$10,583,100

If you have any questions please feel free to contact me.

Thank you,



## Link, Nicholas

---

**From:** [REDACTED]  
**Sent:** Friday, October 23, 2009 2:31 PM  
**To:** Link, Nicholas  
**Subject:** RE: Tenaska Construction Estimate  
**Attachments:** image001.jpg

**Categories:** Green Category

Nicholas

I forgot to send you the information. The pricing is for \$825,000.00 per mile. This does not include any rock excavation or wet land construction or crossings.

---

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Friday, October 23, 2009 1:53 PM  
**To:** [REDACTED]  
**Subject:** RE: Tenaska Construction Estimate

I didn't receive an attachment on this email. Did you intend to attach one?

Nicholas

**From:** [REDACTED]  
**Sent:** Thursday, October 22, 2009 12:47 PM  
**To:** Link, Nicholas  
**Subject:** RE: Tenaska Construction Estimate

Nicholas

Sorry, I thought I had already sent this to you. I'll be back in the office later and will forward it to you.

---

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Thursday, October 22, 2009 10:31 AM  
**To:** [REDACTED]  
**Cc:** [REDACTED]  
**Subject:** Tenaska Construction Estimate

I'm pulling some documents together and was curious if you guys needed anything to complete the Tenaska estimate. When I should expect to see the estimate?  
Thanks,

Nicholas Link

Staff Civil Engineer

**PATRICK**  
**ENERGY SERVICES**

39500 Orchard Hill Place  
Suite 200

Novi, MI 48375

Direct: (248) 319-0743

Main: (248) 319-0700

Fax: (248) 319-0701

[nlink@patrickesi.com](mailto:nlink@patrickesi.com)

**From:** Link, Nicholas

**Sent:** Thursday, October 15, 2009 9:46 AM

**To:** 'Shannon'; [REDACTED]

**Cc:** LaRiviere, Randy; Bromley, Pat

**Subject:** RE: Construction Estimate



The conductor will be a single T2-BLUEJAY per phase. For the shield wire we are using a 24 Fiber OPGW (0.5535 in Dia, 0.3971 lbs/ft).

Nicholas

**From:** [REDACTED]

**Sent:** Wednesday, October 14, 2009 4:47 PM

**To:** Link, Nicholas; Hicks, Ted

**Cc:** LaRiviere, Randy; Bromley, Pat

**Subject:** RE: Construction Estimate

Nicolas

Is this single conductor or bundle?

Thanks

[REDACTED]

---

**From:** Link, Nicholas [<mailto:nlink@patrickesi.com>]

**Sent:** Monday, October 12, 2009 11:15 AM

**To:** [REDACTED]

**Cc:** LaRiviere, Randy; Bromley, Pat

**Subject:** Construction Estimate

[REDACTED]

Patrick Energy Services is requesting an estimate to perform construction services for a 345kV line approximately 14 miles in length. The line is located just north of Taylorville, Ill. Services would include constructing foundations, erecting and assembling poles, and installing cables and hardware. There will be approximately 100 monopole structures with heights ranging from 110 to 140. I have attached a picture of our route which is the black line from the substation to our site. We would like this estimate within 25% accuracy by Friday October 16th . If you have any questions or need more information please feel free to contact me.

**CONSTRUCTION ESTIMATE**

**To: Patrick Engineering**  
Attn: Nicholas Link

**October 16<sup>th</sup>, 2009**

**Project: Tenaska 345kV Line**  
**Labor Only Prices**

As requested for budgetary purposes of +/- 25% on 14 miles of 345kV line that includes:

1. Installation of 100 foundations 6' diameter 20' depth to include labor and concrete. \$16,000/each  
\*Does not include procurement of any rebar or anchor bolt cage, more information required.
  
2. Installation of 100 steel poles varying in heights from 110' to 150' \$9,100/each  
\*Includes moving to pole location, framing and erecting on foundation.
  
3. Installation of single T2-Blue Jay per phase and 24 Fiber OPGW. \$89,000/mile
  
4. Installation of Ground rods. Average 8 rods per structure. \$46,480/total

**Project Total \$3,802,480.00**

If we can be of any more assistance or service please do not hesitate to contact us.

Thank you,

[Redacted signature block]

## Link, Nicholas

---

**From:** [REDACTED]  
**Sent:** Wednesday, October 28, 2009 10:11 AM  
**To:** Link, Nicholas  
**Cc:** Kelley, David  
**Subject:** RE: Tenaska 345kV line brush clearing

**Categories:** Green Category

Nicholas,

Our proposed budget for this project is \$315,000.00. This amount includes clearing, grubbing, pull stumps, root rake disturbed areas, haul away all wood debris. We have developed this number based upon the following:

1. As measured off Google Earth, the entire site route measured 12.60 miles.
2. As measured off Google Earth the sum of the individual pieces that required clearing equals 2.20 miles.
3. No restoration included.
4. No soil erosion devices included.

Thank you.

[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]  
[REDACTED]

## Link, Nicholas

---

**From:** [REDACTED]  
**Sent:** Tuesday, October 27, 2009 10:11 AM  
**To:** Link, Nicholas  
**Subject:** RE: Tenaska 345kV line  
**Attachments:** image001.jpg

**Categories:** Green Category

Nick,

It could run anywhere between \$4000 to \$8000 per acre (43560 sq ft) depending on what will be done with the wood, stumps, and debris. And is it Union or Non Union.

[REDACTED]

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Tuesday, October 27, 2009 9:01 AM  
**To:** [REDACTED]  
**Subject:** RE: Tenaska 345kV line

[REDACTED]

I really can't wait till the end of the week. I only need a budgetary number but I'm out of my comfort zone when it comes to clearing activities. Do you have a ballpark for per square foot of clearing trees and shrubs that I can apply on my own?

**From:** [REDACTED]  
**Sent:** Tuesday, October 27, 2009 8:49 AM  
**To:** Link, Nicholas  
**Subject:** RE: Tenaska 345kV line

Nick,

I have been working on some other bids this week. I will try to have a estimate for by the end of the week.

[REDACTED]

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Tuesday, October 27, 2009 8:47 AM  
**To:** [REDACTED]  
**Subject:** RE: Tenaska 345kV line

[REDACTED]

I was curious what is the status of this?  
Thanks

**Nicholas Link**  
**Staff Civil Engineer**  
**PATRICK**  
**ENERGY SERVICES**  
39500 Orchard Hill Place  
Suite 200  
Novi, MI 48375  
Direct: (248) 319-0743  
Main: (248) 319-0700

**Fax: (248) 319-0701**  
**nlink@patrickesi.com**

**From:** Link, Nicholas  
**Sent:** Friday, October 23, 2009 9:45 AM  
**To:** [REDACTED]  
**Subject:** RE: Tenaska 345kV line

[REDACTED]

I attached some close ups of the areas. Wooded area near E1800 North Rd and N800 East Rd. Wooded areas 2 & 3 are the river crossings. We need about 75 feet on each side of the black line. I have also attached the Google earth route file (.kmz) If you open that inside of Google earth it will let you zoom in and out along the route as needed. I hope this helps.

**Nicholas Link**  
**Staff Civil Engineer**  
***PATRICK***  
**ENERGY SERVICES**  
**39500 Orchard Hill Place**  
**Suite 200**  
**Novi, MI 48375**  
**Direct: (248) 319-0743**  
**Main: (248) 319-0700**  
**Fax: (248) 319-0701**  
**nlink@patrickesi.com**

**From:** [REDACTED]  
**Sent:** Friday, October 23, 2009 9:33 AM  
**To:** Link, Nicholas  
**Subject:** RE: Tenaska 345kV line

Nick,  
There is not enough detail on this map to give an estimate.

[REDACTED]

**From:** Link, Nicholas [mailto:nlink@patrickesi.com]  
**Sent:** Friday, October 23, 2009 9:09 AM  
**To:** [REDACTED]  
**Subject:** Tenaska 345kV line

[REDACTED]

Here is the aerial picture I spoke of. The site is just north of Taylorville, IL. We would like a estimate +/- 25% for budgetary purposes. Like I mentioned on the phone once Tenaska decides to go forward with the project we will send out formal requests for proposals. If you need any additional information let me know.

Thanks

**Nicholas Link**  
**Staff Civil Engineer**



# Appendix J

## EPC Project Management

## PRELIMINARY CONSTRUCTION SCHEDULE TENASKA 345kV TRANSMISSION LINE STUDY

ID	Task Name	Duration	Start	Finish	2nd Half		1st Half		2nd Half		1st Half		2nd Half	
					Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
1	<b>Engineering</b>	0 days	Mon 12/7/09	Mon 12/7/09										
2	Route Verification	65 days?	Mon 12/7/09	Fri 3/5/10										
3	Survey Coordination	10 days?	Mon 1/11/10	Fri 1/22/10										
4														
5	Aerial Survey	50 days?	Mon 1/25/10	Fri 4/2/10										
6	Site Survey	199 days?	Mon 1/25/10	Fri 2/11/11										
7														
8	Structures 50% Design	45 days?	Mon 12/21/09	Fri 2/19/10										
9	Foundation 50% Design	55 days?	Mon 1/18/10	Fri 4/2/10										
10	PLS-CADD Model 50% Design	45 days?	Mon 4/5/10	Fri 6/4/10										
11	50% Client Review	10 days?	Mon 6/7/10	Fri 6/18/10										
12	Structures 100% Design	35 days?	Mon 6/21/10	Fri 8/6/10										
13	Foundation 100% Design	45 days?	Mon 7/12/10	Fri 9/10/10										
14	PLS-CADD Model 100% Design	45 days?	Mon 9/13/10	Fri 11/12/10										
15	Construction Coordination	40 days?	Mon 11/1/10	Fri 12/24/10										
16														
17	Material Ordered	140 days?	Mon 6/14/10	Fri 12/24/10										
18														
19	<b>Owners Acquisition of Right of Way</b>	0 days	Mon 12/27/10	Mon 12/27/10										
20	<b>Construction</b>	0 days	Mon 12/27/10	Mon 12/27/10										
21	Unloading and storage of materials	20 days?	Mon 12/27/10	Fri 1/21/11										
22	Constructing foundations	45 days?	Mon 1/10/11	Fri 3/11/11										
23	Framing poles	45 days?	Mon 3/14/11	Fri 5/13/11										
24	Setting poles	90 days?	Mon 5/16/11	Fri 9/16/11										
25	Pull/string conductor	45 days?	Mon 9/19/11	Fri 11/18/11										
26	Restoration of area	30 days?	Mon 11/21/11	Fri 12/30/11										

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