COMMONWEALTH OF KENTUCKY
BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF	)	
NEW CINGULAR WIRELESS PCS, LLC	)	
FOR ISSUANCE OF A CERTIFICATE OF PUBLIC	)	CASE NO.: 2013-00300
CONVENIENCE AND NECESSITY TO CONSTRUCT	)	
A WIRELESS COMMUNICATIONS FACILITY	)	
IN THE COMMONWEALTH OF KENTUCKY	)	
IN THE COUNTY OF HARLAN	)	

SITE NAME: EVARTS

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APPLICATION FOR
CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY
FOR CONSTRUCTION OF A WIRELESS COMMUNICATIONS FACILITY

New Cingular Wireless PCS, LLC, a Delaware limited liability company, d/b/a AT&T Mobility ("Applicant"), by counsel, pursuant to (i) KRS §§ 278.020, 278.040, 278.650, 278.665, and other statutory authority, and the rules and regulations applicable thereto, and (ii) the Telecommunications Act of 1996, respectfully submits this Application requesting issuance of a Certificate of Public Convenience and Necessity ("CPCN") from the Kentucky Public Service Commission ("PSC") to construct, maintain, and operate a Wireless Communications Facility ("WCF") to serve the customers of the Applicant with wireless communications services.

In support of this Application, Applicant respectfully provides and states the following information:

1. The complete name and address of the Applicant: New Cingular Wireless PCS, LLC, a Delaware limited liability company, d/b/a AT&T Mobility, having a local address of 601

West Chestnut Street, Louisville, Kentucky 40203.

2. Applicant proposes construction of an antenna tower for communications services, which is to be located in an area outside the jurisdiction of a planning commission, and Applicant submits this application to the PSC for a certificate of public convenience and necessity pursuant to KRS §§ 278.020(1), 278.040, 278.650, 278.665, and other statutory authority.

3. The Certificate of Authority filed with the Kentucky Secretary of State for the Applicant entity was attached to a prior application and is part of the case record for PSC case number 2011-00473 and is hereby incorporated by reference.

4. The Applicant operates on frequencies licensed by the Federal Communications Commission ("FCC") pursuant to applicable FCC requirements. A copy of the Applicant's FCC license to provide wireless services is attached to this Application or described as part of **Exhibit A**, and the facility will be constructed and operated in accordance with applicable FCC regulations.

5. The public convenience and necessity require the construction of the proposed WCF. The construction of the WCF will bring or improve the Applicant's services to an area currently not served or not adequately served by the Applicant by increasing coverage or capacity and thereby enhancing the public's access to innovative and competitive wireless communications services. The WCF will provide a necessary link in the Applicant's communications network that is designed to meet the increasing demands for wireless services in Kentucky's wireless communications service area. The WCF is an integral link in the Applicant's network design that must be in place to provide adequate coverage to the

service area.

6. To address the above-described service needs, Applicant proposes to construct a WCF at 9811 KY Highway 38, Evarts, KY 40828 (36°51'58.04" North latitude, 83°11'14.76" West longitude), on a parcel of land located entirely within the county referenced in the caption of this application. The property on which the WCF will be located is owned by Terry Wayne Williams pursuant to a Deed recorded at Deed Book 410, Page 272 in the office of the Harlan County Clerk. The proposed WCF will consist of a 185-foot tall tower, with an approximately 4-foot tall lightning arrestor attached at the top, for a total height of 189-feet. The WCF will also include concrete foundations and a shelter or cabinets to accommodate the placement of the Applicant's radio electronics equipment and appurtenant equipment. The Applicant's equipment cabinet or shelter will be approved for use in the Commonwealth of Kentucky by the relevant building inspector. The WCF compound will be fenced and all access gate(s) will be secured. A description of the manner in which the proposed WCF will be constructed is attached as **Exhibit B** and **Exhibit C**.

7. A list of utilities, corporations, or persons with whom the proposed WCF is likely to compete is attached as **Exhibit D,** along with a map of suitable scale showing the location of the proposed new construction as well as the location of any like facilities located anywhere within the map area, along with a map key showing the owner of such other facilities.

8. The site development plan and a vertical profile sketch of the WCF signed and sealed by a professional engineer registered in Kentucky depicting the tower height, as well as a proposed configuration for the antennas of the Applicant has also been included as part of **Exhibit B**.

9. Foundation design plans signed and sealed by a professional engineer registered in Kentucky and a description of the standards according to which the tower was designed are included as part of **Exhibit C**.

10. Applicant has considered the likely effects of the installation of the proposed WCF on nearby land uses and values and has concluded that there is no more suitable location reasonably available from which adequate services can be provided, and that there are no reasonably available opportunities to co-locate Applicant's antennas on an existing structure. When suitable towers or structures exist, Applicant attempts to co-locate on existing structures such as communications towers or other structures capable of supporting Applicant's facilities; however, no other suitable or available co-location site was found to be located in the vicinity of the site. Information regarding the Applicant's efforts to achieve co-location in the vicinity is presented as **Exhibit E**.

11. A copy of the You Do Not Exceed Notice Criteria Results page, from the Federal Aviation Administration ("FAA") web site, is attached as **Exhibit F**.

12. A copy of the email stating that the Kentucky Airport Zoning Commission ("KAZC") Approval is not required to construct the tower is attached as **Exhibit G**.

13. A geotechnical engineering firm has performed soil boring(s) and subsequent geotechnical engineering studies at the WCF site. A copy of the geotechnical engineering report, signed and sealed by a professional engineer registered in the Commonwealth of Kentucky, is attached as **Exhibit H**. The name and address of the geotechnical engineering firm and the professional engineer registered in the Commonwealth of Kentucky who supervised the examination of this WCF site are included as part of this exhibit.

14. Clear directions to the proposed WCF site from the County seat are attached as **Exhibit I**. The name and telephone number of the preparer of **Exhibit I** are included as part of this exhibit.

15. Applicant, pursuant to a written agreement, has acquired the right to use the WCF site and associated property rights. A copy of the agreement or an abbreviated agreement recorded with the County Clerk is attached as **Exhibit J**.

16. Personnel directly responsible for the design and construction of the proposed WCF are well qualified and experienced. The tower and foundation drawings for the proposed tower submitted as part of **Exhibit C** bear the signature and stamp of a professional engineer registered in the Commonwealth of Kentucky. All tower designs meet or exceed the minimum requirements of applicable laws and regulations.

17. The Construction Manager for the proposed facility is Tommy Bailey, and the identity and qualifications of each person directly responsible for design and construction of the proposed tower are contained **Exhibits B & C**.

18. As noted on the Survey attached as part of **Exhibit B**, the surveyor has determined that the site is not within any flood hazard area.

19. The site development plan signed and sealed by a professional engineer registered in Kentucky. The site survey was performed by a surveyor licensed in Kentucky. **Exhibit B** includes a map drawn to a scale of no less than 1 inch equals 200 feet, and identifies every owner of real estate within 500 feet of the proposed tower (according to the records maintained by the County Property Valuation Administrator). Every structure and every easement within 500 feet of the proposed tower or within 200 feet of the access road

including intersection with the public street system is illustrated in **Exhibit B**.

20. Applicant has notified every person who, according to the records of the County Property Valuation Administrator, owns property which is within 500 feet of the proposed tower or contiguous to the site property, by certified mail, return receipt requested, of the proposed construction. All notified property owners have been given the docket number under which the proposed Application will be processed and have been informed of their right to request intervention. A list of the nearby property owners who received the notices, together with copies of the certified letters, are attached as **Exhibit K** and **Exhibit L**, respectively.

21. Applicant has notified the applicable County Judge/Executive by certified mail, return receipt requested, of the proposed construction. This notice included the PSC docket number under which the application will be processed and informed the County Judge/Executive of his/her right to request intervention. A copy of this notice is attached as **Exhibit M**.

22. Notice signs meeting the requirements prescribed by 807 KAR 5:063, Section 1(2) that measure at least 2 feet in height and 4 feet in width and that contain all required language in letters of required height, have been posted, 1 in a visible location on the proposed site and 1 on the nearest public road. Such signs shall remain posted for at least 2 weeks after filing of the Application, and a copy of the posted text is attached as **Exhibit N**. Notice of the location of the proposed facility has also been published in a newspaper of general circulation in the county in which the WCF is proposed to be located.

23. The general area where the proposed facility is to be located is mountainous.

No residential structures are located within a 500-foot radius of the proposed tower location.

24. The process that was used by the Applicant's radio frequency engineers in selecting the site for the proposed WCF was consistent with the general process used for selecting all other existing and proposed WCF facilities within the proposed network design area. Applicant's radio frequency engineers have conducted studies and tests in order to develop a highly efficient network that is designed to handle voice and data traffic in the service area. The engineers determined an optimum area for the placement of the proposed facility in terms of elevation and location to provide the best quality service to customers in the service area. A radio frequency design search area prepared in reference to these radio frequency studies was considered by the Applicant when searching for sites for its antennas that would provide the coverage deemed necessary by the Applicant. A map of the area in which the tower is proposed to be located which is drawn to scale and clearly depicts the necessary search area within which the site should be located pursuant to radio frequency requirements is attached as **Exhibit O**.

25. All Exhibits to this Application are hereby incorporated by reference as if fully set out as part of the Application.

26. All responses and requests associated with this Application may be directed to:

David A. Pike
Pike Legal Group, PLLC
1578 Highway 44 East, Suite 6
P. O. Box 369
Shepherdsville, KY 40165-0369
Telephone: (502) 955-4400
Telefax: (502) 543-4410
Email: pikelegal@aol.com

Patrick W. Turner
General Attorney-Kentucky
AT&T Kentucky
1600 Williams Street
Suite 5200
Columbia, South Carolina 29201
Telephone: (803) 401-2900
Telefax: (803) 254-1731
Email: pt1285@att.com

WHEREFORE, Applicant respectfully request that the PSC accept the foregoing Application for filing, and having met the requirements of KRS §§ 278.020(1), 278.650, and 278.665 and all applicable rules and regulations of the PSC, grant a Certificate of Public Convenience and Necessity to construct and operate the WCF at the location set forth herein.

Respectfully submitted,

David A. Pike
Pike Legal Group, PLLC
1578 Highway 44 East, Suite 6
P. O. Box 369
Shepherdsville, KY 40165-0369
Telephone: (502) 955-4400
Telefax: (502) 543-4410
Email: pikelegal@aol.com
Attorney for New Cingular Wireless PCS, LLC
d/b/a AT&T Mobility

Date: 8/4/13

LIST OF EXHIBITS

A - FCC License Documentation

B - Site Development Plan:

- 500' Vicinity Map
- Legal Descriptions
- Flood Plain Certification
- Site Plan
- Vertical Tower Profile

C - Tower and Foundation Design

D - Competing Utilities, Corporations, or Persons List and Map of Like Facilities in Vicinity

E - Co-location Report

F - FAA

G - Kentucky Airport Zoning Commission

H - Geotechnical Report

I - Directions to WCF Site

J - Copy of Real Estate Agreement

K - Notification Listing

L - Copy of Property Owner Notification

M - Copy of County Judge/Executive Notice

N - Copy of Posted Notices

O - Copy of Radio Frequency Design Search Area

EXHIBIT A
FCC LICENSE DOCUMENTATION

Federal Communications Commission
Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: NEW CINGULAR WIRELESS PCS, LLC

ATTN: REGINALD YOUNGBLOOD
NEW CINGULAR WIRELESS PCS, LLC
2200 N. GREENVILLE AVE, 1W
RICHARDSON, TX 75082

Call Sign	File Number
KNKN673	
Radio Service CL - Cellular	
Market Numer CMA453	**Channel Block** A
Sub-Market Designator 0	

FCC Registration Number (FRN): 0003291192

Market Name
Kentucky 11 - Clay

Grant Date	Effective Date	Expiration Date	Five Yr Build-Out Date	Print Date
08-30-2011	11-24-2012	10-01-2021		

Site Information:

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
3	36-54-29.1 N	084-08-04.7 W	479.4	83.5	1043806

Address: 3319 CUMBERLAND FALLS HIGHWAY
City: CORBIN **County:** WHITLEY **State:** KY **Construction Deadline:**

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	200.600	201.700	180.100	185.600	212.900	196.300	217.200	223.500
Transmitting ERP (watts)	5.500	2.100	0.200	0.100	0.100	0.100	0.300	2.300
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	200.600	201.700	180.100	185.600	212.900	196.300	217.200	223.500
Transmitting ERP (watts)	1.400	19.600	99.500	115.600	24.700	1.100	0.300	0.200
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	200.600	201.700	180.100	185.600	212.900	196.300	217.200	223.500
Transmitting ERP (watts)	0.100	0.100	0.100	0.100	1.300	4.700	3.400	0.500

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

FCC 601-C
August 2007

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
4	36-44-50.6 N	084-08-43.6 W	469.7	62.2	1043812

Address: 969 CELL TOWER ROAD
City: WILLIAMSBURG **County:** WHITLEY **State:** KY **Construction Deadline:**

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	164.200	142.000	198.300	134.200	151.500	124.900	186.500	184.500
Transmitting ERP (watts)	81.700	32.300	2.200	0.200	0.200	0.200	5.900	43.300
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	164.200	142.000	198.300	134.200	151.500	124.900	186.500	184.500
Transmitting ERP (watts)	1.200	18.300	89.100	102.800	21.300	1.200	0.200	0.200
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	164.200	142.000	198.300	134.200	151.500	124.900	186.500	184.500
Transmitting ERP (watts)	0.400	0.100	0.100	1.300	10.700	35.900	27.200	2.900

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
7	36-38-29.0 N	083-46-24.9 W	917.4	64.9	1056643

Address: 2 MILES NORTHWEST OF NOETOWN 19 MIL
City: Middlesboro **County:** BELL **State:** KY **Construction Deadline:**

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	519.400	520.000	484.000	562.900	457.600	340.000	350.600	426.700
Transmitting ERP (watts)	16.700	17.500	9.200	1.800	0.200	1.700	10.600	17.500
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	503.600	504.200	468.200	547.100	441.700	324.200	334.800	410.900
Transmitting ERP (watts)	0.100	0.300	6.700	5.200	0.300	0.100	0.100	0.100

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
12	36-58-46.0 N	083-01-30.2 W	737.0	80.5	1010610

Address: 21834 HIGHWAY 160
City: GORDON **County:** LETCHER **State:** KY **Construction Deadline:**

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	316.700	319.800	30.000	54.700	30.000	198.900	238.900	287.300
Transmitting ERP (watts)	102.600	118.600	29.200	1.400	0.200	1.300	28.600	110.700

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
12	36-58-46.0 N	083-01-30.2 W	737.0	80.5	1010610

Address: 21834 HIGHWAY 160
City: GORDON **County:** LETCHER **State:** KY **Construction Deadline:**

Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	316.700	319.800	30.000	54.700	30.000	198.900	238.900	287.300
Transmitting ERP (watts)	4.200	52.700	125.900	124.500	88.800	12.900	0.600	0.600
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	316.700	319.800	30.000	54.700	30.000	198.900	238.900	287.300
Transmitting ERP (watts)	4.400	0.500	0.800	12.300	84.600	121.600	131.600	55.300

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
13	36-40-53.1 N	084-08-46.5 W	446.2	58.8	

Address: 895 WAGON WHEEL ROAD
City: WILLIAMSBURG **County:** WHITLEY **State:** KY **Construction Deadline:**

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	162.500	163.500	110.800	129.000	104.600	62.100	110.900	148.900
Transmitting ERP (watts)	8.200	22.600	29.900	21.100	23.800	27.900	11.400	4.900

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
15	37-07-43.8 N	083-50-13.0 W	400.5	94.8	1043631

Address: 2728 HOOKER ROAD
City: Manchester **County:** CLAY **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	149.100	187.700	133.500	100.800	127.700	108.800	91.300	130.400
Transmitting ERP (watts)	37.300	30.600	7.500	0.400	0.100	0.100	1.100	13.900
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	149.100	187.700	133.500	100.800	127.700	108.800	91.300	130.400
Transmitting ERP (watts)	1.400	42.100	252.600	393.600	198.400	24.000	1.100	0.800

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
16	36-50-41.4 N	084-09-27.9 W	410.0	97.8	1204258

Address: 4480 Highway 511
City: Rockholds **County:** WHITLEY **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	144.000	137.900	124.500	157.700	188.600	187.400	152.500	147.000
Transmitting ERP (watts)	42.700	37.200	4.700	0.400	0.100	0.100	1.100	11.000
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	144.000	137.900	124.500	157.700	188.600	187.400	152.500	147.000
Transmitting ERP (watts)	0.100	0.100	1.300	16.600	60.300	51.400	7.000	0.400

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
17	37-09-19.2 N	083-26-33.1 W	516.6	98.1	1043811

Address: 2255 DAVIDSON FORK ROAD
City: THOUSANDSTICKS **County:** LESLIE **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	255.100	250.600	210.300	157.900	145.900	186.400	230.000	208.500
Transmitting ERP (watts)	373.300	211.100	32.200	1.400	0.700	0.900	29.300	211.100
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	255.100	250.600	210.300	157.900	145.900	186.400	230.000	208.500
Transmitting ERP (watts)	4.000	82.000	347.000	422.800	158.000	13.600	0.800	0.800
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	255.100	250.600	210.300	157.900	145.900	186.400	230.000	208.500
Transmitting ERP (watts)	4.500	0.900	0.900	13.500	165.500	442.800	363.400	89.700

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
18	36-45-42.1 N	083-40-29.0 W	685.2	129.5	1215974

Address: 7 PO BOX 264E BIRD BRANCH ROAD
City: PINEVILLE **County:** BELL **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	0	45	90	135	180	225	270	315
Antenna Height AAT (meters)	314.900	270.100	337.000	312.300	338.800	334.000	355.300	387.000
Transmitting ERP (watts)	80.700	93.400	23.000	1.100	0.200	1.000	22.500	87.100

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
18	36-45-42.1 N	083-40-29.0 W	685.2	129.5	1215974

Address: 7 PO BOX 264E BIRD BRANCH ROAD
City: PINEVILLE **County:** BELL **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	314.900	270.100	337.000	312.300	338.800	334.000	355.300	387.000
Transmitting ERP (watts)	0.300	22.500	43.400	34.900	35.600	2.200	0.100	0.100
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	314.900	270.100	337.000	312.300	338.800	334.000	355.300	387.000
Transmitting ERP (watts)	0.400	0.100	0.100	2.900	45.000	42.000	52.200	25.300

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
19	36-53-53.5 N	083-19-27.0 W	858.6	35.4	

Address: 3017 NORTH US HIGHWAY 421
City: BAXTER **County:** HARLAN **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	423.100	288.300	269.800	272.900	414.800	423.400	259.900	380.900
Transmitting ERP (watts)	63.100	60.600	60.300	61.000	64.400	62.300	62.800	62.000

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
20	36-56-49.5 N	084-05-38.9 W	328.3	88.1	1003734

Address: 201 NORTH DEPOT STREET
City: CORBIN **County:** WHITLEY **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	51.900	46.500	48.200	45.400	30.000	40.400	81.900	50.900
Transmitting ERP (watts)	62.100	23.500	2.400	0.600	0.100	0.200	3.300	26.300
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	51.900	46.500	48.200	45.400	30.000	40.400	81.900	50.900
Transmitting ERP (watts)	0.600	8.600	44.000	51.100	10.900	0.500	0.100	0.100
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	51.900	46.500	48.200	45.400	30.000	40.400	81.900	50.900
Transmitting ERP (watts)	0.700	0.100	0.200	1.100	15.200	53.100	38.700	5.300

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
21	36-55-19.4 N	084-03-50.4 W	378.6	79.2	1247122

Address: 620 ALLISON BOULEVARD
City: CORBIN **County:** KNOX **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	97.600	90.100	99.000	99.600	77.700	86.900	96.400	103.600
Transmitting ERP (watts)	22.100	36.600	13.600	9.600	0.100	4.800	17.100	34.200
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	97.600	90.100	99.000	99.600	77.700	86.900	96.400	103.600
Transmitting ERP (watts)	1.400	19.900	100.900	117.200	25.000	1.100	0.300	0.300
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	97.600	90.100	99.000	99.600	77.700	86.900	96.400	103.600
Transmitting ERP (watts)	0.300	0.100	0.100	1.500	18.100	54.500	39.900	4.200

Location	Latitude	Longitude	Ground Elevation (meters)	Structure Hgt to Tip (meters)	Antenna Structure Registration No.
22	37-09-01.0 N	083-41-03.6 W	484.0	94.5	1267062

Address: Bear Creek Rd
City: Hector **County:** CLAY **State:** KY **Construction Deadline:** 02-23-2013

Antenna: 1 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	247.900	220.000	188.600	160.500	206.100	259.700	247.500	246.500
Transmitting ERP (watts)	157.800	62.400	4.200	0.400	0.300	0.300	11.500	83.600
Antenna: 2 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	247.900	220.000	188.600	160.500	206.100	259.700	247.500	246.500
Transmitting ERP (watts)	1.700	25.000	121.900	140.600	29.100	1.700	0.300	0.300
Antenna: 3 Azimuth (from true north)	**0**	**45**	**90**	**135**	**180**	**225**	**270**	**315**
Antenna Height AAT (meters)	247.900	220.000	188.600	160.500	206.100	259.700	247.500	246.500
Transmitting ERP (watts)	0.900	0.300	0.300	5.000	49.100	148.900	107.400	11.900

Control Points:

Control Pt. No. 1

Address: 1650 LYNDON FARMS COURT
City: LOUISVILLE **County:** **State:** KY **Telephone Number:** (502)329-4700

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNKN673 **File Number:** **Print Date:**

Waivers/Conditions:

License renewal granted on a conditional basis, subject to the outcome of FCC proceeding WT Docket No. 10-112 (see FCC 10-86, paras. 113 and 126).

WE MAKE NO FINDING IN THESE CASES THE ISSUES RAISED IN FOOTNOTE 3 OF LA STAR CELLULAR TELEPHONE COMPANY, 7 FF Rcd 3762 (1992). THEREFORE, THESE GRANTS OF TRANSFERS/ASSIGNMENTS ARE CONDITIONED ON ANY SUBSEQUENT ACTION THE COMMISSION MAY TAKE CONCERING THE

The Cellular Geographic Service Areas of the following cellular systems (listed by call sign) have been combined: KNKN861, KNKN841 and KNKN673.

Commission approval of this application and the licenses contained therein are subject to the conditions set forth in the Memorandum Opinion and Order, adopted on December 29, 2006 and released on March 26, 2007, and revised in the Order on Reconsideration, adopted and released on March 26, 2007. See AT&T Inc. and BellSouth Corporation Application for Transfer of Control, WC Docket No. 06-74, Memorandum Opinion and Order, FCC 06-189 (rel. Mar. 26, 2007); AT&T Inc. and BellSouth Corporation, WC Docket No. 06-74, Order on Reconsideration, FCC 07-44 (rel. Mar. 26, 2007).

The action taken with respect to Application #0004302365 does not preclude or prejudice any potential enforcement action regarding this Application, and does not constitute a waiver of any of the Commission's rules with respect to this Application.

The action taken with respect to Application #0004970321 does not preclude or prejudice any potential enforcement action regarding this Application, and does not constitute a waiver of any of the Commission's rules with respect to this Application.

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: NEW CINGULAR WIRELESS PCS, LLC

ATTN: REGINALD YOUNGBLOOD
NEW CINGULAR WIRELESS PCS, LLC
2200 N. GREENVILLE AVE, 1W
RICHARDSON, TX 75082

Call Sign	File Number
KNLF287	
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003291192

Grant Date	Effective Date	Expiration Date	Print Date
08-01-2005	11-24-2012	06-23-2015	

Market Number	Channel Block	Sub-Market Designator
MTA044	A	13

Market Name
Knoxville

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
06-23-2000	06-23-2005		

Waivers/Conditions:

This authorization is subject to the condition that, in the event that systems using the same frequencies as granted herein are authorized in an adjacent foreign territory (Canada/United States), future coordination of any base station transmitters within 72 km (45 miles) of the United States/Canada border shall be required to eliminate any harmful interference to operations in the adjacent foreign territory and to ensure continuance of equal access to the frequencies by both countries.

This authorization is subject to the condition that the remaining balance of the winning bid amount will be paid in accordance with Part 1 of the Commission's rules, 47 C.F.R. Part 1.

Conditions:
Pursuant to §309(h) of the Communications Act of 1934, as amended, 47 U.S.C. §309(h), this license is subject to the following conditions: This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequencies designated in the license beyond the term thereof nor in any other manner than authorized herein. Neither the license nor the right granted thereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934, as amended. See 47 U.S.C. § 310(d). This license is subject in terms to the right of use or control conferred by §706 of the Communications Act of 1934, as amended. See 47 U.S.C. §606.

This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

Licensee Name: NEW CINGULAR WIRELESS PCS, LLC

Call Sign: KNLF287 **File Number:** **Print Date:**

This license is conditioned upon compliance with the provisions of Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation For Consent to Transfer Control of Licenses and Authorizations, Memorandum Opinion and Order, FCC 04-255 (rel. Oct. 26, 2004).

Commission approval of this application and the licenses contained therein are subject to the conditions set forth in the Memorandum Opinion and Order, adopted on December 29, 2006 and released on March 26, 2007, and revised in the Order on Reconsideration, adopted and released on March 26, 2007. See AT&T Inc. and BellSouth Corporation Application for Transfer of Control, WC Docket No. 06-74, Memorandum Opinion and Order, FCC 06-189 (rel. Mar. 26, 2007); AT&T Inc. and BellSouth Corporation, WC Docket No. 06-74, Order on Reconsideration, FCC 07-44 (rel. Mar. 26, 2007).

Federal Communications Commission

Wireless Telecommunications Bureau

RADIO STATION AUTHORIZATION

LICENSEE: NEW CINGULAR WIRELESS PCS, LLC

ATTN: REGINALD YOUNGBLOOD
NEW CINGULAR WIRELESS PCS, LLC
2200 N. GREENVILLE AVE, 1W
RICHARDSON, TX 75082

Call Sign	File Number
KNLF288	
Radio Service CW - PCS Broadband	

FCC Registration Number (FRN): 0003291192

Grant Date	Effective Date	Expiration Date	Print Date
05-31-2005	11-24-2012	06-23-2015	

Market Number	Channel Block	Sub-Market Designator
MTA044	B	0

Market Name
Knoxville

1st Build-out Date	2nd Build-out Date	3rd Build-out Date	4th Build-out Date
06-23-2000	06-23-2005		

Waivers/Conditions:

Commission approval of this application and the licenses contained therein are subject to the conditions set forth in the Memorandum Opinion and Order, adopted on December 29, 2006 and released on March 26, 2007, and revised in the Order on Reconsideration, adopted and released on March 26, 2007. See AT&T Inc. and BellSouth Corporation Application for Transfer of Control, WC Docket No. 06-74, Memorandum Opinion and Order, FCC 06-189 (rel. Mar. 26, 2007); AT&T Inc. and BellSouth Corporation, WC Docket No. 06-74, Order on Reconsideration, FCC 07-44 (rel. Mar. 26, 2007).

Conditions:
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This license may not authorize operation throughout the entire geographic area or spectrum identified on the hardcopy version. To view the specific geographic area and spectrum authorized by this license, refer to the Spectrum and Market Area information under the Market Tab of the license record in the Universal Licensing System (ULS). To view the license record, go to the ULS homepage at http://wireless.fcc.gov/uls/index.htm?job=home and select "License Search". Follow the instructions on how to search for license information.

EXHIBIT B

SITE DEVELOPMENT PLAN:

500' VICINITY MAP
LEGAL DESCRIPTIONS
FLOOD PLAIN CERTIFICATION
SITE PLAN
VERTICAL TOWER PROFILE

EVARTS
SITE ID: LX6137

9811 KY HIGHWAY 38
EVARTS, KY 40828

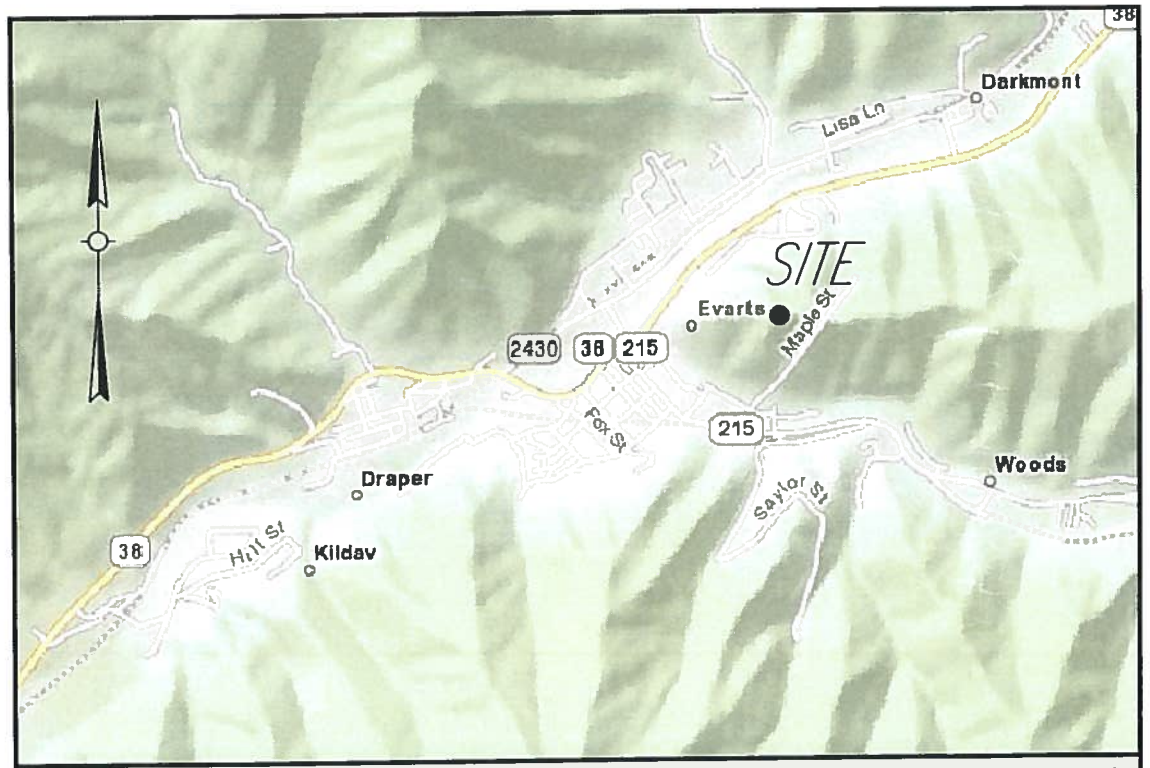
PROPOSED 185' MONOPOLE
WITH 4' LIGHTNING ARRESTOR

UNDERGROUND UTILITIES
CALL 2 WORKING DAYS
BEFORE YOU DIG
INDIANA 1-800-382-5544
KENTUCKY 1-800-752-6007
UTILITIES PROTECTION SERVICE
NON-MEMBERS MUST CALL DIRECTLY

The utility information shown on this plat, prepared by FSTAN was obtained from existing records and or by field locations. It is the contractor's responsibility to verify their existence and location, and to contact the appropriate utility company for field locations.

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5866 (502) 636-5111
Fax: (502) 636-5263

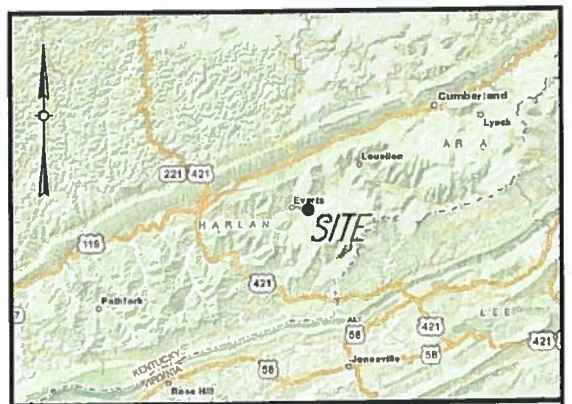
SURVEYING



VICINITY MAP SCALE: NONE

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5866 (502) 636-5111
Fax: (502) 636-5263

ARCHITECTURAL DESIGN
ENGINEER



REGION MAP SCALE: NONE

FROM DOWNTOWN HARLAN COUNTY: 210 E CENTRAL ST, HARLAN, KY 40831 START OUT GOING WEST ON EAST CENTRAL ST TOWARDS N 2ND ST. TURN LEFT ONTO S 1ST STREET. TURN LEFT ONTO E CLOVER ST. TURN LEFT ONTO KY-38. PROCEED 8.4 MILES AND TURN RIGHT ONTO BALL CEMETERY ROAD. THEN PROCEED UP THE HILL 700'± AND TURN RIGHT THEN GO 2600' TO THE SITE ON THE RIGHT.

DRIVE TO DIRECTIONS

SITE NAME
EVARTS

SITE I.D.
LX6137

SITE ADDRESS
9811 KY HIGHWAY 38
EVARTS, KY 40828

PROPERTY OWNER
TERRY WAYNE WILLIAMS
110 NOLAN ST.
EVARTS, KY 40828

APPLICANT
AT&T
601 WEST CHESTNUT
LOUISVILLE, KY 40206

SITE COORDINATES
36° 51' 58.04"
83° 11' 14.76"

PROJECT INFORMATION

SHEET NUMBER	DESCRIPTION
T-1	TITLE SHEET & SITE INFO
C-1	500' RAD./ABUTTERS MAP
C-1.1	ADJOINERS OWNERS LIST
C-2	SITE SURVEY
C-2.1	SITE SURVEY, CONT.
C-3.1	DIMENSION TO PROPERTY LINES
Z-3	SITE LAYOUT
Z-4	NORTH & SOUTH ELEVATIONS
Z-5	EAST & WEST ELEVATIONS

SHEET INDEX

ELECTRIC COMPANY
KENTUCKY UTILITIES
CONTACT: N/A
OFFICE #: (800) 383-5582

TELEPHONE COMPANY
N/A
CONTACT: N/A
OFFICE #: N/A

UTILITY CONTACTS

AT&T _____

WESTOWER
COMMUNICATIONS
MANAGER _____

SITE ACQUISITION _____

SIGNATURE BOX

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5866 (502) 636-5111
Fax: (502) 636-5263

STATE OF KENTUCKY
ELIZABETH W. STUBER
21636
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER: LX6137

SITE NAME: EVARTS

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828

PROPOSED LEASE AREA: AREA = 10,000 SQ. FT.

PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JMW	08.26.10

FSTAN PROJECT NO.: 10-6629

SHEET T-1 OF 17

REVISIONS:
05-21-13 CDs REVISED
07-11-13 REVISED TOWER HEIGHT

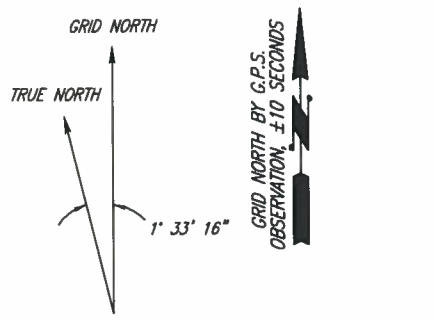
TITLE SHEET, SITE INFO. AND SHEET INDEX

EVARTS
SITE ID# LX6137

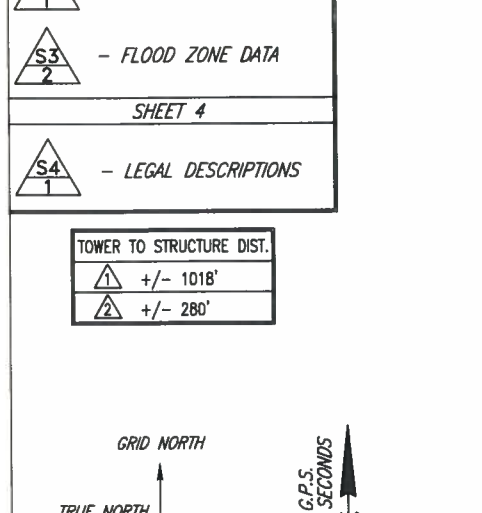
SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828

SHEET 1	
S1/1	– VICINITY AND 500' STRUCTURAL MAP
S1/2	– U.S.G.S. QUAD MAP
SHEET 2	
S2/1	– ABUTTING PROPERTY OWNERS
SHEET 3	
S3/1	– PROPOSED LEASE AREA
S3/2	– FLOOD ZONE DATA
SHEET 4	
S4/1	– LEGAL DESCRIPTIONS

TOWER TO STRUCTURE DIST.	
1	+/- 1018'
2	+/- 280'



NORTH IS BASED ON THE KENTUCKY STATE PLANE COORDINATE SYSTEM, SOUTH ZONE AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON JULY 26, 2010.



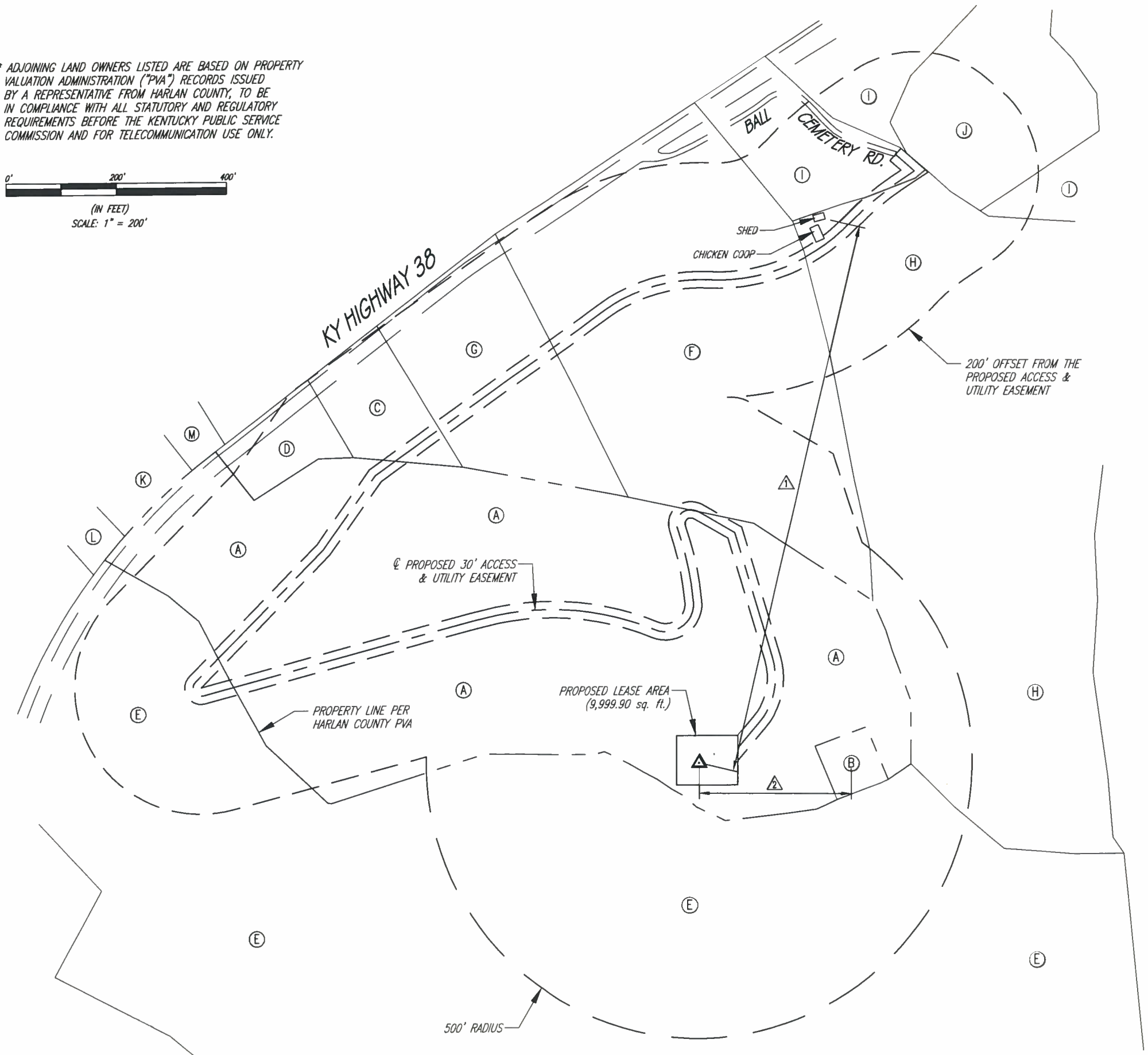
S1/2 QUAD MAP
SCALE: 1"=2000'

U.S.G.S. 7 1/2 MINUTE QUAD MAP OF EVARTS, KY

S1/1

* ADJOINING LAND OWNERS LISTED ARE BASED ON PROPERTY VALUATION ADMINISTRATION ("PVA") RECORDS ISSUED BY A REPRESENTATIVE FROM HARLAN COUNTY, TO BE IN COMPLIANCE WITH ALL STATUTORY AND REGULATORY REQUIREMENTS BEFORE THE KENTUCKY PUBLIC SERVICE COMMISSION AND FOR TELECOMMUNICATION USE ONLY.

0' 200' 400'
(IN FEET)
SCALE: 1" = 200'



at&t

WESTOWER COMMUNICATIONS

FSTAN
Formerly F.S. Land & T. Alan Neal Company
Land Surveyors and Consulting Engineers
2540 Ridgemoor Court, Suite 102
Louisville, KY 40299
Phone: (502) 635-5865 (502) 636-5111
Fax: (502) 636-5265

SITE NUMBER:	LX6137
SITE NAME:	EVARTS
SITE ADDRESS:	9811 KY HIGHWAY 38 EVARTS, KY 40828
PROPOSED LEASE AREA:	AREA = 10,000 sq. ft.
PROPERTY OWNER:	TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828
MAP NUMBER:	134
PARCEL NUMBER:	5
SOURCE OF TITLE:	DEED BOOK 410, PAGE 272

DWG BY:	CHKD BY:	DATE:
KLH	FSII	08.23.10

FSTAN PROJECT NO.: 10-6628

SHEET 1 OF 4

REVISIONS:

BOUNDARY NOTES/LEGALS – 09.30.11
TITLE REVIEW – 10.06.11
ADDRESS – 08.04.13

C1

SHEET 1

S1/1 – VICINITY AND 500' STRUCTURAL MAP

S1/2 – U.S.G.S. QUAD MAP

SHEET 2

S2/1 – ABUTTING PROPERTY OWNERS

SHEET 3

S3/1 – PROPOSED LEASE AREA

S3/2 – FLOOD ZONE DATA

SHEET 4

S4/1 – LEGAL DESCRIPTIONS

S2/1

Ⓐ MAP 134, LOT 5
WILLIAMS, TERRY WAYNE
110 NOLAN ST.
EVARTS, KY 40828
DEED BOOK 410, PAGE 272
NO ZONING

Ⓑ MAP 134, LOT 5.03
NO INFORMATION LISTED
AT THE HARLAN COUNTY
PROPERTY VALUATION ADMINISTRATION
NO DEED OF RECORD FOUND
NO ZONING

Ⓒ MAP 134, LOT 5.01
NO INFORMATION LISTED
AT THE HARLAN COUNTY
PROPERTY VALUATION ADMINISTRATION
NO DEED OF RECORD FOUND
NO ZONING

Ⓓ MAP 134, LOT 5.02
EAST KENTUCKY NETWORK, LLC,
dba APPALACHIAN WIRELESS
(LEASE AREA)
204 TECHNOLOGY TRAIL
IVEL, KY 41642
LEASE BOOK 48, PAGE 70
NO ZONING

Ⓔ MAP 134, LOT 4
GRAHAM, TOMMY L.
P.O. BOX 789
LINDEN, TN 37096
DEED BOOK 407, PAGE 530
DEED BOOK 412, PAGE 66
DEED BOOK 382, PAGE 263
NO ZONING

Ⓕ MAP 134, LOT 7
FORD, HARVEY LEE JR.
22 RAM DR.
CAMERON, NC 28326
DEED BOOK 229, PAGE 729 & 726
DEED BOOK 294, PAGE 19
NO ZONING

Ⓖ MAP 134, LOT 6
FORD, HARVEY LEE JR.
22 RAM DR.
CAMERON, NC 28326
DEED BOOK 236, PAGE 506
DEED BOOK 294, PAGE 22
NO ZONING

Ⓗ MAP 148-10, LOT 1.01
LEDFORD, JACK L. & ALICE M.
P.O. BOX 411
EVARTS, KY 40828
DEED BOOK 358, PAGE 771
NO ZONING

Ⓘ MAP 148-10, LOT 1
BAGGS, WANDA BETH
P.O. BOX 385
EVARTS, KY 40828
NO DEED OF RECORD FOUND
NO ZONING

Ⓙ MAP 148-10, LOT 2
BALL CEMETERY
NO ADDRESS LISTED
NO DEED OF RECORD FOUND
NO ZONING

Ⓚ MAP 134-30, LOT 12
FOX, THEODORE
105 VERDA CAMP RD.
EVARTS, KY 40282
DEED BOOK 358, PAGE 686
NO ZONING

Ⓛ MAP 134-30, LOT 13
EVARTS PENTECOSTAL CHURCH
P.O. BOX 444
EVARTS, KY 40828
DEED BOOK 322, PAGE 19
NO ZONING

Ⓜ MAP 134-30, LOT 11
FOX, THEODORE & PATSY
RT. 1 BOX 393
EVARTS, KY 40282
NO DEED OF RECORD FOUND
NO ZONING

at&t

WESTOWER COMMUNICATIONS

FSTAN
Formerly F.S. Land & T. Alan Neil Company
Land Surveyors and Consulting Engineers
2540 Ridgemoor Court, Suite 102
Louisville, KY 40299
Phone: (502) 635-5666 (502) 636-5111
Fax: (502) 636-5263

SITE NUMBER:
LX6137

SITE NAME:
EVARTS

SITE ADDRESS:
9811 KY HIGHWAY 38
EVARTS, KY 40828

PROPOSED LEASE AREA:
AREA = 10,000 sq. ft.

PROPERTY OWNER:
TERRY WAYNE WILLIAMS
110 NOLAN ST.
EVARTS, KY 40828

MAP NUMBER:
134

PARCEL NUMBER:
5

SOURCE OF TITLE:
DEED BOOK 410, PAGE 272

DWG BY:	CHKD BY:	DATE:
KLH	FSII	08.23.10

FSTAN PROJECT NO.:
10-6628

REVISIONS:

BOUNDARY NOTES/LEGALS - 09.30.11
TITLE REVIEW - 10.06.11
ADDRESS - 08.04.13

C1.1

SHEET 1

S1/1 – VICINITY AND 500' STRUCTURAL MAP

S1/2 – U.S.G.S. QUAD MAP

SHEET 2

S2/1 – ABUTTING PROPERTY OWNERS

SHEET 3

S3/1 – PROPOSED LEASE AREA

S3/2 – FLOOD ZONE DATA

SHEET 4

S4/1 – LEGAL DESCRIPTIONS

COORDINATE POINT LOCATION

NAD 1983
LATITUDE: 36° 51' 58.04"
LONGITUDE: 83° 11' 14.76"
NAVD 1988
ELEVATION: 1793'± AMSL
STATE PLANE COORDINATE SOUTH ZONE
(BLUE MARBLE GEOGRAPHIC
CALCULATOR VERSION 3.0)
NORTHING: 1844563.4860
EASTING: 2389971.5157

POWER POLE

UTILITY COMPANY: KENTUCKY UTILITIES CO.
IDENTIFICATION #: UNKNOWN

PROJECT BENCHMARK

NORTH: 1844541.464
EAST: 2389899.794
ELEVATION: 1803.699' AMSL
LOCATION: BEING A TRAVERSE POINT 30.72' WEST AND 17.98' SOUTH OF THE SOUTHWEST LEASE AREA CORNER

SYMBOL LEGEND

- WOOD POWER POLE
- LIGHT POLE
- GUY ANCHOR
- DRAIN SEWER MANHOLE
- MANHOLE
- ELECTRIC BOX
- F.P. FENCE POST
- 1500.00 SPOT ELEVATION
- SET #5 REBAR (UNLESS OTHERWISE NOTED)
- EXISTING #5 REBAR (UNLESS OTHERWISE NOTED)

ABBREVIATIONS

EP	EDGE OF PAVEMENT
ROW	RIGHT OF WAY
℄	CENTERLINE
RCP	REINFORCED CONCRETE PIPE
CONC	CONCRETE
CMP	CORRUGATED METAL PIPE
℘	SUBJECT PROPERTY LINE
POB	POINT OF BEGINNING
IPC	IRON PIN CAPPED

LINE LEGEND

- E E E — OVERHEAD ELECTRIC
- G G G — UNDERGROUND GAS LINE
- W W W — UNDERGROUND WATER LINE
- E/T E/T E/T — OVERHEAD ELECTRIC & TELEPHONE LINE
- T T — OVERHEAD TELEPHONE LINE
- D D — DRAINAGE/STORM SEWER LINE
- X X X — EXISTING FENCE
- XX XX XX — PROPOSED FENCE
- SUBJECT PROPERTY BOUNDARY
- RIGHT OF WAY CENTERLINE

NOTE: SYMBOLS, ABBREVIATIONS, OR LINESTYLES DO NOT NECESSARILY APPEAR ON DRAWING(S). USE ONLY AS APPLICABLE

UNDERGROUND UTILITIES

CALL 2 WORKING DAYS
BEFORE YOU DIG
INDIANA 1-800-382-5544
KENTUCKY 1-800-752-6007
UTILITIES PROTECTION SERVICE
NON-MEMBERS MUST CALL DIRECTLY

The utility information shown on this plat, prepared by FSTAN was obtained from existing records and or by field locations. It is the contractor's responsibility to verify their existence and location, and to contact the appropriate utility company for field locations.

LAND SURVEYOR'S CERTIFICATE

TYPE "A" SURVEY: UNADJUSTED TRAVERSE CLOSURE BETTER THAN 1 IN 15,000

TO ALL PARTIES INTERESTED IN TITLE TO PREMISES SURVEYED
I hereby certify that this plat and survey were made under my supervision, and that the angular and linear measurements, as witnessed by monuments shown hereon, are true and correct to the best of my knowledge and belief.
This survey and plat meets or exceeds the minimum standards of the governing authorities.
This property is subject to any recorded easements or right of ways not shown hereon.

12.26.12
Frank L. Sellinger, II — Ky. Reg. No. 3282

SURVEYORS NOTES

SOURCE OF BEARING IS A G.P.S. OBSERVATION ON JULY 26, 2010.

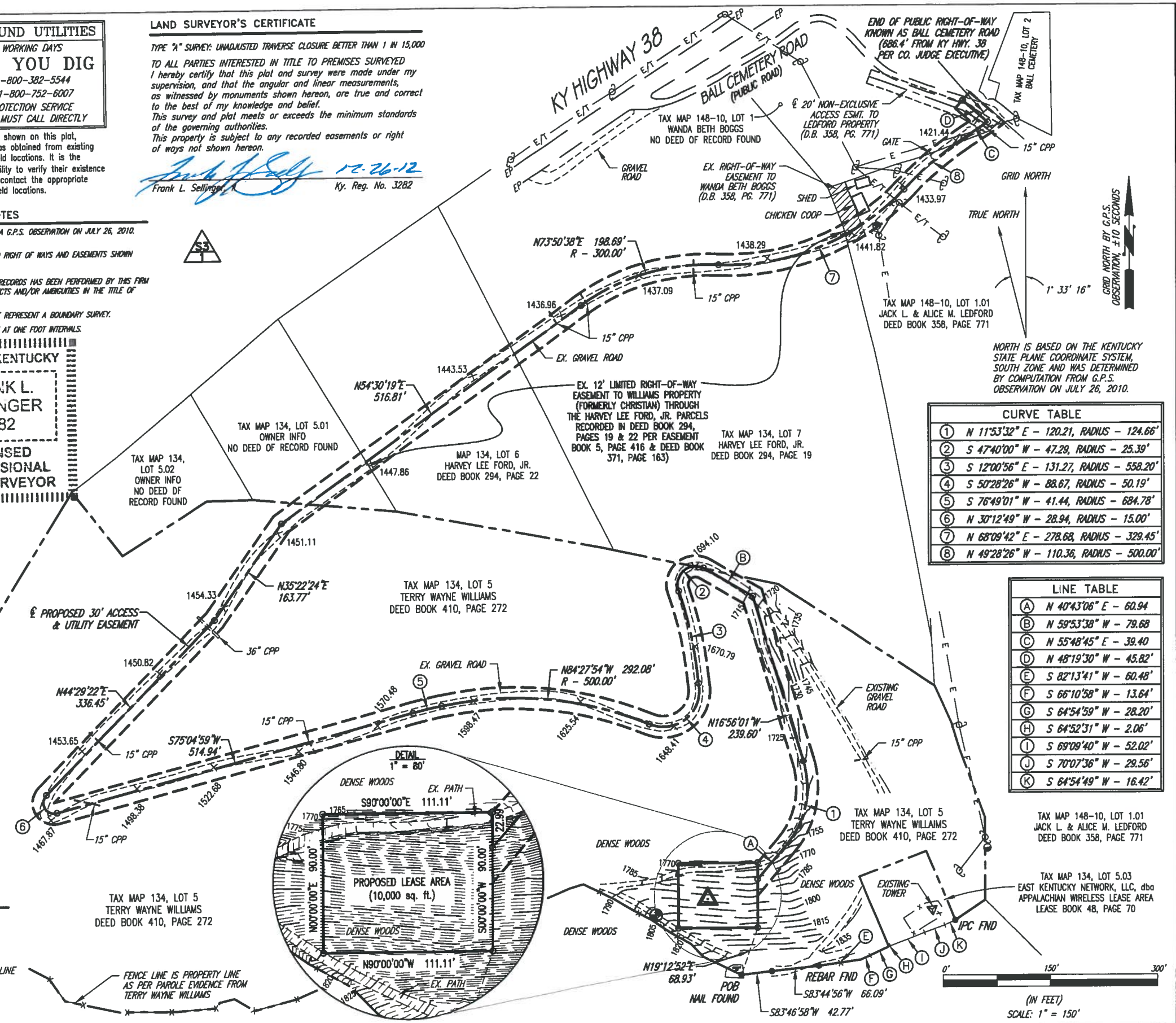
SITE SHOWN SUBJECT TO RIGHT OF WAYS AND EASEMENTS SHOWN HEREON OR NOT.

NO SEARCH OF PUBLIC RECORDS HAS BEEN PERFORMED BY THIS FIRM TO DETERMINE ANY DEFECTS AND/OR AMBIGUITIES IN THE TITLE OF THE PARENT TRACT.

THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

EXISTING CONTOURS ARE AT ONE FOOT INTERVALS.

STATE OF KENTUCKY
FRANK L. SELLINGER 3282
LICENSED PROFESSIONAL LAND SURVEYOR



CURVE TABLE	
1	N 11°53'32" E – 120.21, RADIUS – 124.66'
2	S 47°40'00" W – 47.29, RADIUS – 25.39'
3	S 12°00'56" E – 131.27, RADIUS – 558.20'
4	S 50°28'26" W – 88.67, RADIUS – 50.19'
5	S 76°49'01" W – 41.44, RADIUS – 684.78'
6	N 30°12'49" W – 28.94, RADIUS – 15.00'
7	N 68°09'42" E – 278.68, RADIUS – 329.45'
8	N 49°28'26" W – 110.36, RADIUS – 500.00'

LINE TABLE	
A	N 40°43'06" E – 60.94
B	N 59°53'38" W – 79.68
C	N 55°48'45" E – 39.40
D	N 48°19'30" W – 45.82'
E	S 82°13'41" W – 60.48'
F	S 66°10'58" W – 13.64'
G	S 64°54'59" W – 28.20'
H	S 64°52'31" W – 2.06'
I	S 69°09'40" W – 52.02'
J	S 70°07'36" W – 29.56'
K	S 64°54'49" W – 16.42'

S3/2 — I HAVE REVIEWED THE FLOOD INSURANCE RATE MAPS (FIRM) MAP NO. NO. 210098 0165D DATED 8-16-06 AND THE PROPOSED LEASE AREA DOES NOT APPEAR TO BE IN A FLOOD PRONE AREA. THE PROPOSED LEASE AREA IS LOCATED IN ZONE X.

"CELLULAR COMMUNICATION TOWER SITE SURVEY"
REFERENCED AS "EXHIBIT B"

OWNER APPROVAL: _____ DATE: _____

AT&T APPROVAL: _____ DATE: _____

at&t

WESTOWER COMMUNICATIONS

FS1an
Formerly F.S. Land & T. Alan Neal Company
Land Surveyors and Consulting Engineers
2540 Ridgemoor Court, Suite 102
Louisville, KY 40299
Phone: (502) 635-5666 (502) 636-5111
Fax: (502) 636-5263

SITE NUMBER: LX6137

SITE NAME: EVARTS

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828

PROPOSED LEASE AREA: AREA = 10,000 sq. ft.

PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828

MAP NUMBER: 134

PARCEL NUMBER: 5

SOURCE OF TITLE: DEED BOOK 410, PAGE 272

DWG BY:	CHKD BY:	DATE:
KLH	FSII	08.23.10

FSTAN PROJECT NO.: 10-6628

SHEET 3 OF 4

REVISIONS:

BOUNDARY NOTES/LEGALS – 09.30.11
TITLE REVIEW – 12.26.12
ADDRESS – 08.04.13

C2

SHEET 1

S1/1 – VICINITY AND 500' STRUCTURAL MAP

S1/2 – U.S.G.S. QUAD MAP

SHEET 2

S2/1 – ABUTTING PROPERTY OWNERS

SHEET 3

S3/1 – PROPOSED LEASE AREA

S3/2 – FLOOD ZONE DATA

SHEET 4

S4/1 – LEGAL DESCRIPTIONS

S4/1

LEGAL DESCRIPTIONS:

This is a description for AT&T, of an area to be leased from the property conveyed to Terry Wayne Williams, as recorded in Deed Book 410, Page 272, in the Office of the Clerk of Harlan County, which is further described as follows:

PROPOSED LEASE AREA

Beginning at a Found Nail in a concrete pad corner along a ridge line, corner to the property conveyed to Terry Wayne Williams as recorded in Deed Book 410, Page 272 in the Office of the Clerk of the County Court of Harlan County, Kentucky, said Nail being following calls from an IPC Found stamped "Summit Engineering LS #2661" at the southeast corner of the existing East Kentucky Network, LLC, dba Appalachian Wireless Lease Area as recorded in Lease Book 48, Page 70 in the aforesaid Clerks Office, S 64°54'49" W – 16.42' to a point; thence S 70°07'36" W – 29.56' to a point; thence S 69°09'40" W – 52.02' to a point; thence S 64°52'31" W – 2.06' to a point at the southwest corner of said existing lease area; thence continuing along the south line of said Williams property S 64°54'59" W – 28.20' to a point; thence S 66°10'58" W – 13.64' to a point; thence S 82°13'41" W – 60.48' to a Rebar Found; thence S 83°44'56" W – 66.09' to a Rebar Found; thence S 83°46'58" W – 42.77' to the point of beginning; thence traversing said Williams property N 19°12'52" E – 68.93' to a set #5 rebar with a cap stamped "FSTAN #3282" and the TRUE POINT OF BEGINNING of the Proposed Lease Area; thence N 90°00'00" W – 111.11' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 00°00'00" E – 90.00' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence S 90°00'00" E – 111.11' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence S 00°00'00" W passing a set #5 rebar with a cap stamped "FSTAN #3282" at 22.99', in all 90.00' to the true point of beginning containing 10,000 square feet as per survey by Frank L. Sellinger, II, PLS No. 3282 with F.S./Tan Land Surveyors and Consulting Engineers dated August 23, 2010.

CENTERLINE OF PROPOSED 30' ACCESS & UTIILTY EASEMENT

Beginning at a Found Nail in a concrete pad corner along a ridge line, corner to the property conveyed to Terry Wayne Williams as recorded in Deed Book 410, Page 272 in the Office of the Clerk of the County Court of Harlan County, Kentucky, said Nail being following calls from an IPC Found stamped "Summit Engineering LS #2661" at the southeast corner of the existing East Kentucky Network, LLC, dba Appalachian Wireless Lease Area as recorded in Lease Book 48, Page 70 in the aforesaid Clerks Office, S 64°54'49" W – 16.42' to a point; thence S 70°07'36" W – 29.56' to a point; thence S 69°09'40" W – 52.02' to a point; thence S 64°52'31" W – 2.06' to a point at the southwest corner of said existing lease area; thence continuing along the south line of said Williams property S 64°54'59" W – 28.20' to a point; thence S 66°10'58" W – 13.64' to a point; thence S 82°13'41" W – 60.48' to a Rebar Found; thence S 83°44'56" W – 66.09' to a Rebar Found; thence S 83°46'58" W – 42.77' to the point of beginning; thence traversing said Williams property N 19°12'52" E – 68.93' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 00°00'00" E – 77.01' to a set #5 rebar with a cap stamped "FSTAN #3282" and the TRUE POINT OF BEGINNING of the Centerline of the Proposed 30' Access & Utility Easement; thence following said centerline N 40°43'06" E – 60.94' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 124.66', chord bearing N 11°53'32" E – 120.21' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 16°56'01" W – 239.60' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 59°53'38" W – 79.68' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 25.39', chord bearing S 47°40'00" W – 47.29' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 558.20', chord bearing S 12°00'56" E – 131.27' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 50.19', chord bearing S 50°28'26" W – 88.67' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 500.00', chord bearing N 84°27'54" W – 292.08' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 684.78', chord bearing S 76°49'01" W – 41.44' to a set #5 rebar with a cap stamped "FSTAN #3282'; thence S 75°04'59" W – 514.94' to a set #5 rebar with a cap stamped "FSTAN #3282" to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 15.00', chord bearing N 30°12'49" W – 28.94' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 44°29'22" E – 336.45' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 35°22'24" E – 163.77' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 54°30'19" E passing through Tax Map 134, Lot 5.01 (Owner and Source of Title Unknown), the property conveyed to Harvey Lee Ford, Jr. as recorded in Deed Book 294, Page 22 in the aforesaid Clerks Office and the property conveyed to Harvey Lee Ford, Jr. as recorded in Deed Book 294, Page 19 in the aforesaid Clerks Office, 516.81' to a set #5 rebar with a cap stamped "FSTAN #3282" on said Lee property (Deed Book 294, Page 19); thence following a curve to the right having a radius of 300.00', chord bearing N 73°50'38" E – 198.69' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 329.45', chord bearing N 68°09'42" E – 278.68' to a set #5 rebar with a cap stamped "FSTAN #3282" on the property conveyed to Jack L. and Alice M. Ledford as recorded in Deed Book 358, Page 771 in the aforesaid Clerks Office; thence following a curve to the right having a radius of 500.00', chord bearing N 49°28'26" E – 110.36' to a set #5 rebar with a cap stamped "FSTAN #3282" on the property conveyed to Wanda Beth Boggs (No Deed of Record Found) in the aforesaid Clerks Office; thence N 55°48'45" E – 39.40' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 48°19'30" W – 45.82' to a set Spike in the centerline of Ball Cemetery Road and the end of said easement as per survey by Frank L. Sellinger, II, PLS No. 3282 with F.S./Tan Land Surveyors and Consulting Engineers dated August 23, 2010.

SURVEYOR'S REVIEW OF "SPECIAL EXCEPTIONS"

NOTES CORRESPONDING TO THE OLD REPUBLIC NATIONAL TITLE INS. CO., "COMMITMENT FOR TITLE INSURANCE", COMMITMENT 01-11194660-01T, EFFECTIVE DATE: 06/14/2012 AT 7:00 AM.

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL I)

A. To the extend that the subject property describes a "limited easement" conveyed to the current owner, exception is made for any deficiency resulting from the failure to specify the nature and extend of the easement granted. **(Vague and ambiguous easement description – surveyor unable to determine if easement affects the Proposed Lease Area or the Proposed 30' Access & Utility Easement)**

(6) Findings of fact, conclusions of law and judgment, recorded 4/28/1993, as book 303, page 552, of Harlan County Records.
(Vague and ambiguous description – surveyor unable to show location of the 12' Passageway Easement)

(7) Easement and Covenants as contained in deed dated 8/29/2005, recorded 5/10/2007, as deed book 410, page 272 of Harlan County Records.
(Vague and ambiguous descriptions – surveyor unable to determine if easement & Covenants affect the Proposed Lease Area or the Proposed 30' Access & Utility Easement)

(8) Lease Agreement executed by and between Terry Wayne William, and East Kentucky Network, LLC, d/b/a Appalachian Wireless), dated March 5, 2008, recorded on May 29, 2008, in Lease Book 48, Page 70, of the Harlan County Court Clerk's Office. **(Does not apply to the Proposed Lease Area or the Proposed 30' Access & Utility Easement)**

(9) Certificate of Delinquency sold to Pinnacle Investment for 2008 tax bill number 15888, in the original amount of $29.19, plus interest and penalties thereafter, recorded on October 27, 2009, of record in Miscellaneous Book 34, Page 439, of the Harlan County Court Clerk's Office. **(Not survey related)**

(10) Certificate of Delinquency sold to Pinnacle Investment for 2009 tax bill number 15807, in the original amount of $35.85, plus interest and penalties thereafter, recorded on July 26, 2010, of record in Miscellaneous Book 34, Page 406, of the Harlan County Court Clerk's Office. **(Not survey related)**

SCHEDULE B – SECTION II (EXCEPTIONS TO THE LEASE PARCEL)

(11) Certificate of Delinquency sold to Pinnacle Investment for 2009 tax bill number 15806, in the original amount of $292.62, plus interest and penalties thereafter, recorded on July 26, 2010, of record in Miscellaneous Book 34, Page 416, of the Harlan County Court Clerk's Office. **(Not survey related)**

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL II)

(12) Limited Right of Way Easement to Johnny Jason Christian, dated 4/16/1997, recorded 1/29/1998, as easement book 5, page 416 of Harlan County Records. Note: Contract dated 4/16/1997, recorded 11/20/2002, as book 371, page 163 of Harlan County Records.
(Does affect the Proposed Lease Area and the Proposed 30' Access & Utility Easement as shown on survey)

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL III)

(13) Rights for Pipeline/Well purposes as contained in deed dated 3/8/1989, recorded 9/4/1991, as deed book 294, page 19 of Harlan County Records.
(Vague and ambiguous description – surveyor unable to determine location and if easement affects the Proposed Lease Area or the Proposed 30' Access & Utility Easement)

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL IV)

(14) Easement as contained in deed dated 6/6/2001, recorded 6/15/2001, as deed book 358, page 771 of Harlan County Records.
(Does affect the Proposed 30' Access & Utility Easement)

(15) A mortgage in favor of Area Bank, dated June 6, 2001, in the original amount of $80,000.00, recorded on June 15, 2001 of record in Mortgage Book 267, Page 161, of the Harlan County Court Clerk's Office, and assigned to Central Mortgage Company in MB 279, Page 150. **(Does affect the Proposed Lease Area and the Proposed 30' Access & Utility Easement)**

(16) A Federal Notice of Lien Jack Ledford, Debtor, SS No. xxx-xx-8992, dated March 24, 2004, in the original amount of $15,100.00, recorded on April 12, 2004 in Encumbrance Book 37, Page 232, of the Harlan County Court Clerk's Office. **(Not survey related)**

(17) A Land Contract Agreement dated July 1, 2003, by and between Jack and Alice Ledford and Bill and Connie Ledford, in the original amount of $74,000, recorded on January 7, 2010, in Miscellaneous Book 33, Page 470, of the Harlan County Court Clerk's Office. **(Not survey related)**

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL V)

(19) Findings of fact, conclusions of law and judgment, recorded 4/28/1993, as book 303, page 552, of Harlan County Records.
(Vague and ambiguous description – surveyor unable to show location of the 12' Passageway Easement)

(20) A mortgage in favor of Branch Banking & Trust Company, dated January 8, 2010, in the original amount of $11,250.00, recorded on January 15, 2010 of record in Mortgage Book 386, Page 501, of the Harlan County Court Clerk's Office. **(Does affect the Proposed 30' Access & Utility Easement)**

(21) Memorandum of Lease executed by and between Terry Wayne William, Lessor(s) and New Cingular Wireless PCS, LLC, Grantee, recorded on October 24, 2011, in Lease Book 50, Page 310, of Official Records (as to Parcels I & II). **(Does apply to the Proposed Lease Area and the Proposed 30' Access & Utility Easement)**

(22) Easement agreement by and between Harvey Lee Ford, Jr., & Beverly L. Ford, Grantors, and New Cingular Wireless PCS, LLC, Grantee, recorded on October 24, 2011, in Book 438, Page 682 of Harlan County Records, (as to Parcels III). **(Does apply to the Proposed Lease Area and the Proposed 30' Access & Utility Easement)**

(23) Easement agreement by and between Jack L. Leford & Alice M. Leford, Grantors, and New Cingular Wireless PCS, LLC, Grantee, recorded on October 24, 2011, in Book 438, Page 688 of Harlan County Records, (as to Parcels IV). **(Does apply to the Proposed Lease Area and the Proposed 30' Access & Utility Easement)**

SCHEDULE B – SECTION II (EXCEPTIONS TO PARCEL VI)

(24) Water Access Easement in favor of the City of Evarts, dated 4/151987, recorded in easement book 3, page 431 of Harlan County Records.
(Does not apply to the Proposed Lease Area and the Proposed 30' Access & Utility Easement – located near old C.F.C. Nolan Addition to Evarts Subdivision)

(25) Transfer of Mineral Rights, Covenants, Conditions and Easement Contained in Deed Recorded 12/14/2006, as book 407, page 530 of Harlan County Records. **(Does not apply to the Proposed Lease Area & the Proposed 30' Access & Utility Easement)**

(26) Deed conveying oil, gas and coalbed methane underlying said property, together with certain rights to use of the surface in favor of the Friday Interest, Inc.., dated 5/19/2007, recorded in deed book 410, page 626, of Harlan County Records. **(Does not apply to the Proposed Lease Area & the Proposed 30' Access & Utility Easement)**

at&t

WESTOWER COMMUNICATIONS

FSTan
Formerly F.S. Land & T. Alan Neal Company
Land Surveyors and Consulting Engineers
2540 Ridgemoor Court, Suite 102
Louisville, KY 40299
Phone: (502) 635-5868 (502) 636-5111
Fax: (502) 636-5263

SITE NUMBER:
LX6137

SITE NAME:
EVARTS

SITE ADDRESS:
9811 KY HIGHWAY 38
EVARTS, KY 40828

PROPOSED LEASE AREA:
AREA = 10,000 sq. ft.

PROPERTY OWNER:
TERRY WAYNE WILLIAMS
110 NOLAN ST.
EVARTS, KY 40828

MAP NUMBER:
134

PARCEL NUMBER:
5

SOURCE OF TITLE:
DEED BOOK 410, PAGE 272

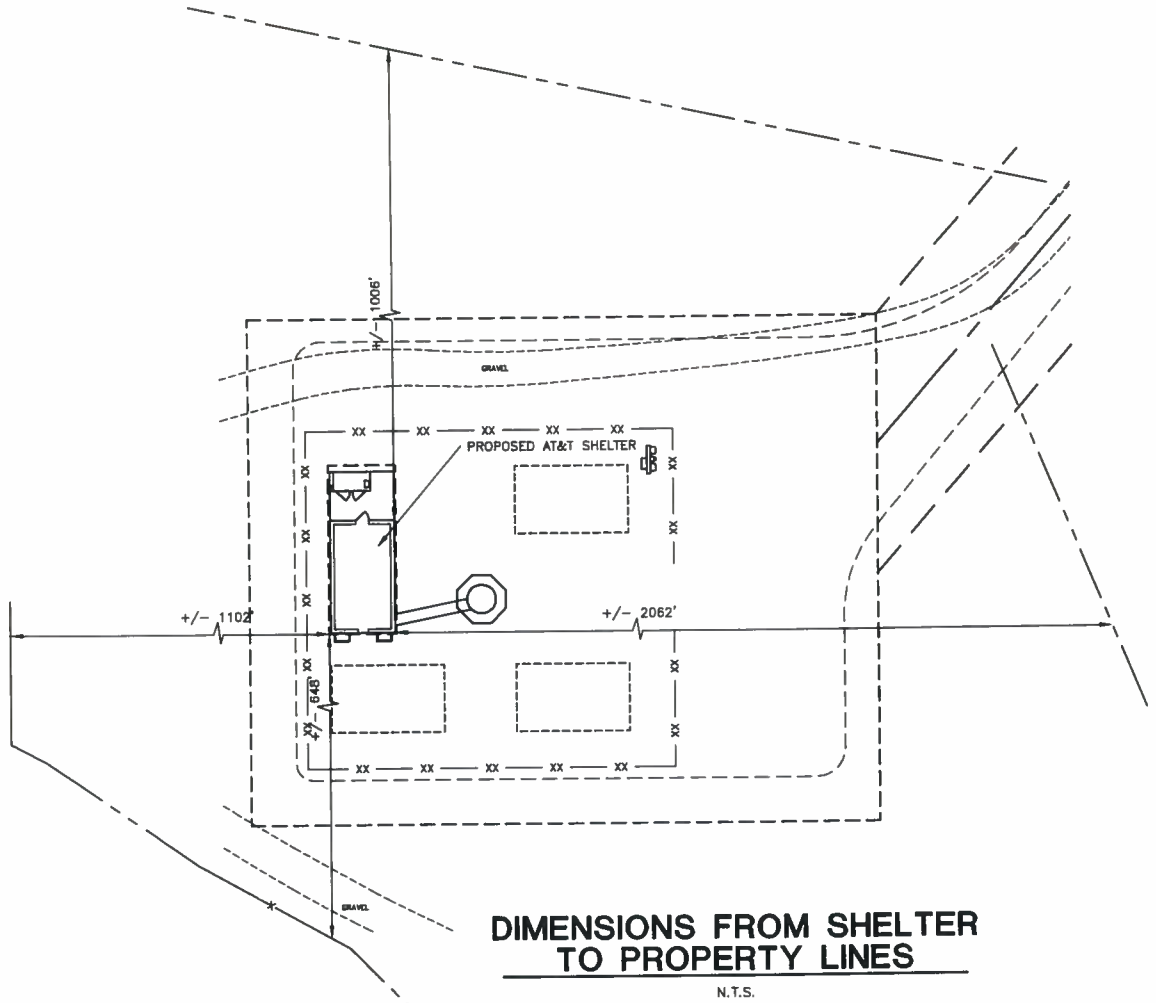
DWG BY:	CHKD BY:	DATE:
KLH	FSII	08.23.10

FSTAN PROJECT NO.:
10-6628

SHEET 4 OF 4

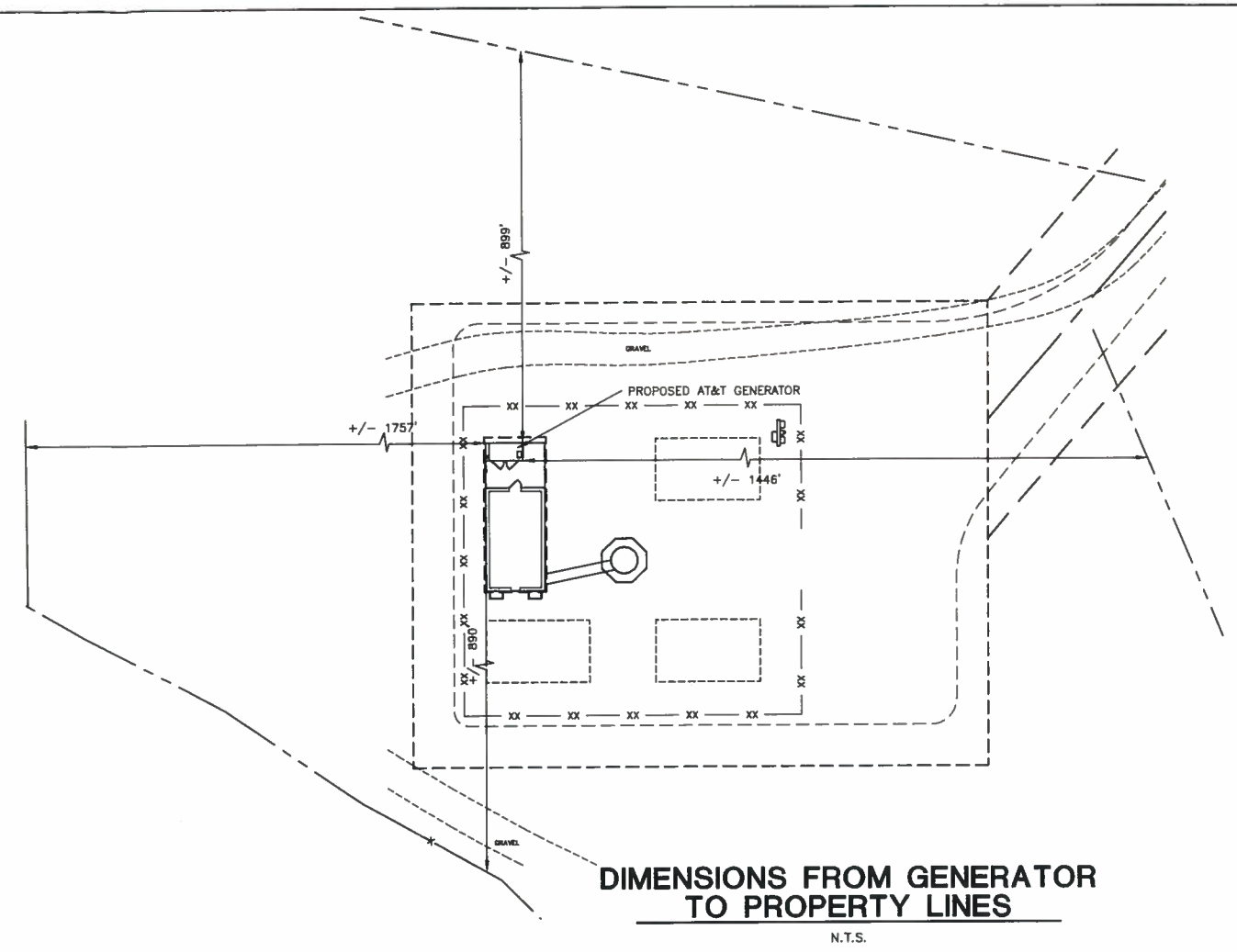
REVISIONS:
BOUNDARY NOTES/LEGALS – 09.30.11
TITLE REVIEW – 12.26.12
ADDRESS – 08.04.13

C2.1



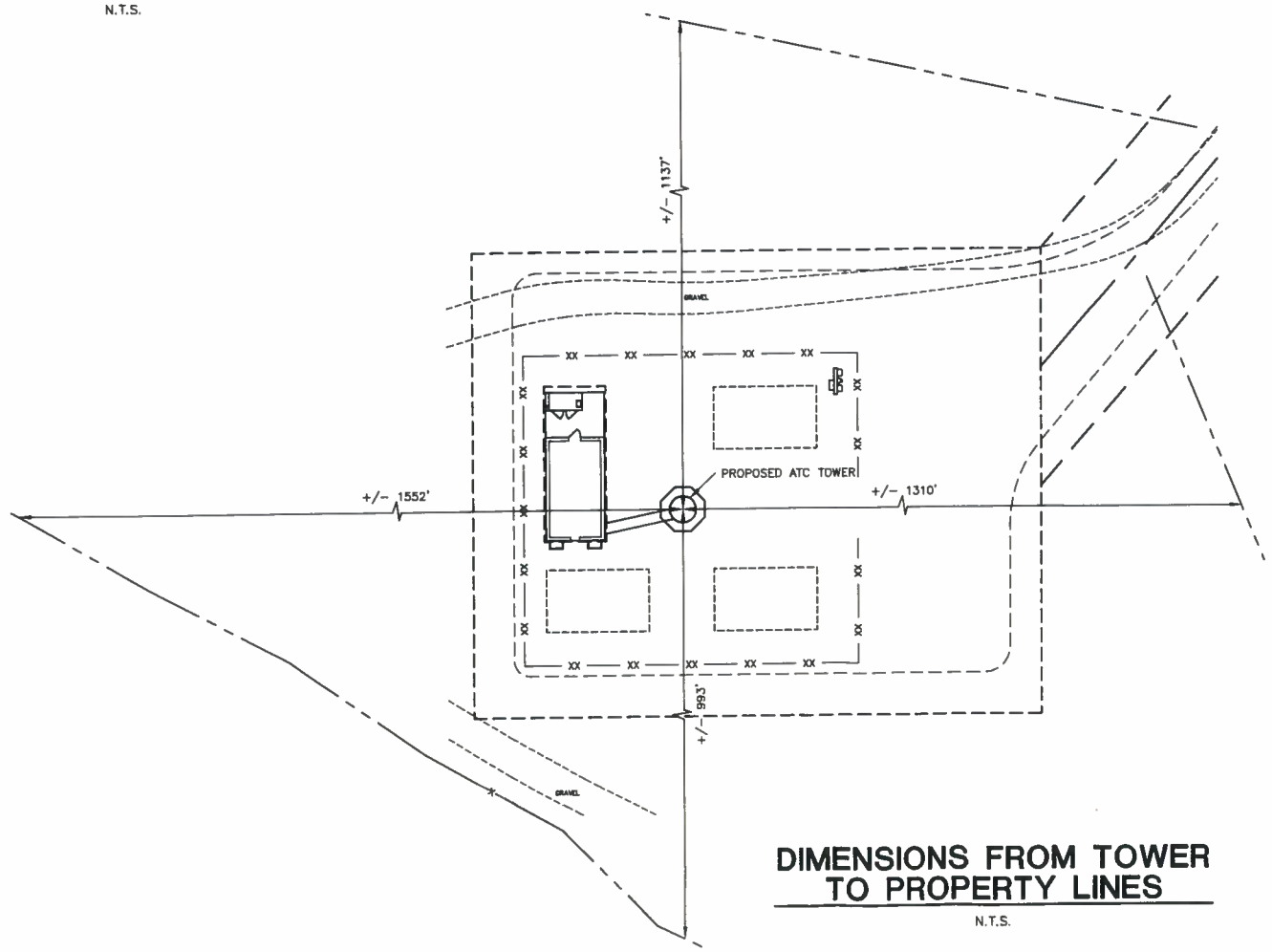
DIMENSIONS FROM SHELTER TO PROPERTY LINES

N.T.S.



DIMENSIONS FROM GENERATOR TO PROPERTY LINES

N.T.S.



DIMENSIONS FROM TOWER TO PROPERTY LINES

N.T.S.

at&t

WESTOWER COMMUNICATIONS

FStan

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17548 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5866 (502) 636-5111
Fax: (502) 636-5283

STATE OF KENTUCKY
ELIZABETH W. STUBER
21639
LICENSED PROFESSIONAL ENGINEER
8/1/13

SITE NUMBER: LX6137

SITE NAME: EVARTS

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828

PROPOSED LEASE AREA: AREA = 10,000 SQ. FT.

PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JMW	08.26.10

FSTAN PROJECT NO.: 10-6628

SHEET C3-1 OF 17

REVISIONS:

05-21-13 CDs REVISED

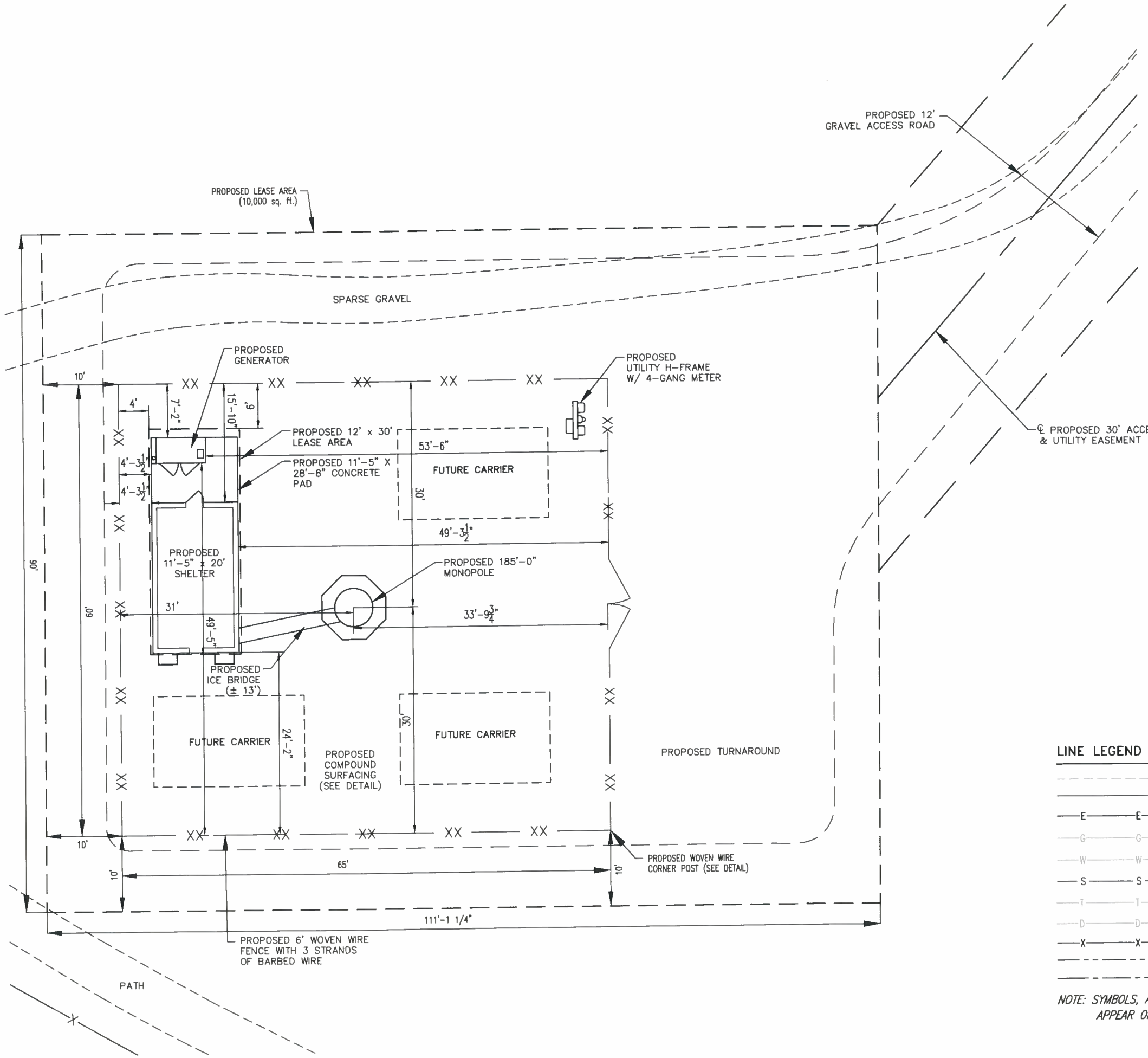
07-1-13 CDs REVISED

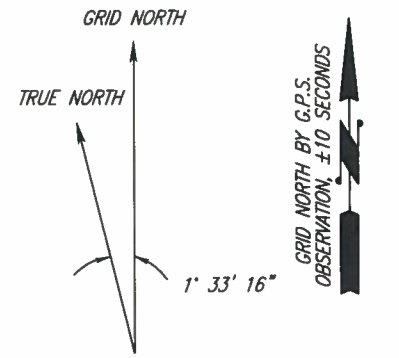
07-11-13 REVISED TOWER HEIGHT

DIMENSION TO PROPERTY LINES

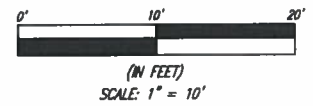
EVARTS
SITE ID# LX6137

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828





NORTH IS BASED ON THE KENTUCKY STATE PLANE COORDINATE SYSTEM, SOUTH ZONE AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON JULY 26, 2010.



NOTES

1. REMOVE ALL VEGETATION & CLEAN AREA W/ LEASE AREA (WHERE REQUIRED)
2. FINISH GRADING TO PROVIDE EFFECTIVE DRAINAGE W/ A SLOPE OF NO LESS THAN ONE EIGHTH (1/8") PER FOOT FLOWING AWAY FROM EQUIP. FOR A MIN. DISTANCE OF SIX FEET (6') IN ALL DIRECTIONS.
3. LOCATE ALL U.G. UTILITIES PRIOR TO ANY CONSTRUCTION
4. FENCE COMPOUND FINISHED SURFACES

LINE LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- E — E — E — OVERHEAD ELECTRIC
- G — G — G — UNDERGROUND GAS LINE
- W — W — W — UNDERGROUND WATER LINE
- S — S — S — PROPOSED SILT FENCE LINE
- T — T — T — OVERHEAD TELEPHONE LINE
- D — D — D — DRAINAGE/STORM SEWER LINE
- X — X — X — FENCE LINE
- SUBJECT PROPERTY BOUNDARY
- RIGHT OF WAY CENTERLINE

NOTE: SYMBOLS, ABBREVIATIONS, OR LINESTYLES DO NOT NECESSARILY APPEAR ON DRAWING(S). USE ONLY AS APPLICABLE

at&t

WESTOWER COMMUNICATIONS

FSTan

F.S. Land Company
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Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
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Phone: (502) 635-5868 (502) 636-5111
Fax: (502) 636-5263

STATE OF KENTUCKY
ELIZABETH W. STUBER
21636
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER: LX6137

SITE NAME: EVARTS

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828

PROPOSED LEASE AREA: AREA = 10,000 SQ. FT.

PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JMW	08.26.10

FSTAN PROJECT NO.: 10-6628

SHEET Z-3 OF 9

REVISIONS:

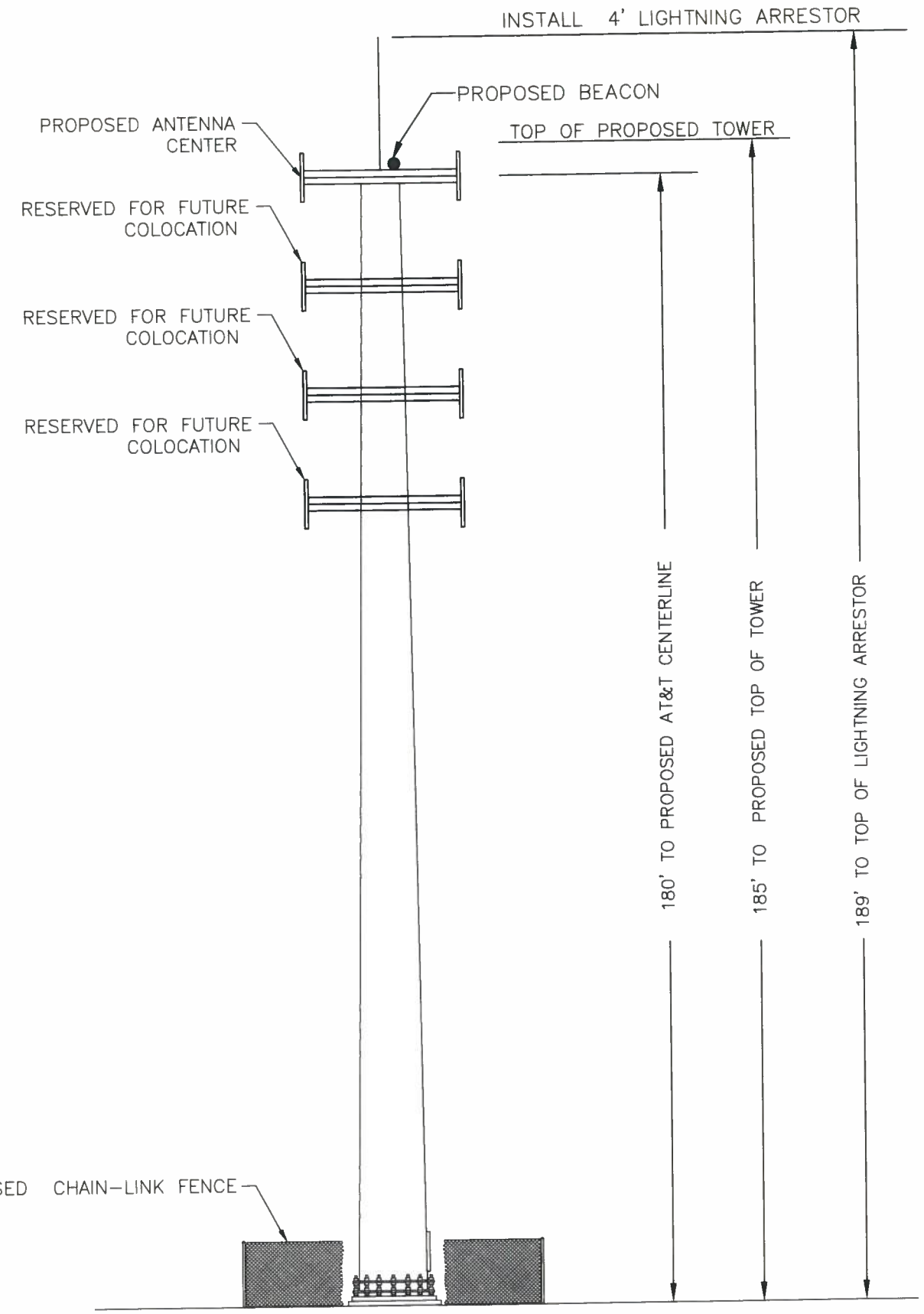
05-21-13 CDs REVISED

07-11-13 REVISED TOWER HEIGHT

AT&T SHELTER LAYOUT

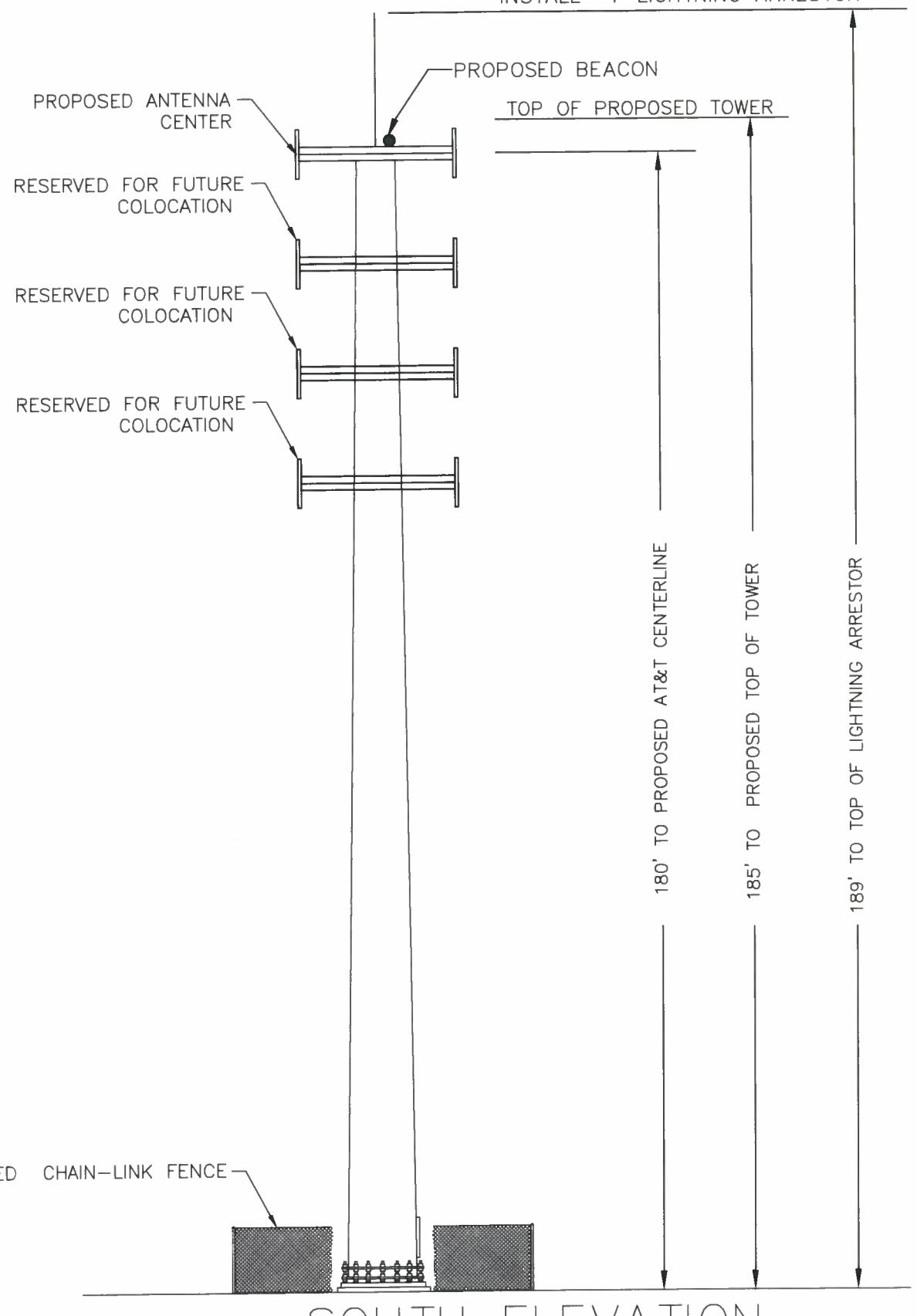
EVARTS
SITE ID# LX6137

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828



NORTH ELEVATION

NOT TO SCALE



SOUTH ELEVATION

NOT TO SCALE

NOTE:

THE ELEVATIONS SHOWN ON THIS SHEET ARE FOR PICTORIAL PURPOSES ONLY. THIS DESIGN WAS PROVIDED BY OTHERS. REFER TO TOWER PLANS FOR TOWER DESIGN.

COAX LADDER TO BE CONSTRUCTED PER STRUCTURAL ANALYSIS.

CONTRACTOR IS RESPONSIBLE FOR REVIEWING STRUCTURAL & INSTALLING COAX PER STRUCTURAL ANALYSIS. NSORO REPRESENTATIVE WILL PROVIDE GENERAL CONTRACTOR WITH STRUCTURAL ANALYSIS.

at&t

WESTOWER COMMUNICATIONS

FStan

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5888 (502) 636-5111
Fax: (502) 636-5283

STATE OF KENTUCKY
ELIZABETH W. STUBER
21636
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
LX6137

SITE NAME:
EVARTS

SITE ADDRESS:
9811 KY HIGHWAY 38
EVARTS, KY 40828

PROPOSED LEASE AREA:
AREA = 10,000 SQ. FT.

PROPERTY OWNER:
TERRY WAYNE WILLIAMS
110 NOLAN ST.
EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JMW	08.26.10

FSTAN PROJECT NO.:
10-6626

SHEET Z-4 OF 9

REVISIONS:

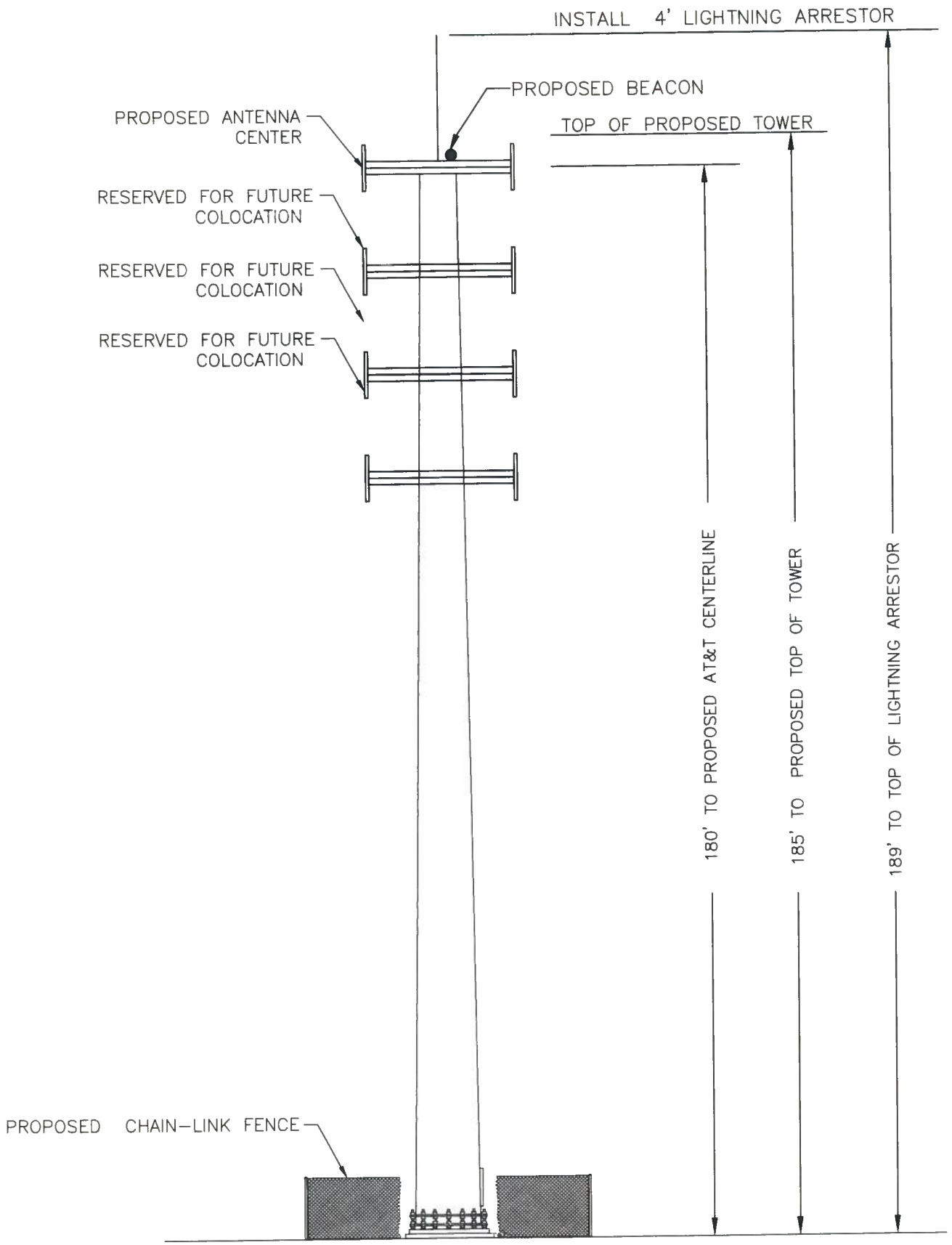
07-11-13 REVISED TOWER HEIGHT

08-04-13 ADDRESS

NORTH & SOUTH ELEVATION

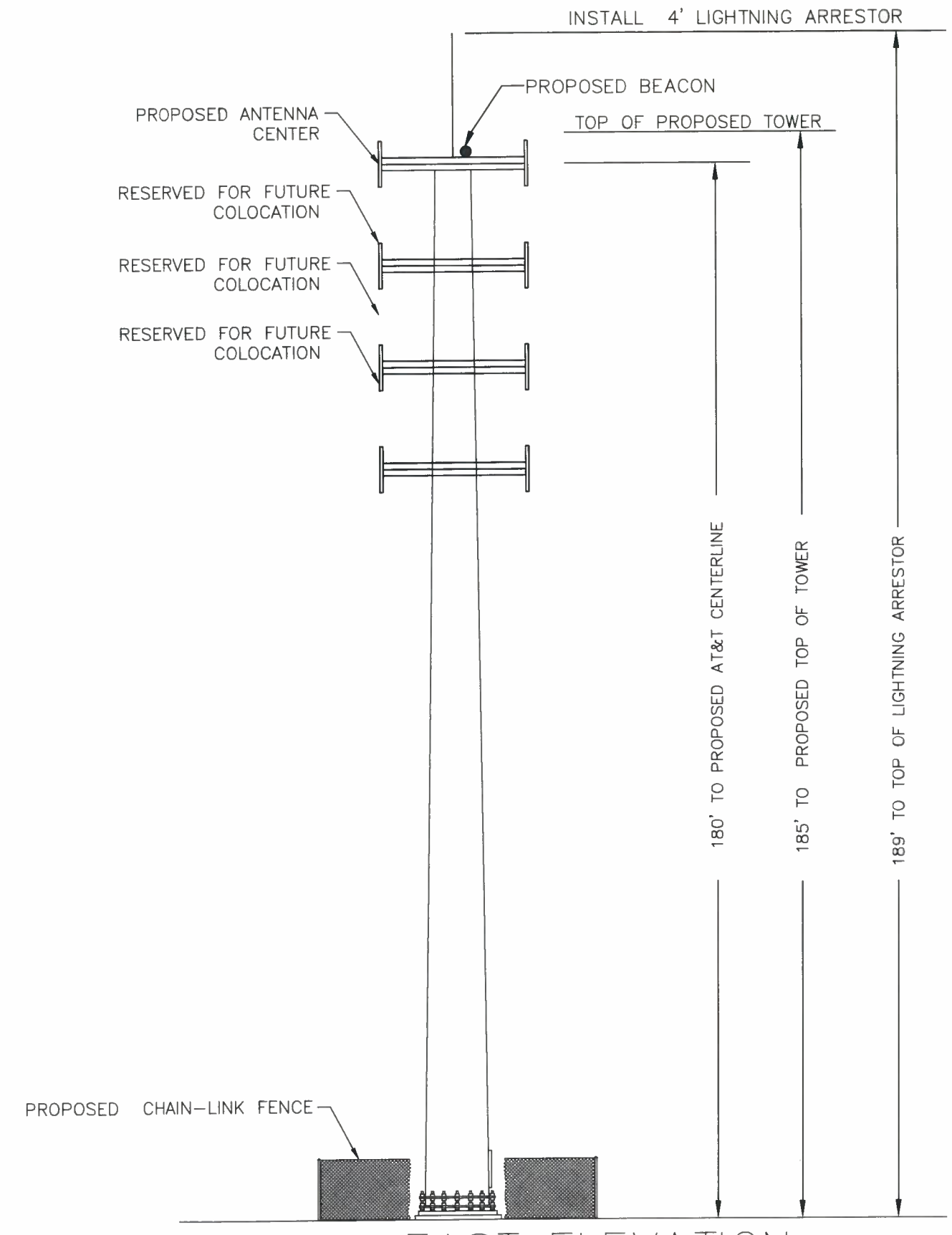
EVARTS
SITE ID# LX6137

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828



WEST ELEVATION

NOT TO SCALE



EAST ELEVATION

NOT TO SCALE

NOTE:

THE ELEVATIONS SHOWN ON THIS SHEET ARE FOR PICTORIAL PURPOSES ONLY. THIS DESIGN WAS PROVIDED BY OTHERS. REFER TO TOWER PLANS FOR TOWER DESIGN.

COAX LADDER TO BE CONSTRUCTED PER STRUCTURAL ANALYSIS.

CONTRACTOR IS RESPONSIBLE FOR REVIEWING STRUCTURAL & INSTALLING COAX PER STRUCTURAL ANALYSIS. NSORO REPRESENTATIVE WILL PROVIDE GENERAL CONTRACTOR WITH STRUCTURAL ANALYSIS.

at&t

WESTOWER COMMUNICATIONS

FStan

F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
PO Box 17546 2313/2315 Crittenden Drive
Louisville, KY 40217
Phone: (502) 635-5866 (502) 636-5111
Fax: (502) 636-5283

STATE OF KENTUCKY
ELIZABETH W. STUBER
21636
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
LX6137

SITE NAME:
EVARTS

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9811 KY HIGHWAY 38
EVARTS, KY 40828

PROPOSED LEASE AREA:
AREA = 10,000 SQ. FT.

PROPERTY OWNER:
TERRY WAYNE WILLIAMS
110 NOLAN ST.
EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JMW	08.26.10

FSTAN PROJECT NO.:
10-6626

SHEET Z-5 OF 9

REVISIONS:

08-04-13 ADDRESS

07-11-13 REVISED TOWER HEIGHT

WEST & EAST ELEVATION

EVARTS
SITE ID# LX6137

SITE ADDRESS: 9811 KY HIGHWAY 38 EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828

EXHIBIT C
TOWER AND FOUNDATION DESIGN

N E L L O
CORPORATION

211 W. Washington St.
Suite 2000
South Bend, IN 46601

Phone: 574-288-3632
Fax: 574-288-5860
www.nelloinc.com

July 26, 2013

Stephani Leadingham
WesTower Communications, Inc.
10400 Linn Station Road, Suite 225
Louisville, KY
(407) 221-1104

Re: NTP 185' - Evarts, Harlan County, KY
Nello Tower Sales Order # 19101

Ms. Leadingham:

This is regarding your inquiry about the expected performance of your NTP 185' tapered pole quoted by Nello Corporation for a site in Harlan County, KY.

Our towers are designed to meet or exceed industry standards defined by TIA/EIA-222-G, "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures" (EIA Standard). It is our opinion that the possibility of a tower collapse is very unlikely. The tower is designed using extreme wind and ice conditions. In fact, wind speeds specified by the EIA Standard are 50-year wind speeds. That is, they have only a 2% statistical chance of occurring in any given year. Furthermore, the tower is designed with extra factors of safety so that it would not be near a failure point even if the wind conditions were at their maximum design level.

This tower has been designed using the following wind conditions: 1) a 90-mph 3-second-gust wind speed with no ice, and 2) a 30-mph 3-second-gust wind speed with 0.50" radial ice. The EIA Standard specifies 90 mph as the wind speed required for Harlan County, KY. The "3-second-gust wind speed" refers to a wind measured at 33 feet above the ground. Equations in the EIA Standard take into account that the wind speed escalates with the increasing height of the tower.

Although we cannot guarantee exactly how a tower would fall if it were to fail, the most likely mode of failure will be a buckling failure of one of the tower section due to excessive compression loading. The tower section with the highest compressive stress ratio is located at the 132' – 185' level. The stress ratio in that section is calculated to be 99.7% of the code-permitted compression loading. Given that the tower section with the highest stress ratio will most likely fail first, the proposed tower would fail at the 132' level with the top 53' of the tower collapsing. Depending on the conditions at the time of failure and the stress levels in structural members below the 132' level, the top 53' of the tower would likely fall within a 0' fall radius.

If you have any other questions or concerns regarding our designs, please contact me by phone at 574-288-3632.

Sincerely,

Jason M. Lambert, PE
Vice President of Engineering

STATE OF KENTUCKY
JASON
MARK
LAMBERT
No. 28217
LICENSED
PROFESSIONAL ENGINEER

JUL 26 2013

NELLO CORPORATION

Tower and Foundation Drawings

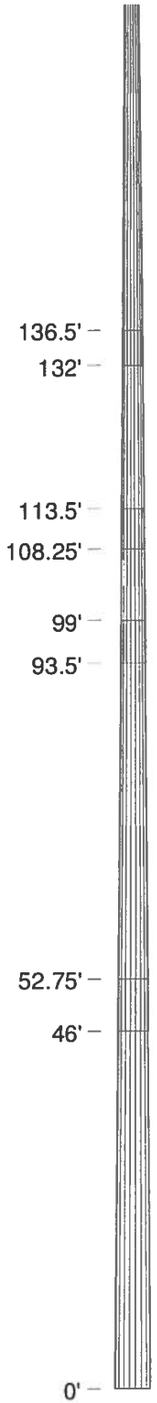
Sales Order:	19101
Drawing Number	200053
Tower:	200054
Foundation:	
Order Description:	NTP 57" X 185'
Site Name:	Evarts
Location:	Harlan Co., KY

Prepared For:

Customer:	WesTower Communications, Inc.
Contact:	Stephani Leadingham
Date:	July 26, 2013

Table of Contents

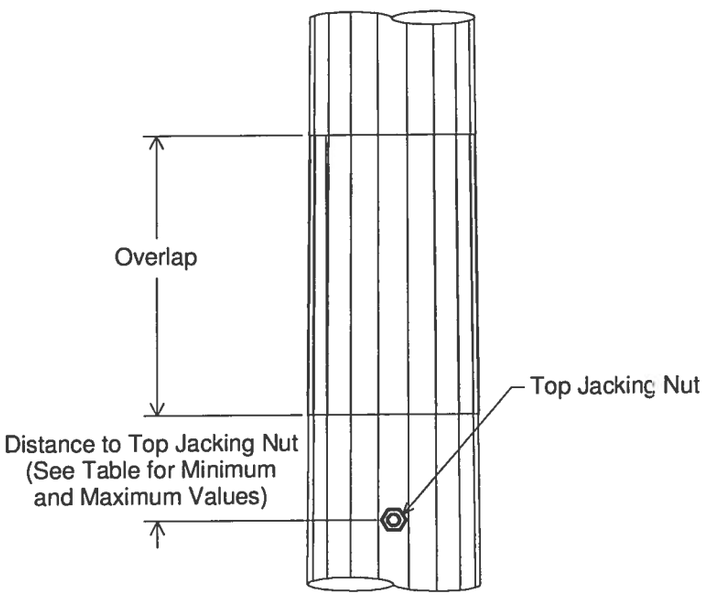
Section	Height (ft)	Height (ft)	Length (ft)	# of Sides	Bottom OD (in)	Top OD (in)	Thickness (in)	Material	Approx. Weight (lb)	Overlap (in)	Overlap (in)	Overlap (in)	to Top Jacking Nut (in)	to Top Jacking Nut (in)	to Top Jacking Nut (in)
1	132	185	53	18	32.9149	22.0000	0.1875	A572-65	3210	54	48 1/2	59 3/8	15	20 1/2	9 5/8
2	108.25	136.5	28.25	18	37.2435	31.4256	0.3125	A572-65	3520	63	54 3/4	69 5/16	15	23 1/4	8 11/16
3	93.5	113.5	20	18	39.4686	35.3498	0.3125	A572-65	2730	66	58 1/4	72 5/8	15	22 3/4	8 3/8
4	46	99	53	18	48.4383	37.5234	0.3750	A572-65	9980	81	71 1/2	89 1/8	15	24 1/2	6 7/8
5	0	52.75	52.75	18	56.9741	46.1107	0.4375	A572-65	15420			0			



Tower Reactions

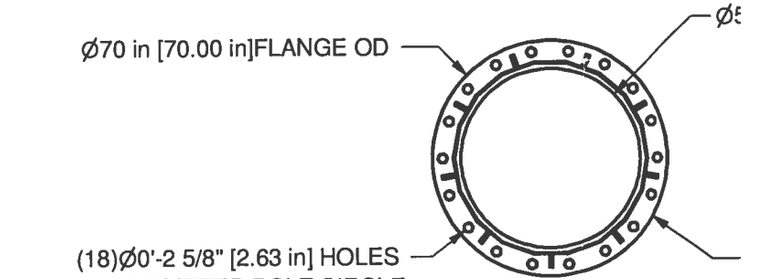
No Ice
Shear: 37.4 kips
Moment: 5215.5 ft-kips
Weight: 66.3 kips

With Ice
Shear: 4.3 kips
Moment: 614.9 ft-kips
Weight: 91.6 kips



A jacking nut is placed near the top of each section which will have another section placed on top. The distance from this nut to the bottom of the next section must not exceed the value given in the column labeled "Maximum Distance to Top Jacking Nut."

Pole Splice Detail



BASE FLANGE DETAIL

ORIG. DATE: 7/25/2013

DWG NO: 200053

TITLE:
WesTowe
Inc.
NTP 57" >
Evarts

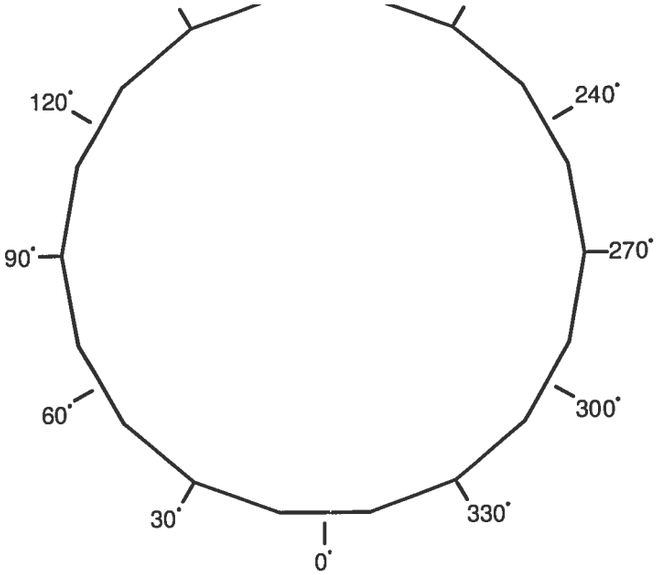
167	3	8 x 16	60, 180, 300
152	3	8 x 16	60, 180, 300
143	3	8 x 16	60, 180, 300
7.5	1	10 x 30	0
7.5	1	10 x 30	90
7.5	1	10 x 30	180
7.5	1	10 x 30	270

Feedline Loading

Height	Qty.	Description
0' - 185'	1	1" Conduit
0' - 185'	24	LDF7-50A (1-5/8 FOAM)
0' - 170'	24	LDF7-50A (1-5/8 FOAM)
0' - 155'	24	LDF7-50A (1-5/8 FOAM)
0' - 140'	24	LDF7-50A (1-5/8 FOAM)

Antenna Loading

Height	Qty.	Description
185'	1	6' Lightning Rod
185'	1	Beacon (12" x 36")
185'	12	Panel-96x12x3
185'	1	Low Profile Platform w/ Handrail
170'	12	Panel-96x12x3
170'	1	Low Profile Platform
155'	12	Panel-96x12x3
155'	1	Low Profile Platform
140'	12	Panel-96x12x3
140'	1	Low Profile Platform



Step Bolts on This Side of Pole

Note:
The azimuths referenced here are only to illustrate where the pole features are in relation to each other. The azimuths are not to indicate which cardinal direction the anchor bolts or the pole should be positioned.

Pole Reference Azimuths

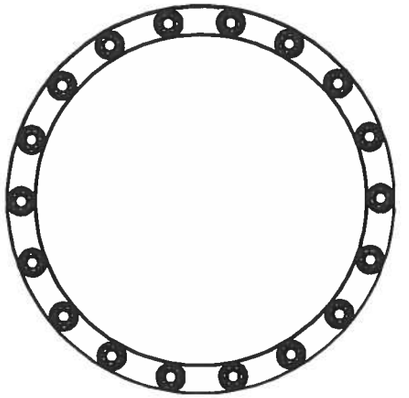
Anc
Are o
the 0

Ancho

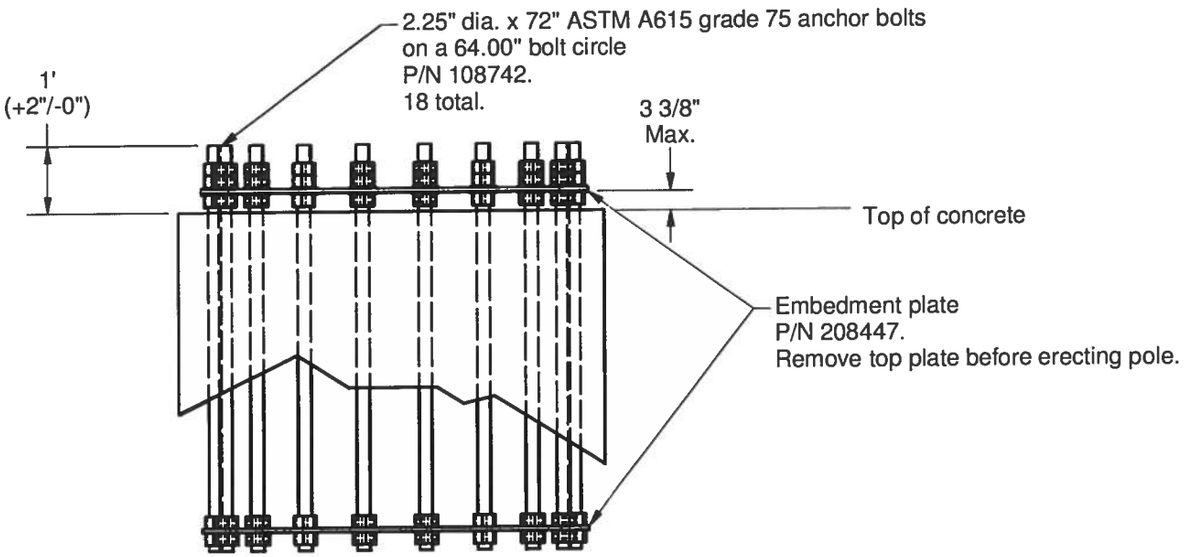
ORIG. DATE: 7/25/2013

DWG NO: 200053

TITLE:
WesTowe
Inc.
NTP 57")
Evarts



PLAN VIEW



ANCHOR BOLT DETAIL

ORIG. DATE: 7/25/2013

DWG NO: 200053

TITLE:
WesTowe
Inc.
NTP 57" X
Evarts

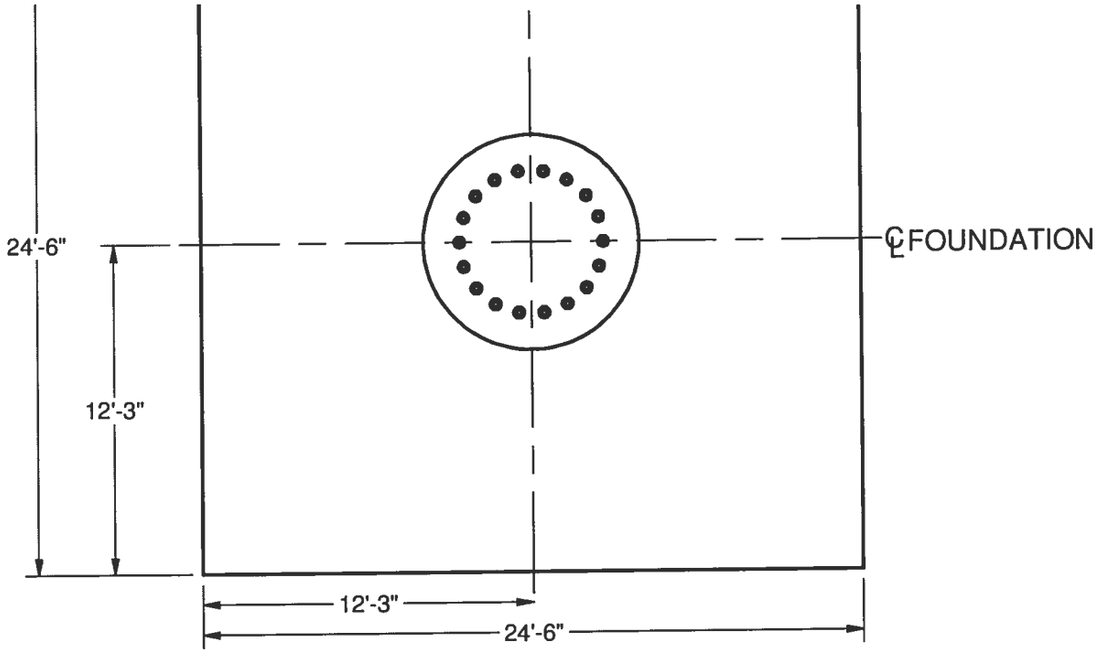
30 mph 3-second gust basic wind speed with 1/2 inch basic ice thickness
Structure Class: II
Exposure Category: C
Topographic Category: 1

2. Tower design loading is assumed to be based on site-specific data and must be verified by others prior to installation.
3. Tower design includes the antennas, dishes, and/or lines listed in the appurtenance loading tables on sheet 2.
4. Antenna mounting pipes may need to be field cut to match the lengths listed in the appurtenance loading tables on sheet 2.
5. Tower member design does not include stresses due to erection since erection equipment and procedures are unknown. Tower installation shall be performed by competent and qualified erectors in accordance with TIA-222-G and OSHA standards and all applicable building codes.
6. Field connections shall be bolted. No field welds shall be allowed unless otherwise noted.
7. Structural bolts shall conform to ASTM A325, except for 1/2 inch diameter and smaller bolts, which shall conform to ASTM A449 or SAE J429 Grade 5.
8. Structural steel and connection bolts shall be galvanized after fabrication in accordance with TIA-222-G.
9. All high strength bolts shall be tightened to a "snug tight" condition as defined in the November 13, 1985, AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
10. Tower shall be marked and lighted in conformance with local building codes, FAA regulations, and TIA-222-G.
11. Tower shall be grounded in conformance with local building codes and TIA-222-G.
12. Allowable tolerance on as-built tower steel height is plus 1% or minus 1/2%.
13. Maintenance and inspection shall be performed over the life of the structure in accordance with TIA-222-G.
14. Material specifications:
    NTP 18-Sided Pole - ASTM A572 Grade 65
    Pole Flange - ASTM A572 Grade 50
    Pole Porthole Rim - ASTM A572 Grade 65
15. A jacking nut is placed near the top of each section which will have another section placed on top. The distance from this top jacking nut to the bottom of the next section must not exceed the value given in the column labeled "Maximum Distance to Top Jacking Nut." Jacking may be required to achieve the proper overlap.
16. The horizontal distance between the vertical centerlines at any two elevations shall not exceed 0.25 percent of the vertical distance between the two elevations. Measure early in the morning before the sunward side of the pole expands.
17. Sections must be erected with the 0 degree azimuth lined up to ensure proper fit.
18. Remove anchor bolt template before erecting pole. Non-shrink grout may be placed under base flange after leveling pole. Drain holes must be provided if grouting.
19. Concrete contractor shall be responsible for properly aligning anchor bolts and materials before and after placing concrete, regardless of whether an anchor bolt template is provided.

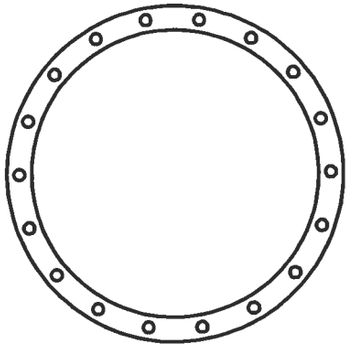
TITLE:
WesTowe
Inc.
NTP 57" X
Evarts

ORIG. DATE: 7/25/2013

DWG NO: 200053



PLAN VIEW
(REINFORCEMENT NOT SHOWN FOR CLARITY)

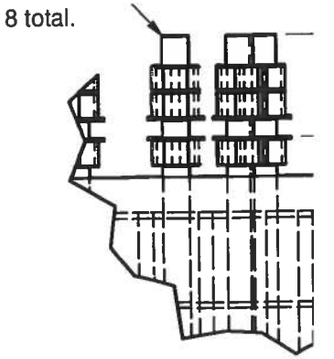


EMBEDMENT PLATE DETAIL

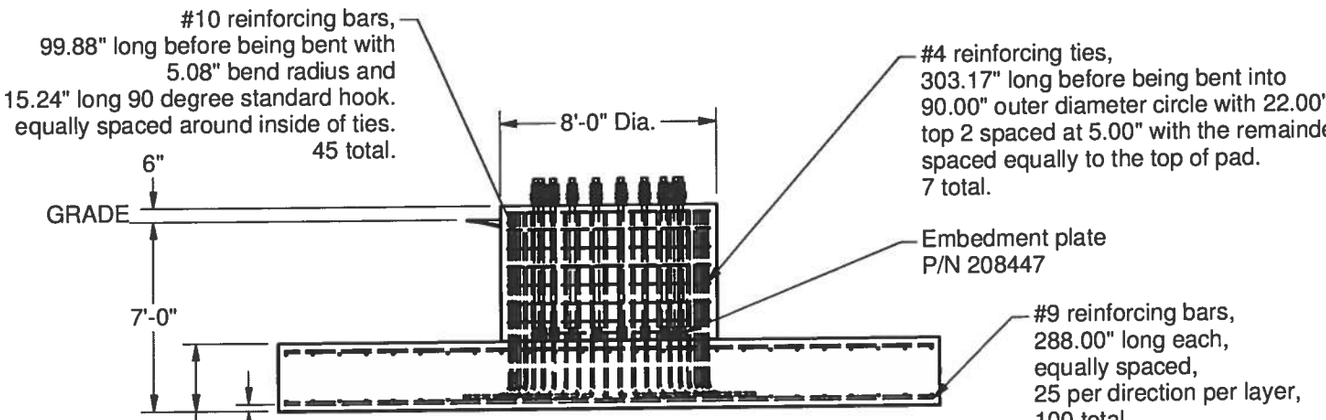
69 in EMBEDMENT PLATE O.D.

(18) 2-5/16" HOLES
ON A 64 in DIAMETER BOLT CIRCLE

59 in EMBEDMENT PLATE I.D.

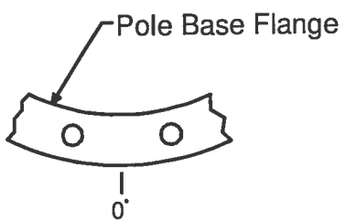


ANCHOR BO



MID-SECTION VIEW

PIER AND PAD FOUNDATION
(CONCRETE VOLUME: 64.9 CU. YD.)



Anchor Bolt Holes
Are on Either Side of
the 0 Degree Azimuth

Anchor Bolt Azimuth

ORIG. DATE: 7/26/2013

DWG NO: 200054

TITLE:
WesTowe
Inc.
NTP 57"
Evarts
Harlan C

Moment: 5215.5 ft-kips
Weight: 66.3 kips

2. Design based on geotechnical report dated 5/9/2013 by Environmental Corporation of America; Project No. L-1055b.

3. A field inspection shall be performed in order to verify that the actual site soil parameters meet or exceed the assumed soil parameters and that the depth of standard foundations are adequate based on the frost penetration and groundwater depth. Local frost depth must be no deeper than the bottom of the base foundation.

4. Reinforcement shall be deformed and conform to the requirements of ASTM A615 Grade 60 unless otherwise noted. Splices in reinforcement shall not be allowed unless otherwise noted.

5. Welding is prohibited on reinforcing steel and anchorage.

6. Structural backfill placed below pad must be compacted in 8" loose lifts to a 97% of maximum dry density at optimum moisture content in accordance with ASTM D698. Backfill must be clean and free of organic and frozen soils and foreign materials.

7. Backfill above foundation should be compacted to 95% of maximum dry density at water content within 2 percent of optimum. Backfill must be clean and free of organic and frozen soils and foreign materials.

8. Foundation designs assume level ground at tower site.

9. Loose material shall be removed from bottom of excavation prior to concrete placement.

10. Concrete cover from exposed surface of concrete to surface of reinforcement shall not be less than 3".

11. Concrete and reinforcement installation must conform to ACI 318, "Building Code Requirements for Structual Concrete."

12. Concrete shall develop a minimum compressive strength of 4000 psi in 28 days.

13. Concrete shall be placed as soon as practical after excavating to avoid disturbance of bearing and side wall surfaces.

14. Concrete contractor shall be responsible for properly aligning anchor bolts and materials before and after placing concrete, regardless of whether an anchor bolt template is provided.

15. Positive drainage shall be maintained during construction and throughout the life of the facility to minimize the potential for surface water infiltration.

16. The sub-grade, if practical, should be proof-rolled with vibratory compaction prior to casting foundation or placing structural fill.

17. Overexcavation of unsuitable soils for compacted backfill placement below footings should extend laterally beyond all edges of the footings at least 12 inches per foot of overexcavation depth below footing base elevation.

18. It shall be the contractor's responsibility to locate and prevent damage to any existing underground utilities, foundations or other buried objects that might be damaged or interfered with during construction of the foundation.

19. It is permissible to utilize a cold joint during construction of a pier and pad type foundation. The cold joint must be located at the interface of the piers with the pad, and contractor shall use a bonding agent suitable for cold joints.

20. A concrete mat may be used to level the bearing surface. The concrete in the leveling mat is to have a minimum compressive strength of 2000 psi at 28 days and can not exceed 12" thick.

21. Foundation design assumes an ultimate bearing capacity value of 10,000 psf.

22. Difficult excavation will be encountered due to very dense silty sand/partially weathered bedrock found approximately 5 feet below ground surface upon drilling of test boring. The contractor should be prepared to remove such material and determine the appropriate excavation equipment necessary.

23. Earthwork operations and foundation installation methods shall be in accordance with the geotechnical report.

ORIG. DATE: 7/26/2013

DWG NO: 200054

TITLE:
WesTowe
Inc.
NTP 57" X
Evarts
Harlan Co

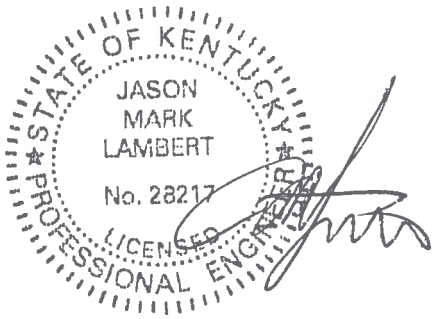
NELLO CORPORATION

Design Supporting Calculations

Sales Order:	19101
Drawing Number	200053
Tower:	200054
Foundation:	
Order Description:	NTP 57" X 185'
Site Name:	Evarts
Location:	Harlan Co., KY

Prepared For:

Customer:	WesTower Communications, Inc.
Contact:	Stephani Leadingham
Date:	July 26, 2013
Included pages:	78



JUL 26 2013

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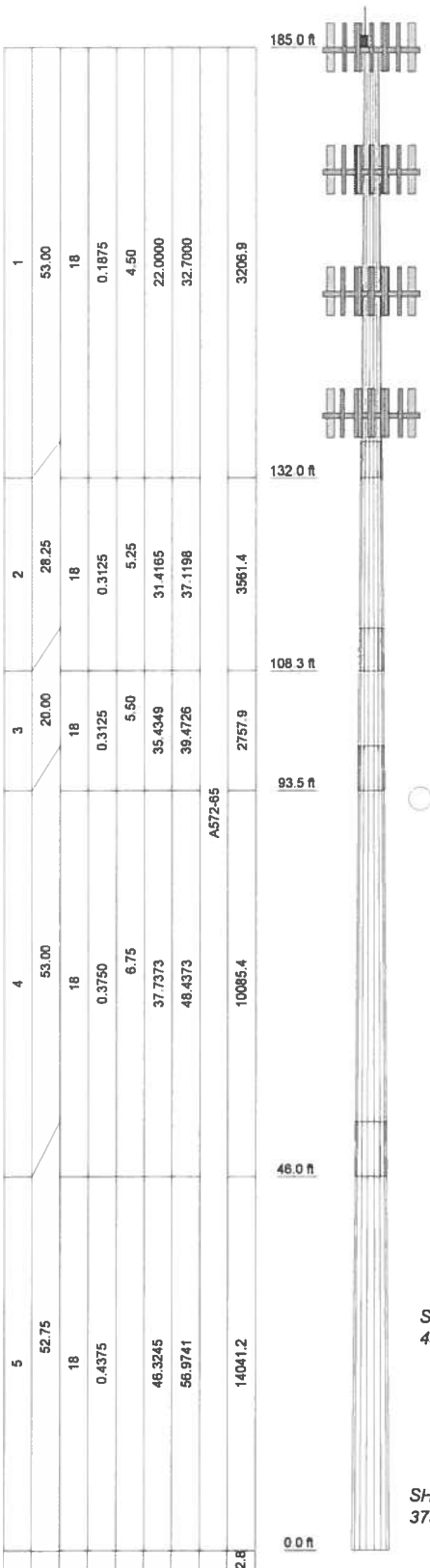


	1	2	3	4	5
Section Length (ft)	53.00	28.25	20.00	53.00	52.75
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.3125	0.3125	0.3750	0.4375
Socket Length (ft)	4.50	5.25	5.50	6.75	
Top Dia (in)	22.0000	31.4165	35.4349	37.7373	46.3245
Bot Dia (in)	32.7000	37.1198	39.4726	48.4373	56.9741
Grade	A572-65				
Weight (lb)	3206.9	3561.4	2757.9	10085.4	14041.2

Section Weight (lb) 33652.8

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6' Lightning Rod	185	Low Profile Platform	170
Beacon (12" x 36")	185	(4) Panel-96x12x3	155
(4) Panel-96x12x3	185	(4) Panel-96x12x3	155
(4) Panel-96x12x3	185	(4) Panel-96x12x3	155
(4) Panel-96x12x3	185	Low Profile Platform	155
Low Profile Platform w/ Handrail	185	(4) Panel-96x12x3	140
(4) Panel-96x12x3	170	(4) Panel-96x12x3	140
(4) Panel-96x12x3	170	(4) Panel-96x12x3	140
(4) Panel-96x12x3	170	Low Profile Platform	140

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 90 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 30 mph basic wind with 0.50 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 99.7%

ALL REACTIONS ARE FACTORED

AXIAL
91574 lb

SHEAR
4345 lb

MOMENT
614932 lb-ft

TORQUE 21 lb-ft
30 mph WIND - 0.5000 in ICE

AXIAL
66258 lb

SHEAR
37353 lb

MOMENT
5215506 lb-ft

TORQUE 160 lb-ft
REACTIONS - 90 mph WIND

STATE OF KENTUCKY
JASON MARK LAMBERT
No. 28217
LICENSED PROFESSIONAL ENGINEER

Nello Corporation
211 W. Washington Street, Suite 2000
South Bend, IN 46601
Phone: (574) 288-3632
FAX: (574) 288-5860

Job: ***SO19101; Tower 200053; Foundation 200054***		
Project: ***NP 185' - Evarts - Harlan Co., KY***		
Client: WesTower Communications, Inc.	Drawn by: BL TNX V. 6.0.0.8	App'd:
Code: TIA-222-G	Date: 07/25/13	Scale: NTS
Path: N:\eri\2000\200053.eri		Dwg No. E-1

tnxTower	Job	Page
	SO19101; Tower 200053; Foundation 200054	1 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	Project NP 185' - Evarts - Harlan Co., KY	Date 10:23:47 07/25/13
	Client WesTower Communications, Inc.	Designed by BL TNX V. 6.0.0.8

Tower Input Data

There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

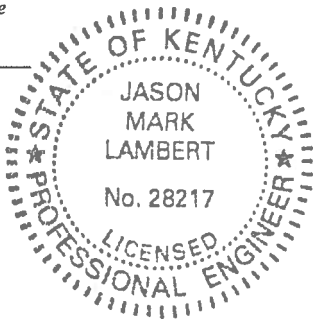
Basic wind speed of 90 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.5000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 30 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	√ Calculate Redundant Bracing Forces
Use Moment Magnification	√ Use Clear Spans For Wind Area	√ Ignore Redundant Members in FEA
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	√ SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	√ Retension Guys To Initial Tension	√ All Leg Panels Have Same Allowable
Escalate Ice	√ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	√ Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	√ Autocalc Torque Arm Areas	Poles
√ Leg Bolts Are At Top Of Section	√ SR Members Have Cut Ends	√ Include Shear-Torsion Interaction
√ Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	√ Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	185.00-132.00	53.00	4.50	18	22.0000	32.7000	0.1875	0.7500	A572-65 (65 ksi)
L2	132.00-108.25	28.25	5.25	18	31.4165	37.1198	0.3125	1.2500	A572-65 (65 ksi)
L3	108.25-93.50	20.00	5.50	18	35.4349	39.4726	0.3125	1.2500	A572-65



Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L4	93.50-46.00	53.00	6.75	18	37.7373	48.4373	0.3750	1.5000	(65 ksi) A572-65
L5	46.00-0.00	52.75		18	46.3245	56.9741	0.4375	1.7500	(65 ksi) A572-65

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	33.2045	19.3490	2584.0252	11.5419	16.6116	155.5555	5171.4505	9.6763	5.4252	28.934
L2	32.8237	30.8513	3770.8868	11.0419	15.9596	236.2772	7546.7355	15.4286	4.9793	15.934
	37.6924	36.5083	6248.8006	13.0666	18.8569	331.3807	12505.8235	18.2576	5.9831	19.146
L3	37.0578	34.8370	5429.3416	12.4685	18.0009	301.6145	10865.8274	17.4218	5.6865	18.197
	40.0816	38.8420	7525.3581	13.9019	20.0521	375.2902	15060.6182	19.4247	6.3972	20.471
L4	39.4469	44.4704	7842.8732	13.2636	19.1705	409.1109	15696.0663	22.2394	5.9818	15.951
	49.1845	57.2061	16695.0727	17.0621	24.6061	678.4924	33412.1132	28.6085	7.8650	20.973
L5	48.4229	63.7199	16950.8789	16.2899	23.5329	720.3068	33924.0622	31.8660	7.3831	16.876
	57.8530	78.5081	31703.7402	20.0705	28.9428	1095.3922	63449.1971	39.2615	9.2574	21.16

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 185.00-132.00				1	1	1.1		
L2 132.00-108.25				1	1	1.1		
L3 108.25-93.50				1	1	1.1		
L4 93.50-46.00				1	1	1.1		
L5 46.00-0.00				1	1	1.1		

Monopole Base Plate Data

Base Plate Data	
Base plate is square	
Base plate is grouted	
Anchor bolt grade	A615-75
Anchor bolt size	2.2500 in
Number of bolts	18
Embedment length	60.0000 in
f'_c	3 ksi
Grout space	0.5000 in
Base plate grade	A572-50
Base plate thickness	3.0000 in
Bolt circle diameter	64.0000 in
Outer diameter	70.0000 in
Inner diameter	53.2500 in

Base Plate Data	
Base plate type	Plain Plate

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1" Conduit	C	No	Inside Pole	185.00 - 0.00	1	No Ice	0.00	0.50
						1/2" Ice	0.00	0.50
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	185.00 - 0.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	170.00 - 0.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	155.00 - 0.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	140.00 - 0.00	24	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	185.00-132.00	A	0.000	0.000	0.000	0.000	747.84
		B	0.000	0.000	0.000	0.000	1200.48
		C	0.000	0.000	0.000	0.000	479.14
L2	132.00-108.25	A	0.000	0.000	0.000	0.000	467.40
		B	0.000	0.000	0.000	0.000	934.80
		C	0.000	0.000	0.000	0.000	479.27
L3	108.25-93.50	A	0.000	0.000	0.000	0.000	290.28
		B	0.000	0.000	0.000	0.000	580.56
		C	0.000	0.000	0.000	0.000	297.65
L4	93.50-46.00	A	0.000	0.000	0.000	0.000	934.80
		B	0.000	0.000	0.000	0.000	1869.60
		C	0.000	0.000	0.000	0.000	958.55
L5	46.00-0.00	A	0.000	0.000	0.000	0.000	905.28
		B	0.000	0.000	0.000	0.000	1810.56
		C	0.000	0.000	0.000	0.000	928.28

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
L1	185.00-132.00	A	1.169	0.000	0.000	0.000	0.000	747.84
		B		0.000	0.000	0.000	0.000	1200.48
		C		0.000	0.000	0.000	0.000	479.14
L2	132.00-108.25	A	1.138	0.000	0.000	0.000	0.000	467.40
		B		0.000	0.000	0.000	0.000	934.80
		C		0.000	0.000	0.000	0.000	479.27
L3	108.25-93.50	A	1.118	0.000	0.000	0.000	0.000	290.28
		B		0.000	0.000	0.000	0.000	580.56
		C		0.000	0.000	0.000	0.000	297.65
L4	93.50-46.00	A	1.077	0.000	0.000	0.000	0.000	934.80

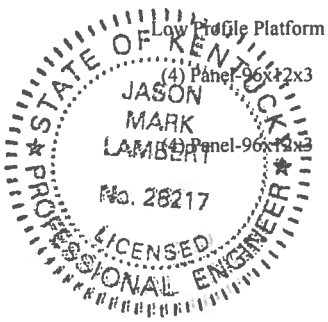
Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight lb
		B		0.000	0.000	0.000	0.000	1869.60
		C		0.000	0.000	0.000	0.000	958.55
L5	46.00-0.00	A	0.966	0.000	0.000	0.000	0.000	905.28
		B		0.000	0.000	0.000	0.000	1810.56
		C		0.000	0.000	0.000	0.000	928.28

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
6' Lightning Rod	C	From Leg	0.00 0.00 3.00	0.0000	185.00	No Ice 1/2" Ice	0.76 1.45	0.76 1.45	10.00 15.34
Beacon (12" x 36")	C	From Leg	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice	2.40 2.67	2.40 2.67	100.00 127.21
(4) Panel-96x12x3	C	From Leg	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	B	From Leg	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	A	From Leg	0.00 0.00 0.00	0.0000	185.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
Low Profile Platform w/ Handrail	C	None		0.0000	185.00	No Ice 1/2" Ice	31.30 40.20	31.30 40.20	1822.00 2452.00
(4) Panel-96x12x3	C	From Leg	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	B	From Leg	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	A	From Leg	0.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
Low Profile Platform	C	None		0.0000	170.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1300.00 1765.00
(4) Panel-96x12x3	C	From Leg	0.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	B	From Leg	0.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08



Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(4) Panel-96x12x3	A	From Leg	0.00 0.00 0.00	0.0000	155.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
Low Profile Platform	C	None		0.0000	155.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1300.00 1765.00
(4) Panel-96x12x3	C	From Leg	0.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	B	From Leg	0.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
(4) Panel-96x12x3	A	From Leg	0.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	11.47 12.39	5.90 8.05	59.28 125.08
Low Profile Platform	C	None		0.0000	140.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1300.00 1765.00

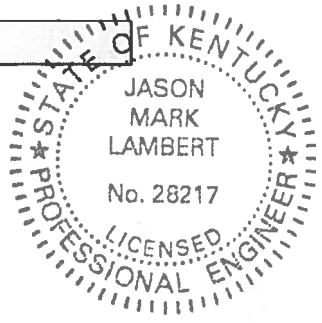
Tower Pressures - No Ice

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 185.00-132.00	157.00	1.392	27	122.659	A	0.000	122.659	122.659	100.00	0.000	0.000
					B	0.000	122.659		100.00	0.000	0.000
					C	0.000	122.659		100.00	0.000	0.000
L2 132.00-108.25	119.85	1.315	26	69.782	A	0.000	69.782	69.782	100.00	0.000	0.000
					B	0.000	69.782		100.00	0.000	0.000
					C	0.000	69.782		100.00	0.000	0.000
L3 108.25-93.50	100.78	1.268	25	47.409	A	0.000	47.409	47.409	100.00	0.000	0.000
					B	0.000	47.409		100.00	0.000	0.000
					C	0.000	47.409		100.00	0.000	0.000
L4 93.50-46.00	69.31	1.172	23	175.416	A	0.000	175.416	175.416	100.00	0.000	0.000
					B	0.000	175.416		100.00	0.000	0.000
					C	0.000	175.416		100.00	0.000	0.000
L5 46.00-0.00	23.31	0.931	18	203.695	A	0.000	203.695	203.695	100.00	0.000	0.000
					B	0.000	203.695		100.00	0.000	0.000
					C	0.000	203.695		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.100$



Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 185.00-132.00	157.00	1.392	3	1.1688	132.984	A	0.000	132.984	132.984	100.00	0.000	0.000
						B	0.000	132.984		100.00	0.000	0.000
						C	0.000	132.984		100.00	0.000	0.000
L2 132.00-108.25	119.85	1.315	3	1.1377	74.408	A	0.000	74.408	74.408	100.00	0.000	0.000
						B	0.000	74.408		100.00	0.000	0.000
						C	0.000	74.408		100.00	0.000	0.000
L3 108.25-93.50	100.78	1.268	3	1.1181	50.205	A	0.000	50.205	50.205	100.00	0.000	0.000
						B	0.000	50.205		100.00	0.000	0.000
						C	0.000	50.205		100.00	0.000	0.000
L4 93.50-46.00	69.31	1.172	3	1.0770	184.268	A	0.000	184.268	184.268	100.00	0.000	0.000
						B	0.000	184.268		100.00	0.000	0.000
						C	0.000	184.268		100.00	0.000	0.000
L5 46.00-0.00	23.31	0.931	2	0.9658	211.953	A	0.000	211.953	211.953	100.00	0.000	0.000
						B	0.000	211.953		100.00	0.000	0.000
						C	0.000	211.953		100.00	0.000	0.000

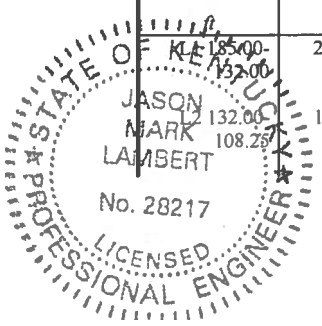
Tower Pressure - Service

$G_H = 1.100$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 185.00-132.00	157.00	1.392	11	122.659	A	0.000	122.659	122.659	100.00	0.000	0.000
					B	0.000	122.659		100.00	0.000	0.000
					C	0.000	122.659		100.00	0.000	0.000
L2 132.00-108.25	119.85	1.315	10	69.782	A	0.000	69.782	69.782	100.00	0.000	0.000
					B	0.000	69.782		100.00	0.000	0.000
					C	0.000	69.782		100.00	0.000	0.000
L3 108.25-93.50	100.78	1.268	10	47.409	A	0.000	47.409	47.409	100.00	0.000	0.000
					B	0.000	47.409		100.00	0.000	0.000
					C	0.000	47.409		100.00	0.000	0.000
L4 93.50-46.00	69.31	1.172	9	175.416	A	0.000	175.416	175.416	100.00	0.000	0.000
					B	0.000	175.416		100.00	0.000	0.000
					C	0.000	175.416		100.00	0.000	0.000
L5 46.00-0.00	23.31	0.931	7	203.695	A	0.000	203.695	203.695	100.00	0.000	0.000
					B	0.000	203.695		100.00	0.000	0.000
					C	0.000	203.695		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	27	1	1	122.659	2402.23	45.33	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	26	1	1	69.782	1292.27	54.41	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			



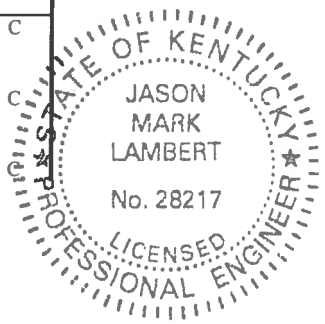
Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L3 108.25-93.50	1168.49	2757.86	A	1	0.65	25	1	1	47.409	846.49	57.39	C
			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	23	1	1	175.416	2883.85	60.71	C
			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	18	1	1	203.695	2658.68	57.80	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	879208.78 lb-ft	10083.53		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	27	1	1	122.659	2402.23	45.33	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	26	1	1	69.782	1292.27	54.41	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			
L3 108.25-93.50	1168.49	2757.86	A	1	0.65	25	1	1	47.409	846.49	57.39	C
			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	23	1	1	175.416	2883.85	60.71	C
			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	18	1	1	203.695	2658.68	57.80	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	879208.78 lb-ft	10083.53		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	27	1	1	122.659	2402.23	45.33	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	26	1	1	69.782	1292.27	54.41	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			
L3 108.25-	1168.49	2757.86	A	1	0.65	25	1	1	47.409	846.49	57.39	



Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
93.50			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	23	1	1	175.416	2883.85	60.71	C
			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	18	1	1	203.695	2658.68	57.80	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	879208.78 lb-ft	10083.53		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	5387.49	A	1	1.2	3	1	1	132.984	534.24	10.08	C
			B	1	1.2		1	1	132.984			
			C	1	1.2		1	1	132.984			
L2 132.00-108.25	1881.47	4757.33	A	1	1.2	3	1	1	74.408	282.66	11.90	C
			B	1	1.2		1	1	74.408			
			C	1	1.2		1	1	74.408			
L3 108.25-93.50	1168.49	3553.85	A	1	1.2	3	1	1	50.205	183.88	12.47	C
			B	1	1.2		1	1	50.205			
			C	1	1.2		1	1	50.205			
L4 93.50-46.00	3762.95	12909.35	A	1	1.2	3	1	1	184.268	621.41	13.08	C
			B	1	1.2		1	1	184.268			
			C	1	1.2		1	1	184.268			
L5 46.00-0.00	3644.12	16964.03	A	1	1.2	2	1	1	211.953	567.48	12.34	C
			B	1	1.2		1	1	211.953			
			C	1	1.2		1	1	211.953			
Sum Weight:	12884.50	43572.04						OTM	192585.53 lb-ft	2189.67		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	5387.49	A	1	1.2	3	1	1	132.984	534.24	10.08	C
			B	1	1.2		1	1	132.984			
			C	1	1.2		1	1	132.984			
L2 132.00-108.25	1881.47	4757.33	A	1	1.2	3	1	1	74.408	282.66	11.90	C
			B	1	1.2		1	1	74.408			
			C	1	1.2		1	1	74.408			
L3 108.25-93.50	1168.49	3553.85	A	1	1.2	3	1	1	50.205	183.88	12.47	C
			B	1	1.2		1	1	50.205			

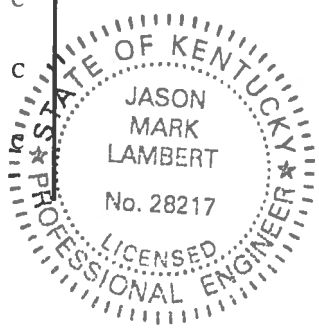
Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	1	1.2		1	1	50.205			
L4 93.50-46.00	3762.95	12909.35	A	1	1.2	3	1	1	184.268	621.41	13.08	C
			B	1	1.2		1	1	184.268			
			C	1	1.2		1	1	184.268			
L5 46.00-0.00	3644.12	16964.03	A	1	1.2	2	1	1	211.953	567.48	12.34	C
			B	1	1.2		1	1	211.953			
			C	1	1.2		1	1	211.953			
Sum Weight:	12884.50	43572.04						OTM	192585.53 lb-ft	2189.67		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	5387.49	A	1	1.2	3	1	1	132.984	534.24	10.08	C
			B	1	1.2		1	1	132.984			
			C	1	1.2		1	1	132.984			
L2 132.00-108.25	1881.47	4757.33	A	1	1.2	3	1	1	74.408	282.66	11.90	C
			B	1	1.2		1	1	74.408			
			C	1	1.2		1	1	74.408			
L3 108.25-93.50	1168.49	3553.85	A	1	1.2	3	1	1	50.205	183.88	12.47	C
			B	1	1.2		1	1	50.205			
			C	1	1.2		1	1	50.205			
L4 93.50-46.00	3762.95	12909.35	A	1	1.2	3	1	1	184.268	621.41	13.08	C
			B	1	1.2		1	1	184.268			
			C	1	1.2		1	1	184.268			
L5 46.00-0.00	3644.12	16964.03	A	1	1.2	2	1	1	211.953	567.48	12.34	C
			B	1	1.2		1	1	211.953			
			C	1	1.2		1	1	211.953			
Sum Weight:	12884.50	43572.04						OTM	192585.53 lb-ft	2189.67		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	11	1	1	122.659	955.27	18.02	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	10	1	1	69.782	513.89	21.64	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			
L3 108.25-93.50	1168.49	2757.86	A	1	0.65	10	1	1	47.409	336.62	22.82	
			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			



Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	9	1	1	175.416	1146.79	24.14	C
			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	7	1	1	203.695	1057.25	22.98	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	349626.88 lb-ft	4009.83		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	11	1	1	122.659	955.27	18.02	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	10	1	1	69.782	513.89	21.64	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			
L3 108.25-93.50	1168.49	2757.86	A	1	0.65	10	1	1	47.409	336.62	22.82	C
			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	9	1	1	175.416	1146.79	24.14	C
			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	7	1	1	203.695	1057.25	22.98	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	349626.88 lb-ft	4009.83		

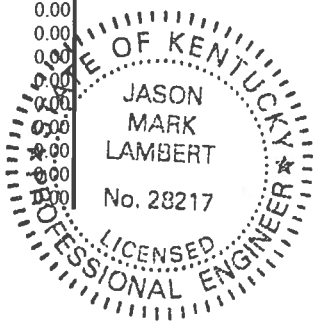
Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
L1 185.00-132.00	2427.46	3206.87	A	1	0.65	11	1	1	122.659	955.27	18.02	C
			B	1	0.65		1	1	122.659			
			C	1	0.65		1	1	122.659			
L2 132.00-108.25	1881.47	3561.36	A	1	0.65	10	1	1	69.782	513.89	21.64	C
			B	1	0.65		1	1	69.782			
			C	1	0.65		1	1	69.782			
L3 108.25-93.50	1168.49	2757.86	A	1	0.65	10	1	1	47.409	336.62	22.82	C
			B	1	0.65		1	1	47.409			
			C	1	0.65		1	1	47.409			
L4 93.50-46.00	3762.95	10085.44	A	1	0.65	9	1	1	175.416	1146.79	24.14	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
46.00			B	1	0.65		1	1	175.416			
			C	1	0.65		1	1	175.416			
L5 46.00-0.00	3644.12	14041.24	A	1	0.65	7	1	1	203.695	1057.25	22.98	C
			B	1	0.65		1	1	203.695			
			C	1	0.65		1	1	203.695			
Sum Weight:	12884.50	33652.77						OTM	349626.88 lb-ft	4009.83		

Mast Vectors - No Ice

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
L1	185.00-132.00	0	Wind Normal	2402.23	0.00	-2402.23	-377158.11	0.00	0.00
		30	Wind 90	2402.23	1201.12	-2080.40	-326628.51	-188579.06	0.00
		60	Wind 60	2402.23	2080.40	-1201.12	-188579.06	-326628.51	0.00
		90	Wind 90	2402.23	2402.23	0.00	0.00	-377158.11	0.00
		120	Wind Normal	2402.23	2080.40	1201.12	188579.06	-326628.51	0.00
		150	Wind 90	2402.23	1201.12	2080.40	326628.51	-188579.06	0.00
		180	Wind 60	2402.23	0.00	2402.23	377158.11	0.00	0.00
		210	Wind 90	2402.23	-1201.12	2080.40	326628.51	188579.06	0.00
		240	Wind Normal	2402.23	-2080.40	1201.12	188579.06	326628.51	0.00
		270	Wind 90	2402.23	-2402.23	0.00	0.00	377158.11	0.00
		300	Wind 60	2402.23	-2080.40	-1201.12	-188579.06	326628.51	0.00
		330	Wind 90	2402.23	-1201.12	-2080.40	-326628.51	188579.06	0.00
L2	132.00-108.25	0	Wind Normal	1292.27	0.00	-1292.27	-154881.34	0.00	0.00
		30	Wind 90	1292.27	646.14	-1119.14	-134131.18	-77440.67	0.00
		60	Wind 60	1292.27	1119.14	-646.14	-77440.67	-134131.18	0.00
		90	Wind 90	1292.27	1292.27	0.00	0.00	-154881.34	0.00
		120	Wind Normal	1292.27	1119.14	646.14	77440.67	-134131.18	0.00
		150	Wind 90	1292.27	646.14	1119.14	134131.18	-77440.67	0.00
		180	Wind 60	1292.27	0.00	1292.27	154881.34	0.00	0.00
		210	Wind 90	1292.27	-646.14	1119.14	134131.18	77440.67	0.00
		240	Wind Normal	1292.27	-1119.14	646.14	77440.67	134131.18	0.00
		270	Wind 90	1292.27	-1292.27	0.00	0.00	154881.34	0.00
		300	Wind 60	1292.27	-1119.14	-646.14	-77440.67	134131.18	0.00
		330	Wind 90	1292.27	-646.14	-1119.14	-134131.18	77440.67	0.00
L3	108.25-93.50	0	Wind Normal	846.49	0.00	-846.49	-85308.45	0.00	0.00
		30	Wind 90	846.49	423.25	-733.08	-73879.28	-42654.22	0.00
		60	Wind 60	846.49	733.08	-423.25	-42654.22	-73879.28	0.00
		90	Wind 90	846.49	846.49	0.00	0.00	-85308.45	0.00
		120	Wind Normal	846.49	733.08	423.25	42654.22	-73879.28	0.00
		150	Wind 90	846.49	423.25	733.08	73879.28	-42654.22	0.00
		180	Wind 60	846.49	0.00	846.49	85308.45	0.00	0.00
		210	Wind 90	846.49	-423.25	733.08	73879.28	42654.22	0.00
		240	Wind Normal	846.49	-733.08	423.25	42654.22	73879.28	0.00
		270	Wind 90	846.49	-846.49	0.00	0.00	85308.45	0.00
		300	Wind 60	846.49	-733.08	-423.25	-42654.22	73879.28	0.00
		330	Wind 90	846.49	-423.25	-733.08	-73879.28	42654.22	0.00
L4	93.50-46.00	0	Wind Normal	2883.85	0.00	-2883.85	-199879.31	0.00	0.00
		30	Wind 90	2883.85	1441.92	-2497.49	-173100.56	-99939.65	0.00
		60	Wind 60	2883.85	2497.49	-1441.92	-99939.65	-173100.56	0.00
		90	Wind 90	2883.85	2883.85	0.00	0.00	-199879.31	0.00
		120	Wind Normal	2883.85	2497.49	1441.92	99939.65	-173100.56	0.00



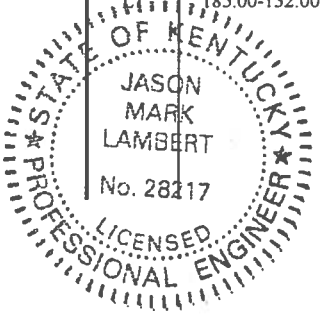
Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
		150	Wind 90	2883.85	1441.92	2497.49	173100.56	-99939.65	0.00
		180	Wind 60	2883.85	0.00	2883.85	199879.31	0.00	0.00
		210	Wind 90	2883.85	-1441.92	2497.49	173100.56	99939.65	0.00
		240	Wind Normal	2883.85	-2497.49	1441.92	99939.65	173100.56	0.00
		270	Wind 90	2883.85	-2883.85	0.00	0.00	199879.31	0.00
		300	Wind 60	2883.85	-2497.49	-1441.92	-99939.65	173100.56	0.00
		330	Wind 90	2883.85	-1441.92	-2497.49	-173100.56	99939.65	0.00
L5	46.00-0.00	0	Wind Normal	2658.68	0.00	-2658.68	-61981.56	0.00	0.00
		30	Wind 90	2658.68	1329.34	-2302.49	-53677.61	-30990.78	0.00
		60	Wind 60	2658.68	2302.49	-1329.34	-30990.78	-53677.61	0.00
		90	Wind 90	2658.68	2658.68	0.00	0.00	-61981.56	0.00
		120	Wind Normal	2658.68	2302.49	1329.34	30990.78	-53677.61	0.00
		150	Wind 90	2658.68	1329.34	2302.49	53677.61	-30990.78	0.00
		180	Wind 60	2658.68	0.00	2658.68	61981.56	0.00	0.00
		210	Wind 90	2658.68	-1329.34	2302.49	53677.61	30990.78	0.00
		240	Wind Normal	2658.68	-2302.49	1329.34	30990.78	53677.61	0.00
		270	Wind 90	2658.68	-2658.68	0.00	0.00	61981.56	0.00
		300	Wind 60	2658.68	-2302.49	-1329.34	-30990.78	53677.61	0.00
		330	Wind 90	2658.68	-1329.34	-2302.49	-53677.61	30990.78	0.00

Mast Totals - No Ice

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-10083.53	-879208.78	0.00	0.00
30	5041.77	-8732.60	-761417.14	-439604.39	0.00
60	8732.60	-5041.77	-439604.39	-761417.14	0.00
90	10083.53	0.00	0.00	-879208.78	0.00
120	8732.60	5041.77	439604.39	-761417.14	0.00
150	5041.77	8732.60	761417.14	-439604.39	0.00
180	0.00	10083.53	879208.78	0.00	0.00
210	-5041.77	8732.60	761417.14	439604.39	0.00
240	-8732.60	5041.77	439604.39	761417.14	0.00
270	-10083.53	0.00	0.00	879208.78	0.00
300	-8732.60	-5041.77	-439604.39	761417.14	0.00
330	-5041.77	-8732.60	-761417.14	439604.39	0.00

Mast Vectors - With Ice

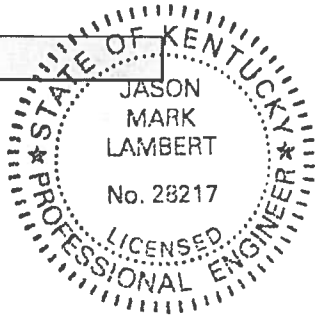
Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
L1	185.00-132.00	0	Wind Normal	534.24	0.00	-534.24	-83877.74	0.00	0.00
		30	Wind 90	534.24	267.12	-462.67	-72640.25	-41938.87	0.00
		60	Wind 60	534.24	462.67	-267.12	-41938.87	-72640.25	0.00
		90	Wind 90	534.24	534.24	0.00	0.00	-83877.74	0.00
		120	Wind Normal	534.24	462.67	267.12	41938.87	-72640.25	0.00
		150	Wind 90	534.24	267.12	462.67	72640.25	-41938.87	0.00
		180	Wind 60	534.24	0.00	534.24	83877.74	0.00	0.00
		210	Wind 90	534.24	-267.12	462.67	72640.25	41938.87	0.00
		240	Wind Normal	534.24	-462.67	267.12	41938.87	72640.25	0.00



Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
		270	Wind 90	534.24	-534.24	0.00	0.00	83877.74	0.00
		300	Wind 60	534.24	-462.67	-267.12	-41938.87	72640.25	0.00
		330	Wind 90	534.24	-267.12	-462.67	-72640.25	41938.87	0.00
L2	132.00-108.25	0	Wind Normal	282.66	0.00	-282.66	-33876.91	0.00	0.00
		30	Wind 90	282.66	141.33	-244.79	-29338.26	-16938.45	0.00
		60	Wind 60	282.66	244.79	-141.33	-16938.45	-29338.26	0.00
		90	Wind 90	282.66	282.66	0.00	0.00	-33876.91	0.00
		120	Wind Normal	282.66	244.79	141.33	16938.45	-29338.26	0.00
		150	Wind 90	282.66	141.33	244.79	29338.26	-16938.45	0.00
		180	Wind 60	282.66	0.00	282.66	33876.91	0.00	0.00
		210	Wind 90	282.66	-141.33	244.79	29338.26	16938.45	0.00
		240	Wind Normal	282.66	-244.79	141.33	16938.45	29338.26	0.00
		270	Wind 90	282.66	-282.66	0.00	0.00	33876.91	0.00
		300	Wind 60	282.66	-244.79	-141.33	-16938.45	29338.26	0.00
		330	Wind 90	282.66	-141.33	-244.79	-29338.26	16938.45	0.00
L3	108.25-93.50	0	Wind Normal	183.88	0.00	-183.88	-18531.49	0.00	0.00
		30	Wind 90	183.88	91.94	-159.25	-16048.74	-9265.74	0.00
		60	Wind 60	183.88	159.25	-91.94	-9265.74	-16048.74	0.00
		90	Wind 90	183.88	183.88	0.00	0.00	-18531.49	0.00
		120	Wind Normal	183.88	159.25	91.94	9265.74	-16048.74	0.00
		150	Wind 90	183.88	91.94	159.25	16048.74	-9265.74	0.00
		180	Wind 60	183.88	0.00	183.88	18531.49	0.00	0.00
		210	Wind 90	183.88	-91.94	159.25	16048.74	9265.74	0.00
		240	Wind Normal	183.88	-159.25	91.94	9265.74	16048.74	0.00
		270	Wind 90	183.88	-183.88	0.00	0.00	18531.49	0.00
		300	Wind 60	183.88	-159.25	-91.94	-9265.74	16048.74	0.00
		330	Wind 90	183.88	-91.94	-159.25	-16048.74	9265.74	0.00
L4	93.50-46.00	0	Wind Normal	621.41	0.00	-621.41	-43069.84	0.00	0.00
		30	Wind 90	621.41	310.70	-538.16	-37299.57	-21534.92	0.00
		60	Wind 60	621.41	538.16	-310.70	-21534.92	-37299.57	0.00
		90	Wind 90	621.41	621.41	0.00	0.00	-43069.84	0.00
		120	Wind Normal	621.41	538.16	310.70	21534.92	-37299.57	0.00
		150	Wind 90	621.41	310.70	538.16	37299.57	-21534.92	0.00
		180	Wind 60	621.41	0.00	621.41	43069.84	0.00	0.00
		210	Wind 90	621.41	-310.70	538.16	37299.57	21534.92	0.00
		240	Wind Normal	621.41	-538.16	310.70	21534.92	37299.57	0.00
		270	Wind 90	621.41	-621.41	0.00	0.00	43069.84	0.00
		300	Wind 60	621.41	-538.16	-310.70	-21534.92	37299.57	0.00
		330	Wind 90	621.41	-310.70	-538.16	-37299.57	21534.92	0.00
L5	46.00-0.00	0	Wind Normal	567.48	0.00	-567.48	-13229.56	0.00	0.00
		30	Wind 90	567.48	283.74	-491.45	-11457.14	-6614.78	0.00
		60	Wind 60	567.48	491.45	-283.74	-6614.78	-11457.14	0.00
		90	Wind 90	567.48	567.48	0.00	0.00	-13229.56	0.00
		120	Wind Normal	567.48	491.45	283.74	6614.78	-11457.14	0.00
		150	Wind 90	567.48	283.74	491.45	11457.14	-6614.78	0.00
		180	Wind 60	567.48	0.00	567.48	13229.56	0.00	0.00
		210	Wind 90	567.48	-283.74	491.45	11457.14	6614.78	0.00
		240	Wind Normal	567.48	-491.45	283.74	6614.78	11457.14	0.00
		270	Wind 90	567.48	-567.48	0.00	0.00	13229.56	0.00
		300	Wind 60	567.48	-491.45	-283.74	-6614.78	11457.14	0.00
		330	Wind 90	567.48	-283.74	-491.45	-11457.14	6614.78	0.00

Mast Totals - With Ice

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft



tnxTower	Job	Page
	SO19101; Tower 200053; Foundation 200054	14 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	Project NP 185' - Evarts - Harlan Co., KY	Date 10:23:47 07/25/13
	Client WesTower Communications, Inc.	Designed by BL TNX V. 6.0.0.8

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-2189.67	-192585.53	0.00	0.00
30	1094.84	-1896.31	-166783.96	-96292.77	0.00
60	1896.31	-1094.84	-96292.77	-166783.96	0.00
90	2189.67	0.00	0.00	-192585.53	0.00
120	1896.31	1094.84	96292.77	-166783.96	0.00
150	1094.84	1896.31	166783.96	-96292.77	0.00
180	0.00	2189.67	192585.53	0.00	0.00
210	-1094.84	1896.31	166783.96	96292.77	0.00
240	-1896.31	1094.84	96292.77	166783.96	0.00
270	-2189.67	0.00	0.00	192585.53	0.00
300	-1896.31	-1094.84	-96292.77	166783.96	0.00
330	-1094.84	-1896.31	-166783.96	96292.77	0.00

Mast Vectors - Service

Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
L1	185.00-132.00	0	Wind Normal	955.27	0.00	-955.27	-149981.00	0.00	0.00
		30	Wind 90	955.27	477.64	-827.29	-129887.36	-74990.50	0.00
		60	Wind 60	955.27	827.29	-477.64	-74990.50	-129887.36	0.00
		90	Wind 90	955.27	955.27	0.00	0.00	-149981.00	0.00
		120	Wind Normal	955.27	827.29	477.64	74990.50	-129887.36	0.00
		150	Wind 90	955.27	477.64	827.29	129887.36	-74990.50	0.00
		180	Wind 60	955.27	0.00	955.27	149981.00	0.00	0.00
		210	Wind 90	955.27	-477.64	827.29	129887.36	74990.50	0.00
		240	Wind Normal	955.27	-827.29	477.64	74990.50	129887.36	0.00
		270	Wind 90	955.27	-955.27	0.00	0.00	149981.00	0.00
		300	Wind 60	955.27	-827.29	-477.64	-74990.50	129887.36	0.00
		330	Wind 90	955.27	-477.64	-827.29	-129887.36	74990.50	0.00
L2	132.00-108.25	0	Wind Normal	513.89	0.00	-513.89	-61590.24	0.00	0.00
		30	Wind 90	513.89	256.94	-445.04	-53338.71	-30795.12	0.00
		60	Wind 60	513.89	445.04	-256.94	-30795.12	-53338.71	0.00
		90	Wind 90	513.89	513.89	0.00	0.00	-61590.24	0.00
		120	Wind Normal	513.89	445.04	256.94	30795.12	-53338.71	0.00
		150	Wind 90	513.89	256.94	445.04	53338.71	-30795.12	0.00
		180	Wind 60	513.89	0.00	513.89	61590.24	0.00	0.00
		210	Wind 90	513.89	-256.94	445.04	53338.71	30795.12	0.00
		240	Wind Normal	513.89	-445.04	256.94	30795.12	53338.71	0.00
		270	Wind 90	513.89	-513.89	0.00	0.00	61590.24	0.00
		300	Wind 60	513.89	-445.04	-256.94	-30795.12	53338.71	0.00
		330	Wind 90	513.89	-256.94	-445.04	-53338.71	30795.12	0.00
L3	108.25-93.50	0	Wind Normal	336.62	0.00	-336.62	-33923.83	0.00	0.00
		30	Wind 90	336.62	168.31	-291.52	-29378.90	-16961.91	0.00
		60	Wind 60	336.62	291.52	-168.31	-16961.91	-29378.90	0.00
		90	Wind 90	336.62	336.62	0.00	0.00	-33923.83	0.00
		120	Wind Normal	336.62	291.52	168.31	16961.91	-29378.90	0.00
		150	Wind 90	336.62	168.31	291.52	29378.90	-16961.91	0.00
		180	Wind 60	336.62	0.00	336.62	33923.83	0.00	0.00
		210	Wind 90	336.62	-168.31	291.52	29378.90	16961.91	0.00
		240	Wind Normal	336.62	-291.52	168.31	16961.91	29378.90	0.00
		270	Wind 90	336.62	-336.62	0.00	0.00	33923.83	0.00
		300	Wind 60	336.62	-291.52	-168.31	-16961.91	29378.90	0.00
		330	Wind 90	336.62	-168.31	-291.52	-29378.90	16961.91	0.00
L4	93.50-46.00	0	Wind Normal	1146.79	0.00	-1146.79	-79484.17	0.00	0.00
		30	Wind 90	1146.79	573.40	-993.15	-68835.31	-39742.08	0.00
		60	Wind 60	1146.79	993.15	-573.40	-39742.08	-68835.31	0.00

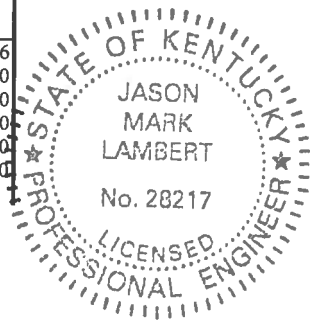
Section No.	Section Elevation ft	Wind Azimuth °	Directionality	F lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
		90	Wind 90	1146.79	1146.79	0.00	0.00	-79484.17	0.00
		120	Wind Normal	1146.79	993.15	573.40	39742.08	-68835.31	0.00
		150	Wind 90	1146.79	573.40	993.15	68835.31	-39742.08	0.00
		180	Wind 60	1146.79	0.00	1146.79	79484.17	0.00	0.00
		210	Wind 90	1146.79	-573.40	993.15	68835.31	39742.08	0.00
		240	Wind Normal	1146.79	-993.15	573.40	39742.08	68835.31	0.00
		270	Wind 90	1146.79	-1146.79	0.00	0.00	79484.17	0.00
		300	Wind 60	1146.79	-993.15	-573.40	-39742.08	68835.31	0.00
		330	Wind 90	1146.79	-573.40	-993.15	-68835.31	39742.08	0.00
L5	46.00-0.00	0	Wind Normal	1057.25	0.00	-1057.25	-24647.64	0.00	0.00
		30	Wind 90	1057.25	528.63	-915.61	-21345.48	-12323.82	0.00
		60	Wind 60	1057.25	915.61	-528.63	-12323.82	-21345.48	0.00
		90	Wind 90	1057.25	1057.25	0.00	0.00	-24647.64	0.00
		120	Wind Normal	1057.25	915.61	528.63	12323.82	-21345.48	0.00
		150	Wind 90	1057.25	528.63	915.61	21345.48	-12323.82	0.00
		180	Wind 60	1057.25	0.00	1057.25	24647.64	0.00	0.00
		210	Wind 90	1057.25	-528.63	915.61	21345.48	12323.82	0.00
		240	Wind Normal	1057.25	-915.61	528.63	12323.82	21345.48	0.00
		270	Wind 90	1057.25	-1057.25	0.00	0.00	24647.64	0.00
		300	Wind 60	1057.25	-915.61	-528.63	-12323.82	21345.48	0.00
		330	Wind 90	1057.25	-528.63	-915.61	-21345.48	12323.82	0.00

Mast Totals - Service

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-4009.83	-349626.88	0.00	0.00
30	2004.91	-3472.61	-302785.76	-174813.44	0.00
60	3472.61	-2004.91	-174813.44	-302785.76	0.00
90	4009.83	0.00	0.00	-349626.88	0.00
120	3472.61	2004.91	174813.44	-302785.76	0.00
150	2004.91	3472.61	302785.76	-174813.44	0.00
180	0.00	4009.83	349626.88	0.00	0.00
210	-2004.91	3472.61	302785.76	174813.44	0.00
240	-3472.61	2004.91	174813.44	302785.76	0.00
270	-4009.83	0.00	0.00	349626.88	0.00
300	-3472.61	-2004.91	-174813.44	302785.76	0.00
330	-2004.91	-3472.61	-302785.76	174813.44	0.00

Discrete Appurtenance Pressures - No Ice $G_H = 1.100$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
6' Lightning Rod	240.0000	10.00	-0.79	0.46	188.00	1.446	28	0.76	0.76
Beacon (12" x 36")	240.0000	100.00	-0.79	0.46	185.00	1.441	28	2.40	2.40
Panel-96x12x3	240.0000	237.12	-0.79	0.46	185.00	1.441	28	45.87	23.60
Panel-96x12x3	120.0000	237.12	0.79	0.46	185.00	1.441	28	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-0.92	185.00	1.441	28	45.87	23.60
Low Profile Platform w/ Handrail	0.0000	1822.00	0.00	0.00	185.00	1.441	28	31.30	31.30



Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Panel-96x12x3	240.0000	237.12	-0.90	0.52	170.00	1.415	28	45.87	23.60
Panel-96x12x3	120.0000	237.12	0.90	0.52	170.00	1.415	28	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.04	170.00	1.415	28	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	170.00	1.415	28	15.70	15.70
Panel-96x12x3	240.0000	237.12	-1.01	0.58	155.00	1.388	27	45.87	23.60
Panel-96x12x3	120.0000	237.12	1.01	0.58	155.00	1.388	27	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.17	155.00	1.388	27	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	155.00	1.388	27	15.70	15.70
Panel-96x12x3	240.0000	237.12	-1.12	0.65	140.00	1.359	27	45.87	23.60
Panel-96x12x3	120.0000	237.12	1.12	0.65	140.00	1.359	27	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.30	140.00	1.359	27	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	140.00	1.359	27	15.70	15.70
	Sum Weight:	8677.44							

Discrete Appurtenance Vectors - No Ice

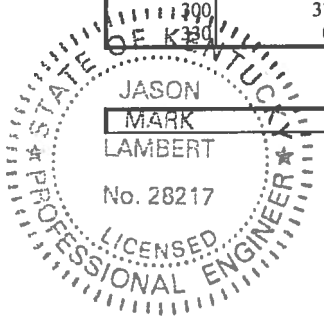
6' Lightning Rod - Elevation 188 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	11.96	20.72	0.00	-23.93	-4493.73	7.94	-18.99
30	20.72	11.96	11.96	-20.72	-3891.07	-2241.22	-10.97
60	23.93	0.00	20.72	-11.96	-2244.57	-3887.72	0.00
90	20.72	11.96	23.93	0.00	4.58	-4490.37	10.97
120	11.96	20.72	20.72	11.96	2253.74	-3887.72	18.99
150	0.00	23.93	11.96	20.72	3900.24	-2241.22	21.93
180	11.96	20.72	0.00	23.93	4502.90	7.94	18.99
210	20.72	11.96	-11.96	20.72	3900.24	2257.10	10.97
240	23.93	0.00	-20.72	11.96	2253.74	3903.59	0.00
270	20.72	11.96	-23.93	0.00	4.58	4506.25	-10.97
300	11.96	20.72	-20.72	-11.96	-2244.57	3903.59	-18.99
330	0.00	23.93	-11.96	-20.72	-3891.07	2257.10	-21.93

Beacon (12" x 36") - Elevation 185 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	37.46	64.88	0.00	-74.92	-13814.50	79.39	-59.48
30	64.88	37.46	37.46	-64.88	-11957.57	-6850.78	-34.34
60	74.92	0.00	64.88	-37.46	-6884.34	-11924.02	0.00
90	64.88	37.46	74.92	0.00	45.83	-13780.95	34.34
120	37.46	64.88	64.88	37.46	6976.00	-11924.02	59.48
150	0.00	74.92	37.46	64.88	12049.24	-6850.78	68.68
180	37.46	64.88	0.00	74.92	13906.17	79.39	59.48
210	64.88	37.46	-37.46	64.88	12049.24	7009.55	34.34
240	74.92	0.00	-64.88	37.46	6976.00	12082.79	0.00
270	64.88	37.46	-74.92	0.00	45.83	13939.72	-34.34
300	37.46	64.88	-64.88	-37.46	-6884.34	12082.79	-59.48
330	0.00	74.92	-37.46	-64.88	-11957.57	7009.55	-68.68

Panel-96x12x3 - Elevation 185 - From Leg C



Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	715.91	638.02	300.99	-910.50	-168332.93	-55494.23	-584.85
30	1239.99	368.36	889.68	-939.01	-173607.27	-164403.28	-337.66
60	1431.82	0.00	1239.99	-715.91	-132334.55	-229210.17	0.00
90	1239.99	368.36	1258.04	-300.99	-55573.78	-232549.94	337.66
120	715.91	638.02	939.01	194.59	36107.06	-173527.71	584.85
150	0.00	736.72	368.36	638.02	118142.16	-67958.42	675.33
180	715.91	638.02	-300.99	910.50	168550.29	55870.70	584.85
210	1239.99	368.36	-889.68	939.01	173824.63	164779.76	337.66
240	1431.82	0.00	-1239.99	715.91	132551.91	229586.65	0.00
270	1239.99	368.36	-1258.04	300.99	55791.14	232926.42	-337.66
300	715.91	638.02	-939.01	-194.59	-35889.70	173904.18	-584.85
330	0.00	736.72	-368.36	-638.02	-117924.80	68334.90	-675.33

Panel-96x12x3 - Elevation 185 - From Leg B

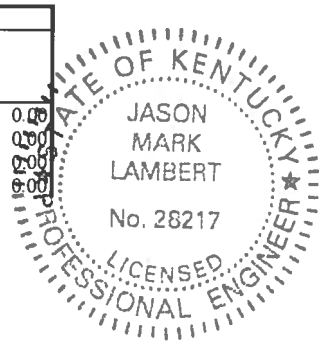
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	715.91	638.02	-300.99	-910.50	-168332.93	55494.23	584.85
30	0.00	736.72	368.36	-638.02	-117924.80	-68334.90	675.33
60	715.91	638.02	939.01	-194.59	-35889.70	-173904.18	584.85
90	1239.99	368.36	1258.04	300.99	55791.14	-232926.42	337.66
120	1431.82	0.00	1239.99	715.91	132551.91	-229586.65	0.00
150	1239.99	368.36	889.68	939.01	173824.63	-164779.76	-337.66
180	715.91	638.02	300.99	910.50	168550.29	-55870.70	-584.85
210	0.00	736.72	-368.36	638.02	118142.16	67958.42	-675.33
240	715.91	638.02	-939.01	194.59	36107.06	173527.71	-584.85
270	1239.99	368.36	-1258.04	-300.99	-55573.78	232549.94	-337.66
300	1431.82	0.00	-1239.99	-715.91	-132334.55	229210.17	0.00
330	1239.99	368.36	-889.68	-939.01	-173607.27	164403.28	337.66

Panel-96x12x3 - Elevation 185 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	1431.82	0.00	0.00	-1431.82	-265103.83	0.00	0.00
30	1239.99	368.36	368.36	-1239.99	-229615.77	-68146.66	-337.66
60	715.91	638.02	638.02	-715.91	-132660.59	-118033.48	-584.85
90	0.00	736.72	736.72	0.00	-217.36	-136293.32	-675.33
120	715.91	638.02	638.02	715.91	132225.87	-118033.48	-584.85
150	1239.99	368.36	368.36	1239.99	229181.05	-68146.66	-337.66
180	1431.82	0.00	0.00	1431.82	264669.11	0.00	0.00
210	1239.99	368.36	-368.36	1239.99	229181.05	68146.66	337.66
240	715.91	638.02	-638.02	715.91	132225.87	118033.48	584.85
270	0.00	736.72	-736.72	0.00	-217.36	136293.32	675.33
300	715.91	638.02	-638.02	-715.91	-132660.59	118033.48	584.85
330	1239.99	368.36	-368.36	-1239.99	-229615.77	68146.66	337.66

Low Profile Platform w/ Handrail - Elevation 185 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	977.09	0.00	0.00	-977.09	-180761.91	0.00	0.00
30	977.09	0.00	488.55	-846.19	-156544.40	-90380.95	0.00
60	977.09	0.00	846.19	-488.55	-90380.95	-156544.40	0.00
90	977.09	0.00	977.09	0.00	0.00	-180761.91	0.00

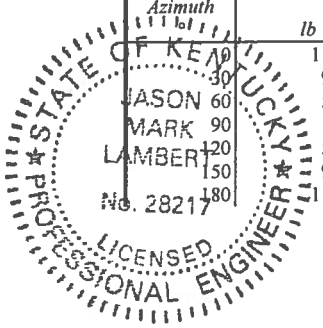


Low Profile Platform w/ Handrail - Elevation 185 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
120	977.09	0.00	846.19	488.55	90380.95	-156544.40	0.00
150	977.09	0.00	488.55	846.19	156544.40	-90380.95	0.00
180	977.09	0.00	0.00	977.09	180761.91	0.00	0.00
210	977.09	0.00	-488.55	846.19	156544.40	90380.95	0.00
240	977.09	0.00	-846.19	488.55	90380.95	156544.40	0.00
270	977.09	0.00	-977.09	0.00	0.00	180761.91	0.00
300	977.09	0.00	-846.19	-488.55	-90380.95	156544.40	0.00
330	977.09	0.00	-488.55	-846.19	-156544.40	90380.95	0.00

Panel-96x12x3 - Elevation 170 - From Leg C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	562.62	501.41	236.54	-715.54	-121518.89	-39997.74	-522.89
30	974.49	289.49	699.19	-737.95	-125327.83	-118647.98	-301.89
60	1125.24	0.00	974.49	-562.62	-95522.15	-165449.21	0.00
90	974.49	289.49	988.68	-236.54	-40088.25	-167861.07	301.89
120	562.62	501.41	737.95	152.92	26120.38	-125237.32	522.89
150	0.00	578.98	289.49	501.41	85363.22	-48998.94	603.78
180	562.62	501.41	-236.54	715.54	121766.17	40426.04	522.89
210	974.49	289.49	-699.19	737.95	125575.11	119076.28	301.89
240	1125.24	0.00	-974.49	562.62	95769.43	165877.51	0.00
270	974.49	289.49	-988.68	236.54	40335.53	168289.37	-301.89
300	562.62	501.41	-737.95	-152.92	-25873.11	125665.62	-522.89
330	0.00	578.98	-289.49	-501.41	-85115.94	49427.24	-603.78

Panel-96x12x3 - Elevation 170 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	562.62	501.41	-236.54	-715.54	-121518.89	39997.74	522.89
30	0.00	578.98	289.49	-501.41	-85115.94	-49427.24	603.78
60	562.62	501.41	737.95	-152.92	-25873.11	-125665.62	522.89
90	974.49	289.49	988.68	236.54	40335.53	-168289.37	301.89
120	1125.24	0.00	974.49	562.62	95769.43	-165877.51	0.00
150	974.49	289.49	699.19	737.95	125575.11	-119076.28	-301.89
180	562.62	501.41	236.54	715.54	121766.17	-40426.04	-522.89
210	0.00	578.98	-289.49	501.41	85363.22	48998.94	-603.78
240	562.62	501.41	-737.95	152.92	26120.38	125237.32	-522.89
270	974.49	289.49	-988.68	-236.54	-40088.25	167861.07	-301.89
300	1125.24	0.00	-974.49	-562.62	-95522.15	165449.21	0.00
330	974.49	289.49	-699.19	-737.95	-125327.83	118647.98	301.89

Panel-96x12x3 - Elevation 170 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	1125.24	0.00	0.00	-1125.24	-191538.85	0.00	0.00
30	974.49	289.49	289.49	-974.49	-165910.64	-49213.09	-301.89
60	562.62	501.41	501.41	-562.62	-95893.07	-85239.58	-522.89
90	0.00	578.98	578.98	0.00	-247.28	-98426.18	-603.78
120	562.62	501.41	501.41	562.62	95398.51	-85239.58	-522.89
150	974.49	289.49	289.49	974.49	165416.08	-49213.09	-301.89
180	1125.24	0.00	0.00	1125.24	191044.29	0.00	0.00



Panel-96x12x3 - Elevation 170 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
210	974.49	289.49	-289.49	974.49	165416.08	49213.09	301.89
240	562.62	501.41	-501.41	562.62	95398.51	85239.58	522.89
270	0.00	578.98	-578.98	0.00	-247.28	98426.18	603.78
300	562.62	501.41	-501.41	-562.62	-95893.07	85239.58	522.89
330	974.49	289.49	-289.49	-974.49	-165910.64	49213.09	301.89

Low Profile Platform - Elevation 170 - None C

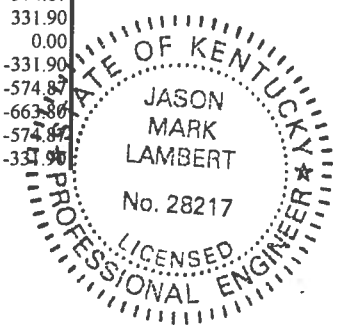
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	481.46	0.00	0.00	-481.46	-81848.04	0.00	0.00
30	481.46	0.00	240.73	-416.96	-70882.49	-40924.02	0.00
60	481.46	0.00	416.96	-240.73	-40924.02	-70882.49	0.00
90	481.46	0.00	481.46	0.00	0.00	-81848.04	0.00
120	481.46	0.00	416.96	240.73	40924.02	-70882.49	0.00
150	481.46	0.00	240.73	416.96	70882.49	-40924.02	0.00
180	481.46	0.00	0.00	481.46	81848.04	0.00	0.00
210	481.46	0.00	-240.73	416.96	70882.49	40924.02	0.00
240	481.46	0.00	-416.96	240.73	40924.02	70882.49	0.00
270	481.46	0.00	-481.46	0.00	0.00	81848.04	0.00
300	481.46	0.00	-416.96	-240.73	-40924.02	70882.49	0.00
330	481.46	0.00	-240.73	-416.96	-70882.49	40924.02	0.00

Panel-96x12x3 - Elevation 155 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	551.79	491.75	231.98	-701.76	-108634.75	-35717.61	-574.87
30	955.72	283.91	685.72	-723.74	-112040.72	-106047.04	-331.90
60	1103.57	0.00	955.72	-551.79	-85388.33	-147896.93	0.00
90	955.72	283.91	969.64	-231.98	-35819.07	-150053.63	331.90
120	551.79	491.75	723.74	149.98	23385.02	-111939.26	574.87
150	0.00	567.83	283.91	491.75	76360.25	-43766.53	663.80
180	551.79	491.75	-231.98	701.76	108911.95	36197.73	574.87
210	955.72	283.91	-685.72	723.74	112317.92	106527.16	331.90
240	1103.57	0.00	-955.72	551.79	85665.53	148377.05	0.00
270	955.72	283.91	-969.64	231.98	36096.27	150533.75	-331.90
300	551.79	491.75	-723.74	-149.98	-23107.82	112419.38	-574.87
330	0.00	567.83	-283.91	-491.75	-76083.05	44246.65	-663.80

Panel-96x12x3 - Elevation 155 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	551.79	491.75	-231.98	-701.76	-108634.75	35717.61	574.87
30	0.00	567.83	283.91	-491.75	-76083.05	-44246.65	663.80
60	551.79	491.75	723.74	-149.98	-23107.82	-112419.38	574.87
90	955.72	283.91	969.64	231.98	36096.27	-150533.75	331.90
120	1103.57	0.00	955.72	551.79	85665.53	-148377.05	0.00
150	955.72	283.91	685.72	723.74	112317.92	-106527.16	-331.90
180	551.79	491.75	231.98	701.76	108911.95	-36197.73	-574.87
210	0.00	567.83	-283.91	491.75	76360.25	43766.53	-663.80
240	551.79	491.75	-723.74	149.98	23385.02	111939.26	-574.87
270	955.72	283.91	-969.64	-231.98	-35819.07	150053.63	-331.90



Panel-96x12x3 - Elevation 155 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
300	1103.57	0.00	-955.72	-551.79	-85388.33	147896.93	0.00
330	955.72	283.91	-685.72	-723.74	-112040.72	106047.04	331.90

Panel-96x12x3 - Elevation 155 - From Leg A

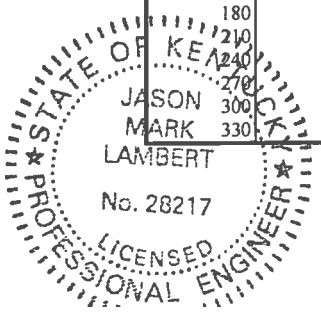
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	1103.57	0.00	0.00	-1103.57	-171331.06	0.00	0.00
30	955.72	283.91	283.91	-955.72	-148414.19	-44006.59	-331.90
60	551.79	491.75	491.75	-551.79	-85804.13	-76221.65	-574.87
90	0.00	567.83	567.83	0.00	-277.20	-88013.18	-663.80
120	551.79	491.75	491.75	551.79	85249.73	-76221.65	-574.87
150	955.72	283.91	283.91	955.72	147859.79	-44006.59	-331.90
180	1103.57	0.00	0.00	1103.57	170776.66	0.00	0.00
210	955.72	283.91	-283.91	955.72	147859.79	44006.59	331.90
240	551.79	491.75	-491.75	551.79	85249.73	76221.65	574.87
270	0.00	567.83	-567.83	0.00	-277.20	88013.18	663.80
300	551.79	491.75	-491.75	-551.79	-85804.13	76221.65	574.87
330	955.72	283.91	-283.91	-955.72	-148414.19	44006.59	331.90

Low Profile Platform - Elevation 155 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	472.19	0.00	0.00	-472.19	-73188.92	0.00	0.00
30	472.19	0.00	236.09	-408.93	-63383.47	-36594.46	0.00
60	472.19	0.00	408.93	-236.09	-36594.46	-63383.47	0.00
90	472.19	0.00	472.19	0.00	0.00	-73188.92	0.00
120	472.19	0.00	408.93	236.09	36594.46	-63383.47	0.00
150	472.19	0.00	236.09	408.93	63383.47	-36594.46	0.00
180	472.19	0.00	0.00	472.19	73188.92	0.00	0.00
210	472.19	0.00	-236.09	408.93	63383.47	36594.46	0.00
240	472.19	0.00	-408.93	236.09	36594.46	63383.47	0.00
270	472.19	0.00	-472.19	0.00	0.00	73188.92	0.00
300	472.19	0.00	-408.93	-236.09	-36594.46	63383.47	0.00
330	472.19	0.00	-236.09	-408.93	-63383.47	36594.46	0.00

Panel-96x12x3 - Elevation 140 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	540.09	481.33	227.07	-686.89	-96010.50	-31523.39	-623.42
30	935.46	277.89	671.19	-708.39	-99021.64	-93700.05	-359.93
60	1080.18	0.00	935.46	-540.09	-75458.87	-130698.60	0.00
90	935.46	277.89	949.08	-227.07	-31635.81	-132605.29	359.93
120	540.09	481.33	708.39	146.80	20705.19	-98909.23	623.42
150	0.00	555.79	277.89	481.33	67539.40	-38639.26	719.86
180	540.09	481.33	-227.07	686.89	96317.62	32055.34	623.42
210	935.46	277.89	-671.19	708.39	99328.76	94232.00	359.93
240	1080.18	0.00	-935.46	540.09	75765.99	131230.54	0.00
270	935.46	277.89	-949.08	227.07	31942.93	133137.23	-359.93
300	540.09	481.33	-708.39	-146.80	-20398.07	99441.18	-623.42
330	0.00	555.79	-277.89	-481.33	-67232.28	39171.20	-719.86

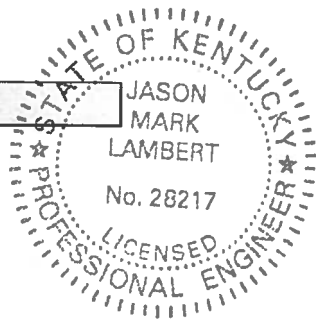


Panel-96x12x3 - Elevation 140 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	540.09	481.33	-227.07	-686.89	-96010.50	31523.39	623.42
30	0.00	555.79	277.89	-481.33	-67232.28	-39171.20	719.86
60	540.09	481.33	708.39	-146.80	-20398.07	-99441.18	623.42
90	935.46	277.89	949.08	227.07	31942.93	-133137.23	359.93
120	1080.18	0.00	935.46	540.09	75765.99	-131230.54	0.00
150	935.46	277.89	671.19	708.39	99328.76	-94232.00	-359.93
180	540.09	481.33	227.07	686.89	96317.62	-32055.34	-623.42
210	0.00	555.79	-277.89	481.33	67539.40	38639.26	-719.86
240	540.09	481.33	-708.39	146.80	20705.19	98909.23	-623.42
270	935.46	277.89	-949.08	-227.07	-31635.81	132605.29	-359.93
300	1080.18	0.00	-935.46	-540.09	-75458.87	130698.60	0.00
330	935.46	277.89	-671.19	-708.39	-99021.64	93700.05	359.93

Panel-96x12x3 - Elevation 140 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	1080.18	0.00	0.00	-1080.18	-151531.98	0.00	0.00
30	935.46	277.89	277.89	-935.46	-131271.69	-38905.23	-359.93
60	540.09	481.33	481.33	-540.09	-75919.55	-67385.84	-623.42
90	0.00	555.79	555.79	0.00	-307.12	-77810.46	-719.86
120	540.09	481.33	481.33	540.09	75305.31	-67385.84	-623.42
150	935.46	277.89	277.89	935.46	130657.45	-38905.23	-359.93
180	1080.18	0.00	0.00	1080.18	150917.74	0.00	0.00
210	935.46	277.89	-277.89	935.46	130657.45	38905.23	359.93
240	540.09	481.33	-481.33	540.09	75305.31	67385.84	623.42
270	0.00	555.79	-555.79	0.00	-307.12	77810.46	719.86
300	540.09	481.33	-481.33	-540.09	-75919.55	67385.84	623.42
330	935.46	277.89	-277.89	-935.46	-131271.69	38905.23	359.93

Low Profile Platform - Elevation 140 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	462.18	0.00	0.00	-462.18	-64704.67	0.00	0.00
30	462.18	0.00	231.09	-400.26	-56035.89	-32352.34	0.00
60	462.18	0.00	400.26	-231.09	-32352.34	-56035.89	0.00
90	462.18	0.00	462.18	0.00	0.00	-64704.67	0.00
120	462.18	0.00	400.26	231.09	32352.34	-56035.89	0.00
150	462.18	0.00	231.09	400.26	56035.89	-32352.34	0.00
180	462.18	0.00	0.00	462.18	64704.67	0.00	0.00
210	462.18	0.00	-231.09	400.26	56035.89	32352.34	0.00
240	462.18	0.00	-400.26	231.09	32352.34	56035.89	0.00
270	462.18	0.00	-462.18	0.00	0.00	64704.67	0.00
300	462.18	0.00	-400.26	-231.09	-32352.34	56035.89	0.00
330	462.18	0.00	-231.09	-400.26	-56035.89	32352.34	0.00

Discrete Appurtenance Totals - No Ice



Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-13261.95	-2187311.64	87.32	-78.47
30	6630.98	-11485.19	-1894260.69	-1093593.70	-45.31
60	11485.19	-6630.98	-1093630.61	-1894223.78	0.00
90	13261.95	0.00	50.42	-2187274.73	45.31
120	11485.19	6630.98	1093731.44	-1894223.78	78.47
150	6630.98	11485.19	1894361.52	-1093593.70	90.61
180	0.00	13261.95	2187412.47	87.32	78.47
210	-6630.98	11485.19	1894361.52	1093768.35	45.31
240	-11485.19	6630.98	1093731.44	1894398.43	0.00
270	-13261.95	0.00	50.42	2187449.38	-45.31
300	-11485.19	-6630.98	-1093630.61	1894398.43	-78.47
330	-6630.98	-11485.19	-1894260.69	1093768.35	-90.61

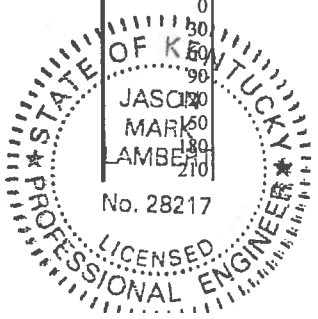
Discrete Appurtenance Pressures - With Ice $G_H = 1.100$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2	t_z in
6' Lightning Rod	240.0000	22.68	-0.79	0.46	188.00	1.446	3	2.38	2.38	1.1881
Beacon (12" x 36")	240.0000	170.99	-0.79	0.46	185.00	1.441	3	3.07	3.07	1.1881
Panel-96x12x3	240.0000	1023.74	-0.79	0.46	185.00	1.441	3	54.69	44.03	1.1881
Panel-96x12x3	120.0000	1023.74	0.79	0.46	185.00	1.441	3	54.69	44.03	1.1881
Panel-96x12x3	0.0000	1023.74	0.00	-0.92	185.00	1.441	3	54.69	44.03	1.1881
Low Profile Platform w/ Handrail	0.0000	3319.05	0.00	0.00	185.00	1.441	3	52.45	52.45	1.1881
Panel-96x12x3	240.0000	1016.13	-0.90	0.52	170.00	1.415	3	54.61	43.86	1.1781
Panel-96x12x3	120.0000	1016.13	0.90	0.52	170.00	1.415	3	54.61	43.86	1.1781
Panel-96x12x3	0.0000	1016.13	0.00	-1.04	170.00	1.415	3	54.61	43.86	1.1781
Low Profile Platform	0.0000	2395.66	0.00	0.00	170.00	1.415	3	26.07	26.07	1.1781
Panel-96x12x3	240.0000	1007.89	-1.01	0.58	155.00	1.388	3	54.53	43.67	1.1673
Panel-96x12x3	120.0000	1007.89	1.01	0.58	155.00	1.388	3	54.53	43.67	1.1673
Panel-96x12x3	0.0000	1007.89	0.00	-1.17	155.00	1.388	3	54.53	43.67	1.1673
Low Profile Platform	0.0000	2385.59	0.00	0.00	155.00	1.388	3	25.97	25.97	1.1673
Panel-96x12x3	240.0000	998.90	-1.12	0.65	140.00	1.359	3	54.44	43.47	1.1555
Panel-96x12x3	120.0000	998.90	1.12	0.65	140.00	1.359	3	54.44	43.47	1.1555
Panel-96x12x3	0.0000	998.90	0.00	-1.30	140.00	1.359	3	54.44	43.47	1.1555
Low Profile Platform	0.0000	2374.59	0.00	0.00	140.00	1.359	3	25.87	25.87	1.1555
	Sum Weight:	22808.58								

Discrete Appurtenance Vectors - With Ice

6' Lightning Rod - Elevation 188 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	4.15	7.18	0.00	-8.29	-1548.72	18.00	-6.58
30	7.18	4.15	4.15	-7.18	-1339.84	-761.55	-3.80
60	8.29	0.00	7.18	-4.15	-769.16	-1332.23	0.00
90	7.18	4.15	8.29	0.00	10.39	-1541.11	3.80
120	4.15	7.18	7.18	4.15	789.95	-1332.23	6.58
150	0.00	8.29	4.15	7.18	1360.63	-761.55	7.60
180	4.15	7.18	0.00	8.29	1569.51	18.00	6.58
210	7.18	4.15	-4.15	7.18	1360.63	797.56	3.80



6' Lightning Rod - Elevation 188 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
240	8.29	0.00	-7.18	4.15	789.95	1368.24	0.00
270	7.18	4.15	-8.29	0.00	10.39	1577.12	-3.80
300	4.15	7.18	-7.18	-4.15	-769.16	1368.24	-6.58
330	0.00	8.29	-4.15	-7.18	-1339.84	797.56	-7.60

Beacon (12" x 36") - Elevation 185 - From Leg C

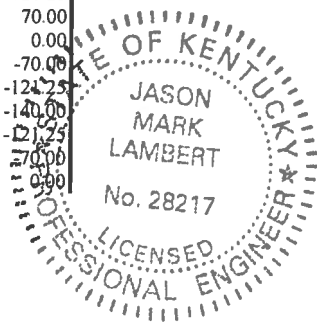
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	5.32	9.22	0.00	-10.64	-1890.59	135.75	-8.45
30	9.22	5.32	5.32	-9.22	-1626.80	-848.74	-4.88
60	10.64	0.00	9.22	-5.32	-906.11	-1569.43	0.00
90	9.22	5.32	10.64	0.00	78.37	-1833.22	4.88
120	5.32	9.22	9.22	5.32	1062.85	-1569.43	8.45
150	0.00	10.64	5.32	9.22	1783.54	-848.74	9.76
180	5.32	9.22	0.00	10.64	2047.33	135.75	8.45
210	9.22	5.32	-5.32	9.22	1783.54	1120.23	4.88
240	10.64	0.00	-9.22	5.32	1062.85	1840.92	0.00
270	9.22	5.32	-10.64	0.00	78.37	2104.71	-4.88
300	5.32	9.22	-9.22	-5.32	-906.11	1840.92	-8.45
330	0.00	10.64	-5.32	-9.22	-1626.80	1120.23	-9.76

Panel-96x12x3 - Elevation 185 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	94.84	132.27	16.00	-161.97	-29494.64	-2147.20	-121.25
30	164.27	76.36	104.08	-148.27	-26960.20	-18441.48	-70.00
60	189.68	0.00	164.27	-94.84	-17076.07	-29576.62	0.00
90	164.27	76.36	180.44	-16.00	-2490.69	-32568.96	70.00
120	94.84	132.27	148.27	67.13	12887.79	-26616.71	121.25
150	0.00	152.73	76.36	132.27	24938.72	-13314.77	140.00
180	94.84	132.27	-16.00	161.97	30433.07	3772.61	121.25
210	164.27	76.36	-104.08	148.27	27898.63	20066.89	70.00
240	189.68	0.00	-164.27	94.84	18014.50	31202.03	0.00
270	164.27	76.36	-180.44	16.00	3429.12	34194.37	-70.00
300	94.84	132.27	-148.27	-67.13	-11949.36	28242.12	-121.25
330	0.00	152.73	-76.36	-132.27	-24000.29	14940.18	-140.00

Panel-96x12x3 - Elevation 185 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	94.84	132.27	-16.00	-161.97	-29494.64	2147.20	121.25
30	0.00	152.73	76.36	-132.27	-24000.29	-14940.18	140.00
60	94.84	132.27	148.27	-67.13	-11949.36	-28242.12	121.25
90	164.27	76.36	180.44	16.00	3429.12	-34194.37	70.00
120	189.68	0.00	164.27	94.84	18014.50	-31202.03	0.00
150	164.27	76.36	104.08	148.27	27898.63	-20066.89	-70.00
180	94.84	132.27	16.00	161.97	30433.07	-3772.61	-121.25
210	0.00	152.73	-76.36	132.27	24938.72	13314.77	-140.00
240	94.84	132.27	-148.27	67.13	12887.79	26616.71	-121.25
270	164.27	76.36	-180.44	-16.00	-2490.69	32568.96	-70.00
300	189.68	0.00	-164.27	-94.84	-17076.07	29576.62	0.00



Panel-96x12x3 - Elevation 185 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
330	164.27	76.36	-104.08	-148.27	-26960.20	18441.48	70.00

Panel-96x12x3 - Elevation 185 - From Leg A

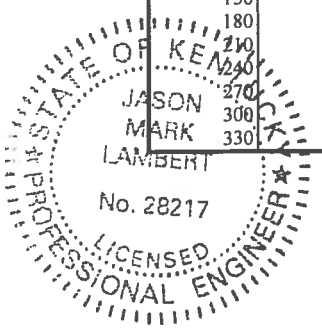
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	189.68	0.00	0.00	-189.68	-36029.00	0.00	0.00
30	164.27	76.36	76.36	-164.27	-31327.76	-14127.48	-70.00
60	94.84	132.27	132.27	-94.84	-18483.72	-24469.51	-121.25
90	0.00	152.73	152.73	0.00	-938.43	-28254.96	-140.00
120	94.84	132.27	132.27	94.84	16606.85	-24469.51	-121.25
150	164.27	76.36	76.36	164.27	29450.89	-14127.48	-70.00
180	189.68	0.00	0.00	189.68	34152.14	0.00	0.00
210	164.27	76.36	-76.36	164.27	29450.89	14127.48	70.00
240	94.84	132.27	-132.27	94.84	16606.85	24469.51	121.25
270	0.00	152.73	-152.73	0.00	-938.43	28254.96	140.00
300	94.84	132.27	-132.27	-94.84	-18483.72	24469.51	121.25
330	164.27	76.36	-76.36	-164.27	-31327.76	14127.48	70.00

Low Profile Platform w/ Handrail - Elevation 185 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	181.92	0.00	0.00	-181.92	-33655.47	0.00	0.00
30	181.92	0.00	90.96	-157.55	-29146.49	-16827.73	0.00
60	181.92	0.00	157.55	-90.96	-16827.73	-29146.49	0.00
90	181.92	0.00	181.92	0.00	0.00	-33655.47	0.00
120	181.92	0.00	157.55	90.96	16827.73	-29146.49	0.00
150	181.92	0.00	90.96	157.55	29146.49	-16827.73	0.00
180	181.92	0.00	0.00	181.92	33655.47	0.00	0.00
210	181.92	0.00	-90.96	157.55	29146.49	16827.73	0.00
240	181.92	0.00	-157.55	90.96	16827.73	29146.49	0.00
270	181.92	0.00	-181.92	0.00	0.00	33655.47	0.00
300	181.92	0.00	-157.55	-90.96	-16827.73	29146.49	0.00
330	181.92	0.00	-90.96	-157.55	-29146.49	16827.73	0.00

Panel-96x12x3 - Elevation 170 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	74.43	103.54	12.69	-126.88	-21040.60	-1239.46	-107.98
30	128.92	59.78	81.76	-116.23	-19229.29	-12981.11	-62.34
60	148.86	0.00	128.92	-74.43	-12123.54	-20998.59	0.00
90	128.92	59.78	141.54	-12.69	-1627.33	-23143.61	62.34
120	74.43	103.54	116.23	52.45	9446.90	-18841.42	107.98
150	0.00	119.56	59.78	103.54	18131.80	-9244.80	124.68
180	74.43	103.54	-12.69	126.88	22100.27	3074.86	107.98
210	128.92	59.78	-81.76	116.23	20288.96	14816.52	62.34
240	148.86	0.00	-128.92	74.43	13183.21	22833.99	0.00
270	128.92	59.78	-141.54	12.69	2687.00	24979.01	-62.34
300	74.43	103.54	-116.23	-52.45	-8387.22	20676.83	-107.98
330	0.00	119.56	-59.78	-103.54	-17072.13	11080.20	-124.68

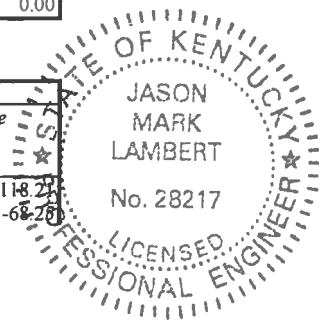


Panel-96x12x3 - Elevation 170 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	74.43	103.54	-12.69	-126.88	-21040.60	1239.46	107.98
30	0.00	119.56	59.78	-103.54	-17072.13	-11080.20	124.68
60	74.43	103.54	116.23	-52.45	-8387.22	-20676.83	107.98
90	128.92	59.78	141.54	12.69	2687.00	-24979.01	62.34
120	148.86	0.00	128.92	74.43	13183.21	-22833.99	0.00
150	128.92	59.78	81.76	116.23	20288.96	-14816.52	-62.34
180	74.43	103.54	12.69	126.88	22100.27	-3074.86	-107.98
210	0.00	119.56	-59.78	103.54	18131.80	9244.80	-124.68
240	74.43	103.54	-116.23	52.45	9446.90	18841.42	-107.98
270	128.92	59.78	-141.54	-12.69	-1627.33	23143.61	-62.34
300	148.86	0.00	-128.92	-74.43	-12123.54	20998.59	0.00
330	128.92	59.78	-81.76	-116.23	-19229.29	12981.11	62.34

Panel-96x12x3 - Elevation 170 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	148.86	0.00	0.00	-148.86	-26366.42	0.00	0.00
30	128.92	59.78	59.78	-128.92	-22975.96	-10162.50	-62.34
60	74.43	103.54	103.54	-74.43	-13713.05	-17601.96	-107.98
90	0.00	119.56	119.56	0.00	-1059.67	-20325.00	-124.68
120	74.43	103.54	103.54	74.43	11593.70	-17601.96	-107.98
150	128.92	59.78	59.78	128.92	20856.62	-10162.50	-62.34
180	148.86	0.00	0.00	148.86	24247.08	0.00	0.00
210	128.92	59.78	-59.78	128.92	20856.62	10162.50	62.34
240	74.43	103.54	-103.54	74.43	11593.70	17601.96	107.98
270	0.00	119.56	-119.56	0.00	-1059.67	20325.00	124.68
300	74.43	103.54	-103.54	-74.43	-13713.05	17601.96	107.98
330	128.92	59.78	-59.78	-128.92	-22975.96	10162.50	62.34

Low Profile Platform - Elevation 170 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	88.82	0.00	0.00	-88.82	-15099.63	0.00	0.00
30	88.82	0.00	44.41	-76.92	-13076.67	-7549.82	0.00
60	88.82	0.00	76.92	-44.41	-7549.82	-13076.67	0.00
90	88.82	0.00	88.82	0.00	0.00	-15099.63	0.00
120	88.82	0.00	76.92	44.41	7549.82	-13076.67	0.00
150	88.82	0.00	44.41	76.92	13076.67	-7549.82	0.00
180	88.82	0.00	0.00	88.82	15099.63	0.00	0.00
210	88.82	0.00	-44.41	76.92	13076.67	7549.82	0.00
240	88.82	0.00	-76.92	44.41	7549.82	13076.67	0.00
270	88.82	0.00	-88.82	0.00	0.00	15099.63	0.00
300	88.82	0.00	-76.92	-44.41	-7549.82	13076.67	0.00
330	88.82	0.00	-44.41	-76.92	-13076.67	7549.82	0.00

Panel-96x12x3 - Elevation 155 - From Leg C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	72.89	101.12	12.57	-124.01	-18633.04	-927.55	-118.21
30	126.25	58.38	80.15	-113.68	-17031.73	-11402.30	-68.28



Panel-96x12x3 - Elevation 155 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
60	145.78	0.00	126.25	-72.89	-10708.93	-18548.40	0.00
90	126.25	58.38	138.53	-12.57	-1358.82	-20451.06	68.25
120	72.89	101.12	113.68	51.12	8513.24	-16600.46	118.21
150	0.00	116.76	58.38	101.12	16262.04	-8028.36	136.49
180	72.89	101.12	-12.57	124.01	19811.29	2968.34	118.21
210	126.25	58.38	-80.15	113.68	18209.98	13443.10	68.25
240	145.78	0.00	-126.25	72.89	11887.18	20589.20	0.00
270	126.25	58.38	-138.53	12.57	2537.07	22491.85	-68.25
300	72.89	101.12	-113.68	-51.12	-7334.99	18641.25	-118.21
330	0.00	116.76	-58.38	-101.12	-15083.78	10069.16	-136.49

Panel-96x12x3 - Elevation 155 - From Leg B

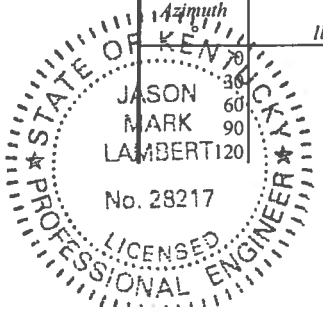
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	72.89	101.12	-12.57	-124.01	-18633.04	927.55	118.21
30	0.00	116.76	58.38	-101.12	-15083.78	-10069.16	136.49
60	72.89	101.12	113.68	-51.12	-7334.99	-18641.25	118.21
90	126.25	58.38	138.53	12.57	2537.07	-22491.85	68.25
120	145.78	0.00	126.25	72.89	11887.18	-20589.20	0.00
150	126.25	58.38	80.15	113.68	18209.98	-13443.10	-68.25
180	72.89	101.12	12.57	124.01	19811.29	-2968.34	-118.21
210	0.00	116.76	-58.38	101.12	16262.04	8028.36	-136.49
240	72.89	101.12	-113.68	51.12	8513.24	16600.46	-118.21
270	126.25	58.38	-138.53	-12.57	-1358.82	20451.06	-68.25
300	145.78	0.00	-126.25	-72.89	-10708.93	18548.40	0.00
330	126.25	58.38	-80.15	-113.68	-17031.73	11402.30	68.25

Panel-96x12x3 - Elevation 155 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	145.78	0.00	0.00	-145.78	-23774.36	0.00	0.00
30	126.25	58.38	58.38	-126.25	-20747.05	-9048.76	-68.25
60	72.89	101.12	101.12	-72.89	-12476.30	-15672.91	-118.21
90	0.00	116.76	116.76	0.00	-1178.25	-18097.52	-136.49
120	72.89	101.12	101.12	72.89	10119.80	-15672.91	-118.21
150	126.25	58.38	58.38	126.25	18390.55	-9048.76	-68.25
180	145.78	0.00	0.00	145.78	21417.85	0.00	0.00
210	126.25	58.38	-58.38	126.25	18390.55	9048.76	68.25
240	72.89	101.12	-101.12	72.89	10119.80	15672.91	118.21
270	0.00	116.76	-116.76	0.00	-1178.25	18097.52	136.49
300	72.89	101.12	-101.12	-72.89	-12476.30	15672.91	118.21
330	126.25	58.38	-58.38	-126.25	-20747.05	9048.76	68.25

Low Profile Platform - Elevation 155 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	86.79	0.00	0.00	-86.79	-13452.79	0.00	0.00
30	86.79	0.00	43.40	-75.16	-11650.46	-6726.39	0.00
60	86.79	0.00	75.16	-43.40	-6726.39	-11650.46	0.00
90	86.79	0.00	86.79	0.00	0.00	-13452.79	0.00
120	86.79	0.00	75.16	43.40	6726.39	-11650.46	0.00



Low Profile Platform - Elevation 155 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
150	86.79	0.00	43.40	75.16	11650.46	-6726.39	0.00
180	86.79	0.00	0.00	86.79	13452.79	0.00	0.00
210	86.79	0.00	-43.40	75.16	11650.46	6726.39	0.00
240	86.79	0.00	-75.16	43.40	6726.39	11650.46	0.00
270	86.79	0.00	-86.79	0.00	0.00	13452.79	0.00
300	86.79	0.00	-75.16	-43.40	-6726.39	11650.46	0.00
330	86.79	0.00	-43.40	-75.16	-11650.46	6726.39	0.00

Panel-96x12x3 - Elevation 140 - From Leg C

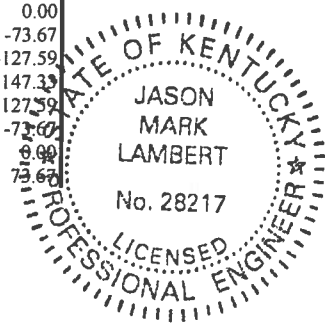
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	71.23	98.51	12.43	-120.93	-16283.10	-620.02	-127.59
30	123.37	56.88	78.41	-110.94	-14885.14	-9856.69	-73.67
60	142.46	0.00	123.37	-71.23	-9325.39	-16152.05	0.00
90	123.37	56.88	135.28	-12.43	-1093.57	-17819.26	73.67
120	71.23	98.51	110.94	49.70	7604.60	-14411.59	127.59
150	0.00	113.75	56.88	98.51	14438.46	-6842.12	147.33
180	71.23	98.51	-12.43	120.93	17576.88	2860.91	127.59
210	123.37	56.88	-78.41	110.94	16178.93	12097.59	73.67
240	142.46	0.00	-123.37	71.23	10619.17	18392.95	0.00
270	123.37	56.88	-135.28	12.43	2387.35	20060.15	-73.67
300	71.23	98.51	-110.94	-49.70	-6310.82	16652.48	-127.59
330	0.00	113.75	-56.88	-98.51	-13144.68	9083.02	-147.33

Panel-96x12x3 - Elevation 140 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	71.23	98.51	-12.43	-120.93	-16283.10	620.02	127.59
30	0.00	113.75	56.88	-98.51	-13144.68	-9083.02	147.33
60	71.23	98.51	110.94	-49.70	-6310.82	-16652.48	127.59
90	123.37	56.88	135.28	12.43	2387.35	-20060.15	73.67
120	142.46	0.00	123.37	71.23	10619.17	-18392.95	0.00
150	123.37	56.88	78.41	110.94	16178.93	-12097.59	-73.67
180	71.23	98.51	12.43	120.93	17576.88	-2860.91	-127.59
210	0.00	113.75	-56.88	98.51	14438.46	6842.12	-147.33
240	71.23	98.51	-110.94	49.70	7604.60	14411.59	-127.59
270	123.37	56.88	-135.28	-12.43	-1093.57	17819.26	-73.67
300	142.46	0.00	-123.37	-71.23	-9325.39	16152.05	0.00
330	123.37	56.88	-78.41	-110.94	-14885.14	9856.69	73.67

Panel-96x12x3 - Elevation 140 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	142.46	0.00	0.00	-142.46	-21238.35	0.00	0.00
30	123.37	56.88	56.88	-123.37	-18566.28	-7962.57	-73.67
60	71.23	98.51	98.51	-71.23	-11266.06	-13791.57	-127.59
90	0.00	113.75	113.75	0.00	-1293.78	-15925.14	-147.33
120	71.23	98.51	98.51	71.23	8678.50	-13791.57	-127.59
150	123.37	56.88	56.88	123.37	15978.72	-7962.57	-73.67
180	142.46	0.00	0.00	142.46	18650.78	0.00	0.00
210	123.37	56.88	-56.88	123.37	15978.72	7962.57	73.67



Panel-96x12x3 - Elevation 140 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
240	71.23	98.51	-98.51	71.23	8678.50	13791.57	127.59
270	0.00	113.75	-113.75	0.00	-1293.78	15925.14	147.33
300	71.23	98.51	-98.51	-71.23	-11266.06	13791.57	127.59
330	123.37	56.88	-56.88	-123.37	-18566.28	7962.57	73.67

Low Profile Platform - Elevation 140 - None C

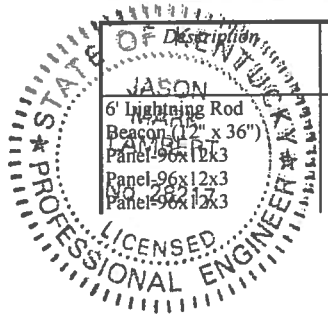
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	84.61	0.00	0.00	-84.61	-11845.67	0.00	0.00
30	84.61	0.00	42.31	-73.28	-10258.65	-5922.84	0.00
60	84.61	0.00	73.28	-42.31	-5922.84	-10258.65	0.00
90	84.61	0.00	84.61	0.00	0.00	-11845.67	0.00
120	84.61	0.00	73.28	42.31	5922.84	-10258.65	0.00
150	84.61	0.00	42.31	73.28	10258.65	-5922.84	0.00
180	84.61	0.00	0.00	84.61	11845.67	0.00	0.00
210	84.61	0.00	-42.31	73.28	10258.65	5922.84	0.00
240	84.61	0.00	-73.28	42.31	5922.84	10258.65	0.00
270	84.61	0.00	-84.61	0.00	0.00	11845.67	0.00
300	84.61	0.00	-73.28	-42.31	-5922.84	10258.65	0.00
330	84.61	0.00	-42.31	-73.28	-10258.65	5922.84	0.00

Discrete Appurtenance Totals - With Ice

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-2155.46	-355803.76	153.75	-15.03
30	1077.73	-1866.68	-308123.20	-177792.51	-8.68
60	1866.68	-1077.73	-177857.50	-308058.22	0.00
90	2155.46	0.00	88.77	-355738.78	8.68
120	1866.68	1077.73	178035.03	-308058.22	15.03
150	1077.73	1866.68	308300.73	-177792.51	17.36
180	0.00	2155.46	355981.29	153.75	15.03
210	-1077.73	1866.68	308300.73	178100.01	8.68
240	-1866.68	1077.73	178035.03	308365.71	0.00
270	-2155.46	0.00	88.77	356046.27	-8.68
300	-1866.68	-1077.73	-177857.50	308365.71	-15.03
330	-1077.73	-1866.68	-308123.20	178100.01	-17.36

Discrete Appurtenance Pressures - Service $G_H = 1.100$

Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
6' Lightning Rod	240.0000	10.00	-0.79	0.46	188.00	1.446	11	0.76	0.76
Beacon (12" x 36")	240.0000	100.00	-0.79	0.46	185.00	1.441	11	2.40	2.40
Panel-96x12x3	240.0000	237.12	-0.79	0.46	185.00	1.441	11	45.87	23.60
Panel-96x12x3	120.0000	237.12	0.79	0.46	185.00	1.441	11	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-0.92	185.00	1.441	11	45.87	23.60



Description	Aiming Azimuth °	Weight lb	$Offset_x$ ft	$Offset_z$ ft	z ft	K_z	q_z psf	C_AA_C Front ft^2	C_AA_C Side ft^2
Low Profile Platform w/ Handrail	0.0000	1822.00	0.00	0.00	185.00	1.441	11	31.30	31.30
Panel-96x12x3	240.0000	237.12	-0.90	0.52	170.00	1.415	11	45.87	23.60
Panel-96x12x3	120.0000	237.12	0.90	0.52	170.00	1.415	11	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.04	170.00	1.415	11	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	170.00	1.415	11	15.70	15.70
Panel-96x12x3	240.0000	237.12	-1.01	0.58	155.00	1.388	11	45.87	23.60
Panel-96x12x3	120.0000	237.12	1.01	0.58	155.00	1.388	11	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.17	155.00	1.388	11	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	155.00	1.388	11	15.70	15.70
Panel-96x12x3	240.0000	237.12	-1.12	0.65	140.00	1.359	11	45.87	23.60
Panel-96x12x3	120.0000	237.12	1.12	0.65	140.00	1.359	11	45.87	23.60
Panel-96x12x3	0.0000	237.12	0.00	-1.30	140.00	1.359	11	45.87	23.60
Low Profile Platform	0.0000	1300.00	0.00	0.00	140.00	1.359	11	15.70	15.70
	Sum Weight:	8677.44							

Discrete Appurtenance Vectors - Service

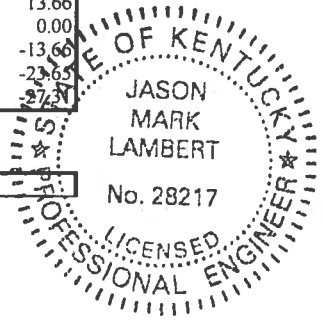
6' Lightning Rod - Elevation 188 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	4.76	8.24	0.00	-9.51	-1784.22	7.94	-7.55
30	8.24	4.76	4.76	-8.24	-1544.57	-886.46	-4.36
60	9.51	0.00	8.24	-4.76	-889.82	-1541.21	0.00
90	8.24	4.76	9.51	0.00	4.58	-1780.86	4.36
120	4.76	8.24	8.24	4.76	898.98	-1541.21	7.55
150	0.00	9.51	4.76	8.24	1553.73	-886.46	8.72
180	4.76	8.24	0.00	9.51	1793.39	7.94	7.55
210	8.24	4.76	-4.76	8.24	1553.73	902.34	4.36
240	9.51	0.00	-8.24	4.76	898.98	1557.09	0.00
270	8.24	4.76	-9.51	0.00	4.58	1796.74	-4.36
300	4.76	8.24	-8.24	-4.76	-889.82	1557.09	-7.55
330	0.00	9.51	-4.76	-8.24	-1544.57	902.34	-8.72

Beacon (12" x 36") - Elevation 185 - From Leg C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	14.90	25.80	0.00	-29.79	-5465.88	79.39	-23.65
30	25.80	14.90	14.90	-25.80	-4727.45	-2676.47	-13.66
60	29.79	0.00	25.80	-14.90	-2710.02	-4693.90	0.00
90	25.80	14.90	29.79	0.00	45.83	-5432.33	13.66
120	14.90	25.80	25.80	14.90	2801.69	-4693.90	23.65
150	0.00	29.79	14.90	25.80	4819.12	-2676.47	27.31
180	14.90	25.80	0.00	29.79	5557.55	79.39	23.65
210	25.80	14.90	-14.90	25.80	4819.12	2835.24	13.66
240	29.79	0.00	-25.80	14.90	2801.69	4852.67	0.00
270	25.80	14.90	-29.79	0.00	45.83	5591.10	-13.66
300	14.90	25.80	-25.80	-14.90	-2710.02	4852.67	-23.65
330	0.00	29.79	-14.90	-25.80	-4727.45	2835.24	-27.31

Panel-96x12x3 - Elevation 185 - From Leg C



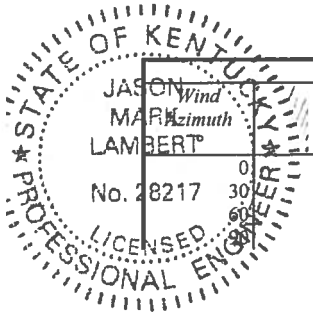
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	284.69	253.72	119.69	-362.07	-66873.95	-21954.50	-232.57
30	493.10	146.48	353.79	-373.41	-68971.35	-65263.36	-134.28
60	569.38	0.00	493.10	-284.69	-52558.80	-91034.52	0.00
90	493.10	146.48	500.27	-119.69	-22034.05	-92362.62	134.28
120	284.69	253.72	373.41	77.38	14423.82	-68891.79	232.57
150	0.00	292.96	146.48	253.72	47045.97	-26911.02	268.55
180	284.69	253.72	-119.69	362.07	67091.31	22330.97	232.57
210	493.10	146.48	-353.79	373.41	69188.71	65639.84	134.28
240	569.38	0.00	-493.10	284.69	52776.16	91411.00	0.00
270	493.10	146.48	-500.27	119.69	22251.41	92739.10	-134.28
300	284.69	253.72	-373.41	-77.38	-14206.46	69268.26	-232.57
330	0.00	292.96	-146.48	-253.72	-46828.61	27287.50	-268.55

Panel-96x12x3 - Elevation 185 - From Leg B

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	284.69	253.72	-119.69	-362.07	-66873.95	21954.50	232.57
30	0.00	292.96	146.48	-253.72	-46828.61	-27287.50	268.55
60	284.69	253.72	373.41	-77.38	-14206.46	-69268.26	232.57
90	493.10	146.48	500.27	119.69	22251.41	-92739.10	134.28
120	569.38	0.00	493.10	284.69	52776.16	-91411.00	0.00
150	493.10	146.48	353.79	373.41	69188.71	-65639.84	-134.28
180	284.69	253.72	119.69	362.07	67091.31	-22330.97	-232.57
210	0.00	292.96	-146.48	253.72	47045.97	26911.02	-268.55
240	284.69	253.72	-373.41	77.38	14423.82	68891.79	-232.57
270	493.10	146.48	-500.27	-119.69	-22034.05	92362.62	-134.28
300	569.38	0.00	-493.10	-284.69	-52558.80	91034.52	0.00
330	493.10	146.48	-353.79	-373.41	-68971.35	65263.36	134.28

Panel-96x12x3 - Elevation 185 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	569.38	0.00	0.00	-569.38	-105552.33	0.00	0.00
30	493.10	146.48	146.48	-493.10	-91440.12	-27099.26	-134.28
60	284.69	253.72	253.72	-284.69	-52884.84	-46937.29	-232.57
90	0.00	292.96	292.96	0.00	-217.36	-54198.51	-268.55
120	284.69	253.72	253.72	284.69	52450.12	-46937.29	-232.57
150	493.10	146.48	146.48	493.10	91005.40	-27099.26	-134.28
180	569.38	0.00	0.00	569.38	105117.61	0.00	0.00
210	493.10	146.48	-146.48	493.10	91005.40	27099.26	134.28
240	284.69	253.72	-253.72	284.69	52450.12	46937.29	232.57
270	0.00	292.96	-292.96	0.00	-217.36	54198.51	268.55
300	284.69	253.72	-253.72	-284.69	-52884.84	46937.29	232.57
330	493.10	146.48	-146.48	-493.10	-91440.12	27099.26	134.28



Low Profile Platform w/ Handrail - Elevation 185 - None C

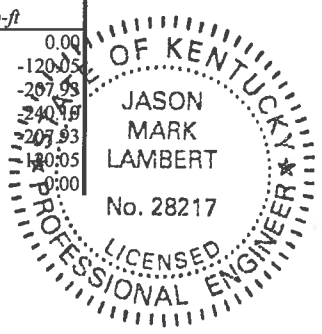
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	388.55	0.00	0.00	-388.55	-71881.93	0.00	0.00
30	388.55	0.00	194.28	-336.50	-62251.58	-35940.96	0.00
60	388.55	0.00	336.50	-194.28	-35940.96	-62251.58	0.00
90	388.55	0.00	388.55	0.00	0.00	-71881.93	0.00

Low Profile Platform w/ Handrail - Elevation 185 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
120	388.55	0.00	336.50	194.28	35940.96	-62251.58	0.00
150	388.55	0.00	194.28	336.50	62251.58	-35940.96	0.00
180	388.55	0.00	0.00	388.55	71881.93	0.00	0.00
210	388.55	0.00	-194.28	336.50	62251.58	35940.96	0.00
240	388.55	0.00	-336.50	194.28	35940.96	62251.58	0.00
270	388.55	0.00	-388.55	0.00	0.00	71881.93	0.00
300	388.55	0.00	-336.50	-194.28	-35940.96	62251.58	0.00
330	388.55	0.00	-194.28	-336.50	-62251.58	35940.96	0.00

Panel-96x12x3 - Elevation 170 - From Leg C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	223.73	199.39	94.06	-284.54	-48248.83	-15776.54	-207.93
30	387.52	115.12	278.04	-293.45	-49763.49	-47052.66	-120.05
60	447.47	0.00	387.52	-223.73	-37910.94	-65663.68	0.00
90	387.52	115.12	393.16	-94.06	-15867.05	-66622.78	120.05
120	223.73	199.39	293.45	60.81	10461.53	-49672.98	207.93
150	0.00	230.24	115.12	199.39	34020.08	-19355.97	240.10
180	223.73	199.39	-94.06	284.54	48496.11	16204.84	207.93
210	387.52	115.12	-278.04	293.45	50010.77	47480.96	120.05
240	447.47	0.00	-387.52	223.73	38158.22	66091.98	0.00
270	387.52	115.12	-393.16	94.06	16114.33	67051.08	-120.05
300	223.73	199.39	-293.45	-60.81	-10214.25	50101.28	-207.93
330	0.00	230.24	-115.12	-199.39	-33772.80	19784.27	-240.10

Panel-96x12x3 - Elevation 170 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	223.73	199.39	-94.06	-284.54	-48248.83	15776.54	207.93
30	0.00	230.24	115.12	-199.39	-33772.80	-19784.27	240.10
60	223.73	199.39	293.45	-60.81	-10214.25	-50101.28	207.93
90	387.52	115.12	393.16	94.06	16114.33	-67051.08	120.05
120	447.47	0.00	387.52	223.73	38158.22	-66091.98	0.00
150	387.52	115.12	278.04	293.45	50010.77	-47480.96	-120.05
180	223.73	199.39	94.06	284.54	48496.11	-16204.84	-207.93
210	0.00	230.24	-115.12	199.39	34020.08	19355.97	-240.10
240	223.73	199.39	-293.45	60.81	10461.53	49672.98	-207.93
270	387.52	115.12	-393.16	-94.06	-15867.05	66622.78	-120.05
300	447.47	0.00	-387.52	-223.73	-37910.94	65663.68	0.00
330	387.52	115.12	-278.04	-293.45	-49763.49	47052.66	120.05

Panel-96x12x3 - Elevation 170 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	447.47	0.00	0.00	-447.47	-76316.44	0.00	0.00
30	387.52	115.12	115.12	-387.52	-66125.11	-19570.12	-120.05
60	223.73	199.39	199.39	-223.73	-38281.86	-33896.44	-207.93
90	0.00	230.24	230.24	0.00	-247.28	-39140.24	-240.15
120	223.73	199.39	199.39	223.73	37787.30	-33896.44	-207.93
150	387.52	115.12	115.12	387.52	65630.55	-19570.12	-120.05
180	447.47	0.00	0.00	447.47	75821.88	0.00	0.00

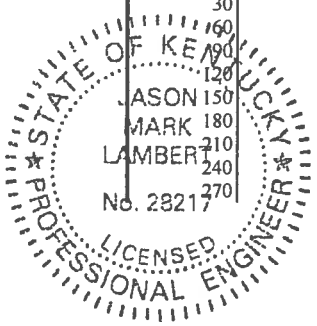


Panel-96x12x3 - Elevation 170 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
210	387.52	115.12	-115.12	387.52	65630.55	19570.12	120.05
240	223.73	199.39	-199.39	223.73	37787.30	33896.44	207.93
270	0.00	230.24	-230.24	0.00	-247.28	39140.24	240.10
300	223.73	199.39	-199.39	-223.73	-38281.86	33896.44	207.93
330	387.52	115.12	-115.12	-387.52	-66125.11	19570.12	120.05

Low Profile Platform - Elevation 170 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	191.46	0.00	0.00	-191.46	-32547.76	0.00	0.00
30	191.46	0.00	95.73	-165.81	-28187.19	-16273.88	0.00
60	191.46	0.00	165.81	-95.73	-16273.88	-28187.19	0.00
90	191.46	0.00	191.46	0.00	0.00	-32547.76	0.00
120	191.46	0.00	165.81	95.73	16273.88	-28187.19	0.00
150	191.46	0.00	95.73	165.81	28187.19	-16273.88	0.00
180	191.46	0.00	0.00	191.46	32547.76	0.00	0.00
210	191.46	0.00	-95.73	165.81	28187.19	16273.88	0.00
240	191.46	0.00	-165.81	95.73	16273.88	28187.19	0.00
270	191.46	0.00	-191.46	0.00	0.00	32547.76	0.00
300	191.46	0.00	-165.81	-95.73	-16273.88	28187.19	0.00
330	191.46	0.00	-95.73	-165.81	-28187.19	16273.88	0.00

Panel-96x12x3 - Elevation 155 - From Leg C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	219.42	195.55	92.25	-279.06	-43116.30	-14058.90	-228.60
30	380.05	112.90	272.69	-287.80	-44470.72	-42026.15	-131.98
60	438.85	0.00	380.05	-219.42	-33872.11	-58668.21	0.00
90	380.05	112.90	385.59	-92.25	-14160.36	-59525.85	131.98
120	219.42	195.55	287.80	59.64	9382.79	-44369.26	228.60
150	0.00	225.80	112.90	195.55	30448.96	-17259.63	263.97
180	219.42	195.55	-92.25	279.06	43393.50	14539.02	228.60
210	380.05	112.90	-272.69	287.80	44747.92	42506.28	131.98
240	438.85	0.00	-380.05	219.42	34149.31	59148.34	0.00
270	380.05	112.90	-385.59	92.25	14437.56	60005.97	-131.98
300	219.42	195.55	-287.80	-59.64	-9105.59	44849.38	-228.60
330	0.00	225.80	-112.90	-195.55	-30171.76	17739.76	-263.97

Panel-96x12x3 - Elevation 155 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	219.42	195.55	-92.25	-279.06	-43116.30	14058.90	228.60
30	0.00	225.80	112.90	-195.55	-30171.76	-17739.76	263.97
60	219.42	195.55	287.80	-59.64	-9105.59	-44849.38	228.60
90	380.05	112.90	385.59	92.25	14437.56	-60005.97	131.98
120	438.85	0.00	380.05	219.42	34149.31	-59148.34	0.00
150	380.05	112.90	272.69	287.80	44747.92	-42506.28	-131.98
180	219.42	195.55	92.25	279.06	43393.50	-14539.02	-228.60
210	0.00	225.80	-112.90	195.55	30448.96	17259.63	-263.97
240	219.42	195.55	-287.80	59.64	9382.79	44369.26	-228.60
270	380.05	112.90	-385.59	-92.25	-14160.36	59525.85	-131.98

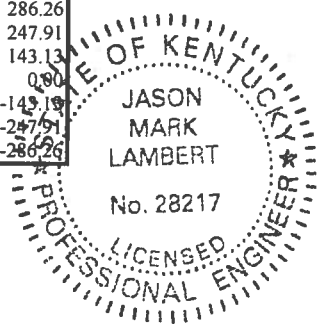


Panel-96x12x3 - Elevation 155 - From Leg B							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
300	438.85	0.00	-380.05	-219.42	-33872.11	58668.21	0.00
330	380.05	112.90	-272.69	-287.80	-44470.72	42026.15	131.98

Panel-96x12x3 - Elevation 155 - From Leg A							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	438.85	0.00	0.00	-438.85	-68298.62	0.00	0.00
30	380.05	112.90	112.90	-380.05	-59185.48	-17499.70	-131.98
60	219.42	195.55	195.55	-219.42	-34287.91	-30310.36	-228.60
90	0.00	225.80	225.80	0.00	-277.20	-34999.39	-263.97
120	219.42	195.55	195.55	219.42	33733.51	-30310.36	-228.60
150	380.05	112.90	112.90	380.05	58631.08	-17499.70	-131.98
180	438.85	0.00	0.00	438.85	67744.22	0.00	0.00
210	380.05	112.90	-112.90	380.05	58631.08	17499.70	131.98
240	219.42	195.55	-195.55	219.42	33733.51	30310.36	228.60
270	0.00	225.80	-225.80	0.00	-277.20	34999.39	263.97
300	219.42	195.55	-195.55	-219.42	-34287.91	30310.36	228.60
330	380.05	112.90	-112.90	-380.05	-59185.48	17499.70	131.98

Low Profile Platform - Elevation 155 - None C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	187.77	0.00	0.00	-187.77	-29104.37	0.00	0.00
30	187.77	0.00	93.89	-162.61	-25205.12	-14552.18	0.00
60	187.77	0.00	162.61	-93.89	-14552.18	-25205.12	0.00
90	187.77	0.00	187.77	0.00	0.00	-29104.37	0.00
120	187.77	0.00	162.61	93.89	14552.18	-25205.12	0.00
150	187.77	0.00	93.89	162.61	25205.12	-14552.18	0.00
180	187.77	0.00	0.00	187.77	29104.37	0.00	0.00
210	187.77	0.00	-93.89	162.61	25205.12	14552.18	0.00
240	187.77	0.00	-162.61	93.89	14552.18	25205.12	0.00
270	187.77	0.00	-187.77	0.00	0.00	29104.37	0.00
300	187.77	0.00	-162.61	-93.89	-14552.18	25205.12	0.00
330	187.77	0.00	-93.89	-162.61	-25205.12	14552.18	0.00

Panel-96x12x3 - Elevation 140 - From Leg C							
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	214.77	191.41	90.30	-273.15	-38087.12	-12375.41	-247.91
30	372.00	110.51	266.90	-281.70	-39284.53	-37100.63	-143.13
60	429.54	0.00	372.00	-214.77	-29914.54	-51813.50	0.00
90	372.00	110.51	377.41	-90.30	-12487.83	-52571.72	143.13
120	214.77	191.41	281.70	58.38	8326.14	-39172.12	247.91
150	0.00	221.02	110.51	191.41	26950.27	-15205.11	286.26
180	214.77	191.41	-90.30	273.15	38394.24	12907.36	247.91
210	372.00	110.51	-266.90	281.70	39591.65	37632.58	143.13
240	429.54	0.00	-372.00	214.77	30221.66	52345.45	0.00
270	372.00	110.51	-377.41	90.30	12794.94	53103.67	-143.13
300	214.77	191.41	-281.70	-58.38	-8019.02	39704.06	-247.91
330	0.00	221.02	-110.51	-191.41	-26643.15	15737.06	-286.26



Panel-96x12x3 - Elevation 140 - From Leg B

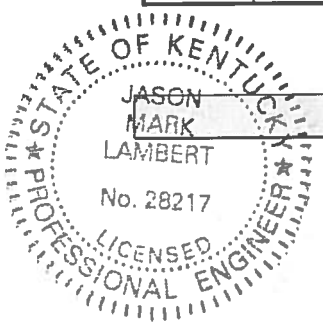
Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	214.77	191.41	-90.30	-273.15	-38087.12	12375.41	247.91
30	0.00	221.02	110.51	-191.41	-26643.15	-15737.06	286.26
60	214.77	191.41	281.70	-58.38	-8019.02	-39704.06	247.91
90	372.00	110.51	377.41	90.30	12794.94	-53103.67	143.13
120	429.54	0.00	372.00	214.77	30221.66	-52345.45	0.00
150	372.00	110.51	266.90	281.70	39591.65	-37632.58	-143.13
180	214.77	191.41	90.30	273.15	38394.24	-12907.36	-247.91
210	0.00	221.02	-110.51	191.41	26950.27	15205.11	-286.26
240	214.77	191.41	-281.70	58.38	8326.14	39172.12	-247.91
270	372.00	110.51	-377.41	-90.30	-12487.83	52571.72	-143.13
300	429.54	0.00	-372.00	-214.77	-29914.54	51813.50	0.00
330	372.00	110.51	-266.90	-281.70	-39284.53	37100.63	143.13

Panel-96x12x3 - Elevation 140 - From Leg A

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	429.54	0.00	0.00	-429.54	-60443.32	0.00	0.00
30	372.00	110.51	110.51	-372.00	-52386.60	-15471.09	-143.13
60	214.77	191.41	191.41	-214.77	-30375.22	-26796.71	-247.91
90	0.00	221.02	221.02	0.00	-307.12	-30942.17	-286.26
120	214.77	191.41	191.41	214.77	29760.98	-26796.71	-247.91
150	372.00	110.51	110.51	372.00	51772.36	-15471.09	-143.13
180	429.54	0.00	0.00	429.54	59829.08	0.00	0.00
210	372.00	110.51	-110.51	372.00	51772.36	15471.09	143.13
240	214.77	191.41	-191.41	214.77	29760.98	26796.71	247.91
270	0.00	221.02	-221.02	0.00	-307.12	30942.17	286.26
300	214.77	191.41	-191.41	-214.77	-30375.22	26796.71	247.91
330	372.00	110.51	-110.51	-372.00	-52386.60	15471.09	143.13

Low Profile Platform - Elevation 140 - None C

Wind Azimuth °	F_a lb	F_s lb	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	183.79	0.00	0.00	-183.79	-25730.51	0.00	0.00
30	183.79	0.00	91.89	-159.17	-22283.28	-12865.26	0.00
60	183.79	0.00	159.17	-91.89	-12865.26	-22283.28	0.00
90	183.79	0.00	183.79	0.00	0.00	-25730.51	0.00
120	183.79	0.00	159.17	91.89	12865.26	-22283.28	0.00
150	183.79	0.00	91.89	159.17	22283.28	-12865.26	0.00
180	183.79	0.00	0.00	183.79	25730.51	0.00	0.00
210	183.79	0.00	-91.89	159.17	22283.28	12865.26	0.00
240	183.79	0.00	-159.17	91.89	12865.26	22283.28	0.00
270	183.79	0.00	-183.79	0.00	0.00	25730.51	0.00
300	183.79	0.00	-159.17	-91.89	-12865.26	22283.28	0.00
330	183.79	0.00	-91.89	-159.17	-22283.28	12865.26	0.00

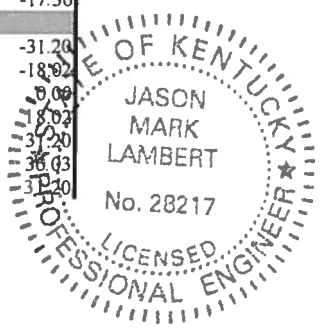


Discrete Appurtenance Totals - Service

Wind Azimuth °	V_x lb	V_z lb	OTM_x lb-ft	OTM_z lb-ft	Torque lb-ft
0	0.00	-5273.76	-869777.77	87.32	-31.20
30	2636.88	-4567.21	-753242.89	-434826.77	-18.02
60	4567.21	-2636.88	-434863.68	-753205.98	0.00
90	5273.76	0.00	50.42	-869740.86	18.02
120	4567.21	2636.88	434964.51	-753205.98	31.20
150	2636.88	4567.21	753343.72	-434826.77	36.03
180	0.00	5273.76	869878.60	87.32	31.20
210	-2636.88	4567.21	753343.72	435001.42	18.02
240	-4567.21	2636.88	434964.51	753380.63	0.00
270	-5273.76	0.00	50.42	869915.51	-18.02
300	-4567.21	-2636.88	-434863.68	753380.63	-31.20
330	-2636.88	-4567.21	-753242.89	435001.42	-36.03

Force Totals

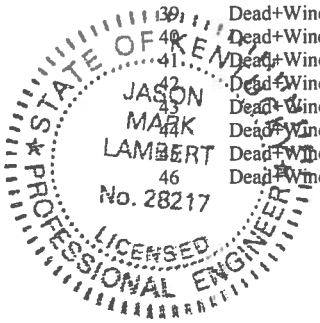
Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	33652.77					
Bracing Weight	0.00					
Total Member Self-Weight	33652.77			50.42	87.32	
Total Weight	55214.71			50.42	87.32	
Wind 0 deg - No Ice		0.00	-23345.49	-3066520.42	87.32	-78.47
Wind 30 deg - No Ice		11672.74	-20217.78	-2655677.83	-1533198.09	-45.31
Wind 60 deg - No Ice		20217.78	-11672.74	-1533235.00	-2655640.92	0.00
Wind 90 deg - No Ice		23345.49	0.00	50.42	-3066483.51	45.31
Wind 120 deg - No Ice		20217.78	11672.74	1533335.83	-2655640.92	78.47
Wind 150 deg - No Ice		11672.74	20217.78	2655778.66	-1533198.09	90.61
Wind 180 deg - No Ice		0.00	23345.49	3066621.25	87.32	78.47
Wind 210 deg - No Ice		-11672.74	20217.78	2655778.66	1533372.74	45.31
Wind 240 deg - No Ice		-20217.78	11672.74	1533335.83	2655815.57	0.00
Wind 270 deg - No Ice		-23345.49	0.00	50.42	3066658.16	-45.31
Wind 300 deg - No Ice		-20217.78	-11672.74	-1533235.00	2655815.57	-78.47
Wind 330 deg - No Ice		-11672.74	-20217.78	-2655677.83	1533372.74	-90.61
Member Ice	9919.27					
Total Weight Ice	79265.12			88.77	153.75	
Wind 0 deg - Ice		0.00	-4345.13	-548389.29	153.75	-15.03
Wind 30 deg - Ice		2172.56	-3762.99	-474907.17	-274085.28	-8.68
Wind 60 deg - Ice		3762.99	-2172.56	-274150.26	-474842.18	0.00
Wind 90 deg - Ice		4345.13	0.00	88.77	-548324.31	8.68
Wind 120 deg - Ice		3762.99	2172.56	274327.80	-474842.18	15.03
Wind 150 deg - Ice		2172.56	3762.99	475084.70	-274085.28	17.36
Wind 180 deg - Ice		0.00	4345.13	548566.82	153.75	15.03
Wind 210 deg - Ice		-2172.56	3762.99	475084.70	274392.78	8.68
Wind 240 deg - Ice		-3762.99	2172.56	274327.80	475149.68	0.00
Wind 270 deg - Ice		-4345.13	0.00	88.77	548631.81	-8.68
Wind 300 deg - Ice		-3762.99	-2172.56	-274150.26	475149.68	-15.03
Wind 330 deg - Ice		-2172.56	-3762.99	-474907.17	274392.78	-17.36
Total Weight	55214.71			50.42	87.32	
Wind 0 deg - Service		0.00	-9283.59	-1219404.65	87.32	-31.20
Wind 30 deg - Service		4641.79	-8039.82	-1056028.65	-609640.21	-18.02
Wind 60 deg - Service		8039.82	-4641.79	-609677.12	-1055991.74	0.00
Wind 90 deg - Service		9283.59	0.00	50.42	-1219367.74	18.02
Wind 120 deg - Service		8039.82	4641.79	609777.95	-1055991.74	31.20
Wind 150 deg - Service		4641.79	8039.82	1056129.48	-609640.21	36.03
Wind 180 deg - Service		0.00	9283.59	1219505.48	87.32	31.20



Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 210 deg - Service		-4641.79	8039.82	1056129.48	609814.86	18.02
Wind 240 deg - Service		-8039.82	4641.79	609777.95	1056166.39	0.00
Wind 270 deg - Service		-9283.59	0.00	50.42	1219542.39	-18.02
Wind 300 deg - Service		-8039.82	-4641.79	-609677.12	1056166.39	-31.20
Wind 330 deg - Service		-4641.79	-8039.82	-1056028.65	609814.86	-36.03

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service

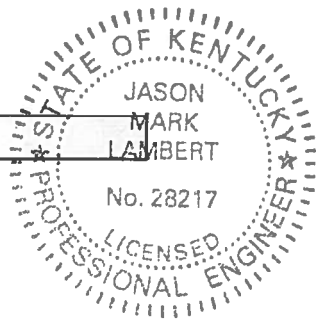


Comb. No.	Description
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	185 - 132	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32667.78	171.21	-98.85
			Max. Mx	20	-13094.99	740866.48	-56.90
			Max. My	14	-13095.07	98.55	-740820.53
			Max. Vy	20	-26674.35	740866.48	-56.90
			Max. Vx	14	26674.31	98.55	-740820.53
			Max. Torque	24			163.59
L2	132 - 108.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39827.88	171.21	-98.85
			Max. Mx	20	-19328.66	1380499.17	-60.71
			Max. My	14	-19328.71	105.15	-1380452.32
			Max. Vy	20	-28921.72	1380499.17	-60.71
			Max. Vx	14	28921.69	105.15	-1380452.32
			Max. Torque	24			162.45
L3	108.25 - 93.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45465.17	171.21	-98.85
			Max. Mx	20	-24212.12	1811039.38	-62.53
			Max. My	14	-24212.17	108.31	-1810991.99
			Max. Vy	20	-30367.71	1811039.38	-62.53
			Max. Vx	14	30367.67	108.31	-1810991.99
			Max. Torque	24			161.77
L4	93.5 - 46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64246.93	171.21	-98.85
			Max. Mx	20	-41171.86	3312017.20	-66.09
			Max. My	14	-41171.88	114.48	-3311968.41
			Max. Vy	20	-34312.09	3312017.20	-66.09
			Max. Vx	14	34312.07	114.48	-3311968.41
			Max. Torque	24			161.34
L5	46 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-91573.85	171.21	-98.85
			Max. Mx	20	-66220.42	5215481.54	-66.86
			Max. My	14	-66220.42	115.81	-5215432.10
			Max. Vy	20	-37418.75	5215481.54	-66.86
			Max. Vx	14	37418.75	115.81	-5215432.10
			Max. Torque	24			160.34

Maximum Reactions



Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Pole	Max. Vert	36	91573.85	4345.15	-0.00
	Max. H_x	21	49693.24	37352.80	-0.00
	Max. H_z	2	66257.65	0.00	37352.78
	Max. M_x	2	5215297.03	0.00	37352.78
	Max. M_z	8	5215247.59	-37352.78	-0.00
	Max. Torsion	24	160.04	18676.39	32348.45
	Min. Vert	23	49693.24	32348.45	18676.39
	Min. H_x	9	49693.24	-37352.80	-0.00
	Min. H_z	14	66257.65	0.00	-37352.78
	Min. M_x	14	-5215432.10	0.00	-37352.78
	Min. M_z	20	-5215481.54	37352.78	-0.00
	Min. Torsion	12	-160.03	-18676.39	-32348.45

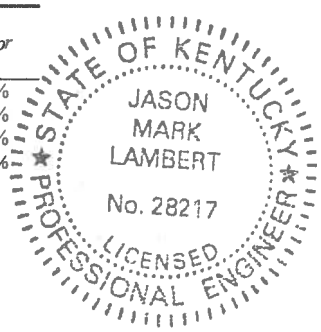
Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	55214.71	0.00	0.00	50.42	87.32	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	66257.65	-0.00	-37352.78	-5215297.03	115.77	-138.60
0.9 Dead+1.6 Wind 0 deg - No Ice	49693.24	-0.00	-37352.78	-5129273.51	84.06	-134.10
1.2 Dead+1.6 Wind 30 deg - No Ice	66257.65	18676.39	-32348.45	-4516575.89	-2607569.14	-80.01
0.9 Dead+1.6 Wind 30 deg - No Ice	49693.24	18676.39	-32348.45	-4442075.36	-2564577.38	-77.40
1.2 Dead+1.6 Wind 60 deg - No Ice	66257.65	32348.45	-18676.39	-2607617.97	-4516526.80	-0.01
0.9 Dead+1.6 Wind 60 deg - No Ice	49693.24	32348.45	-18676.39	-2564612.84	-4442039.72	-0.02
1.2 Dead+1.6 Wind 90 deg - No Ice	66257.65	37352.78	0.00	66.84	-5215247.59	80.02
0.9 Dead+1.6 Wind 90 deg - No Ice	49693.24	37352.80	0.00	48.54	-5129213.21	77.43
1.2 Dead+1.6 Wind 120 deg - No Ice	66257.65	32348.45	18676.39	2607752.00	-4516527.41	138.60
0.9 Dead+1.6 Wind 120 deg - No Ice	49693.24	32348.45	18676.39	2564710.15	-4442040.14	134.12
1.2 Dead+1.6 Wind 150 deg - No Ice	66257.65	18676.39	32348.45	4516710.62	-2607569.75	160.03
0.9 Dead+1.6 Wind 150 deg - No Ice	49693.24	18676.39	32348.45	4442173.16	-2564577.80	154.83
1.2 Dead+1.6 Wind 180 deg - No Ice	66257.65	-0.00	37352.78	5215432.10	115.77	138.60
0.9 Dead+1.6 Wind 180 deg - No Ice	49693.24	-0.00	37352.78	5129371.56	84.06	134.10
1.2 Dead+1.6 Wind 210 deg - No Ice	66257.65	-18676.39	32348.45	4516711.67	2607801.88	80.02
0.9 Dead+1.6 Wind 210 deg - No Ice	49693.24	-18676.39	32348.45	4442173.90	2564746.35	77.44
1.2 Dead+1.6 Wind 240 deg - No Ice	66257.65	-32348.45	18676.39	2607753.05	4516760.76	-0.01
0.9 Dead+1.6 Wind 240 deg - No Ice	49693.24	-32348.45	18676.39	2564710.89	4442209.54	-0.02
1.2 Dead+1.6 Wind 270 deg -	66257.65	-37352.78	0.00	66.84	5215481.54	-80.02

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
No Ice						
0.9 Dead+1.6 Wind 270 deg - No Ice	49693.24	-37352.80	0.00	48.54	5129383.04	-77.43
1.2 Dead+1.6 Wind 300 deg - No Ice	66257.65	-32348.45	-18676.39	-2607619.02	4516760.15	-138.59
0.9 Dead+1.6 Wind 300 deg - No Ice	49693.24	-32348.45	-18676.39	-2564613.58	4442209.12	-134.08
1.2 Dead+1.6 Wind 330 deg - No Ice	66257.65	-18676.39	-32348.45	-4516576.95	2607801.27	-160.04
0.9 Dead+1.6 Wind 330 deg - No Ice	49693.24	-18676.39	-32348.45	-4442076.10	2564745.93	-154.86
1.2 Dead+1.0 Ice+1.0 Temp	91573.85	0.00	0.00	98.85	171.21	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	91573.85	-0.00	-4345.15	-614554.36	218.26	-18.52
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	91573.85	2172.57	-3763.01	-532202.79	-307121.92	-10.69
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	91573.85	3763.01	-2172.57	-307214.17	-532110.53	-0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	91573.85	4345.15	0.00	126.01	-614462.09	10.69
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	91573.85	3763.01	2172.57	307466.21	-532110.56	18.52
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	91573.85	2172.57	3763.01	532454.86	-307121.95	21.39
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	91573.85	-0.00	4345.15	614806.44	218.26	18.52
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	91573.85	-2172.57	3763.01	532454.91	307558.49	10.69
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	91573.85	-3763.01	2172.57	307466.25	532547.16	-0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	91573.85	-4345.15	0.00	126.01	614898.71	-10.69
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	91573.85	-3763.01	-2172.57	-307214.21	532547.13	-18.52
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	91573.85	-2172.57	-3763.01	-532202.84	307558.47	-21.39
Dead+Wind 0 deg - Service	55214.71	-0.00	-9283.60	-1286484.00	97.23	-34.84
Dead+Wind 30 deg - Service	55214.71	4641.79	-8039.82	-1114135.17	-643181.43	-20.11
Dead+Wind 60 deg - Service	55214.71	8039.82	-4641.79	-643222.52	-1114094.07	-0.00
Dead+Wind 90 deg - Service	55214.71	9283.60	0.00	56.13	-1286442.88	20.11
Dead+Wind 120 deg - Service	55214.71	8039.82	4641.79	643334.81	-1114094.10	34.84
Dead+Wind 150 deg - Service	55214.71	4641.79	8039.82	1114247.50	-643181.46	40.23
Dead+Wind 180 deg - Service	55214.71	-0.00	9283.60	1286596.34	97.23	34.84
Dead+Wind 210 deg - Service	55214.71	-4641.79	8039.82	1114247.55	643375.95	20.12
Dead+Wind 240 deg - Service	55214.71	-8039.82	4641.79	643334.86	1114288.65	-0.00
Dead+Wind 270 deg - Service	55214.71	-9283.60	0.00	56.13	1286637.46	-20.11
Dead+Wind 300 deg - Service	55214.71	-8039.82	-4641.79	-643222.58	1114288.62	-34.84
Dead+Wind 330 deg - Service	55214.71	-4641.79	-8039.82	-1114135.23	643375.92	-40.23

Solution Summary

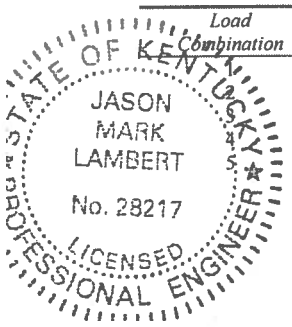
Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
1	0.00	-55214.71	0.00	0.00	55214.71	0.00	0.000%
2	0.00	-66257.65	-37352.78	0.00	66257.65	37352.78	0.000%
3	0.00	-49693.24	-37352.78	0.00	49693.24	37352.78	0.000%
4	18676.39	-66257.65	-32348.45	-18676.39	66257.65	32348.45	0.000%



Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
5	18676.39	-49693.24	-32348.45	-18676.39	49693.24	32348.45	0.000%
6	32348.45	-66257.65	-18676.39	-32348.45	66257.65	18676.39	0.000%
7	32348.45	-49693.24	-18676.39	-32348.45	49693.24	18676.39	0.000%
8	37352.78	-66257.65	0.00	-37352.78	66257.65	-0.00	0.000%
9	37352.78	-49693.24	0.00	-37352.80	49693.24	-0.00	0.000%
10	32348.45	-66257.65	18676.39	-32348.45	66257.65	-18676.39	0.000%
11	32348.45	-49693.24	18676.39	-32348.45	49693.24	-18676.39	0.000%
12	18676.39	-66257.65	32348.45	-18676.39	66257.65	-32348.45	0.000%
13	18676.39	-49693.24	32348.45	-18676.39	49693.24	-32348.45	0.000%
14	0.00	-66257.65	37352.78	0.00	66257.65	-37352.78	0.000%
15	0.00	-49693.24	37352.78	0.00	49693.24	-37352.78	0.000%
16	-18676.39	-66257.65	32348.45	18676.39	66257.65	-32348.45	0.000%
17	-18676.39	-49693.24	32348.45	18676.39	49693.24	-32348.45	0.000%
18	-32348.45	-66257.65	18676.39	32348.45	66257.65	-18676.39	0.000%
19	-32348.45	-49693.24	18676.39	32348.45	49693.24	-18676.39	0.000%
20	-37352.78	-66257.65	0.00	37352.78	66257.65	-0.00	0.000%
21	-37352.78	-49693.24	0.00	37352.80	49693.24	-0.00	0.000%
22	-32348.45	-66257.65	-18676.39	32348.45	66257.65	18676.39	0.000%
23	-32348.45	-49693.24	-18676.39	32348.45	49693.24	18676.39	0.000%
24	-18676.39	-66257.65	-32348.45	18676.39	66257.65	32348.45	0.000%
25	-18676.39	-49693.24	-32348.45	18676.39	49693.24	32348.45	0.000%
26	0.00	-91573.85	0.00	0.00	91573.85	0.00	0.000%
27	0.00	-91573.85	-4345.13	0.00	91573.85	4345.15	0.000%
28	2172.56	-91573.85	-3762.99	-2172.57	91573.85	3763.01	0.000%
29	3762.99	-91573.85	-2172.56	-3763.01	91573.85	2172.57	0.000%
30	4345.13	-91573.85	0.00	-4345.15	91573.85	-0.00	0.000%
31	3762.99	-91573.85	2172.56	-3763.01	91573.85	-2172.57	0.000%
32	2172.56	-91573.85	3762.99	-2172.57	91573.85	-3763.01	0.000%
33	0.00	-91573.85	4345.13	0.00	91573.85	-4345.15	0.000%
34	-2172.56	-91573.85	3762.99	2172.57	91573.85	-3763.01	0.000%
35	-3762.99	-91573.85	2172.56	3763.01	91573.85	-2172.57	0.000%
36	-4345.13	-91573.85	0.00	4345.15	91573.85	-0.00	0.000%
37	-3762.99	-91573.85	-2172.56	3763.01	91573.85	2172.57	0.000%
38	-2172.56	-91573.85	-3762.99	2172.57	91573.85	3763.01	0.000%
39	0.00	-55214.71	-9283.59	0.00	55214.71	9283.60	0.000%
40	4641.79	-55214.71	-8039.82	-4641.79	55214.71	8039.82	0.000%
41	8039.82	-55214.71	-4641.79	-8039.82	55214.71	4641.79	0.000%
42	9283.59	-55214.71	0.00	-9283.60	55214.71	-0.00	0.000%
43	8039.82	-55214.71	4641.79	-8039.82	55214.71	-4641.79	0.000%
44	4641.79	-55214.71	8039.82	-4641.79	55214.71	-8039.82	0.000%
45	0.00	-55214.71	9283.59	0.00	55214.71	-9283.60	0.000%
46	-4641.79	-55214.71	8039.82	4641.79	55214.71	-8039.82	0.000%
47	-8039.82	-55214.71	4641.79	8039.82	55214.71	-4641.79	0.000%
48	-9283.59	-55214.71	0.00	9283.60	55214.71	-0.00	0.000%
49	-8039.82	-55214.71	-4641.79	8039.82	55214.71	4641.79	0.000%
50	-4641.79	-55214.71	-8039.82	4641.79	55214.71	8039.82	0.000%

Non-Linear Convergence Results

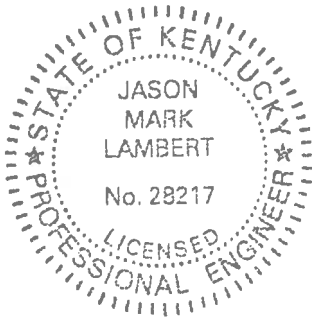
Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
4	Yes	4	0.00000001	0.00000001
5	Yes	5	0.00000001	0.00010398
4	Yes	5	0.00000001	0.00003582
5	Yes	7	0.00000001	0.00010026
4	Yes	6	0.00000001	0.00044890



6	Yes	7	0.00000001	0.00010033
7	Yes	6	0.00000001	0.00044926
8	Yes	5	0.00000001	0.00009760
9	Yes	4	0.00000001	0.00098408
10	Yes	7	0.00000001	0.00010047
11	Yes	6	0.00000001	0.00044989
12	Yes	7	0.00000001	0.00010019
13	Yes	6	0.00000001	0.00044857
14	Yes	5	0.00000001	0.00010398
15	Yes	5	0.00000001	0.00003583
16	Yes	7	0.00000001	0.00010042
17	Yes	6	0.00000001	0.00044966
18	Yes	7	0.00000001	0.00010035
19	Yes	6	0.00000001	0.00044931
20	Yes	5	0.00000001	0.00009761
21	Yes	4	0.00000001	0.00098417
22	Yes	7	0.00000001	0.00010021
23	Yes	6	0.00000001	0.00044868
24	Yes	7	0.00000001	0.00010049
25	Yes	6	0.00000001	0.00045000
26	Yes	4	0.00000001	0.00000001
27	Yes	6	0.00000001	0.00020489
28	Yes	6	0.00000001	0.00024213
29	Yes	6	0.00000001	0.00024215
30	Yes	6	0.00000001	0.00020481
31	Yes	6	0.00000001	0.00024242
32	Yes	6	0.00000001	0.00024233
33	Yes	6	0.00000001	0.00020510
34	Yes	6	0.00000001	0.00024279
35	Yes	6	0.00000001	0.00024276
36	Yes	6	0.00000001	0.00020517
37	Yes	6	0.00000001	0.00024250
38	Yes	6	0.00000001	0.00024259
39	Yes	4	0.00000001	0.00044546
40	Yes	5	0.00000001	0.00056046
41	Yes	5	0.00000001	0.00056135
42	Yes	4	0.00000001	0.00044347
43	Yes	5	0.00000001	0.00056313
44	Yes	5	0.00000001	0.00055979
45	Yes	4	0.00000001	0.00044556
46	Yes	5	0.00000001	0.00056286
47	Yes	5	0.00000001	0.00056196
48	Yes	4	0.00000001	0.00044365
49	Yes	5	0.00000001	0.00056019
50	Yes	5	0.00000001	0.00056354

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 132	48.459	48	2.4418	0.0007
L2	136.5 - 108.25	25.686	48	1.8661	0.0002
L3	113.5 - 93.5	17.432	48	1.5300	0.0001
L4	99 - 46	13.064	48	1.3145	0.0001
L5	52.75 - 0	3.545	47	0.6226	0.0000



Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	6' Lightning Rod	48	48.459	2.4418	0.0007	27770
170.00	(4) Panel-96x12x3	48	40.955	2.2768	0.0005	9256
155.00	(4) Panel-96x12x3	48	33.744	2.1036	0.0003	4627
140.00	(4) Panel-96x12x3	48	27.117	1.9137	0.0002	3086

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	185 - 132	195.931	20	9.8865	0.0027
L2	136.5 - 108.25	104.047	20	7.5651	0.0007
L3	113.5 - 93.5	70.653	20	6.2054	0.0005
L4	99 - 46	52.964	20	5.3328	0.0004
L5	52.75 - 0	14.376	20	2.5259	0.0001

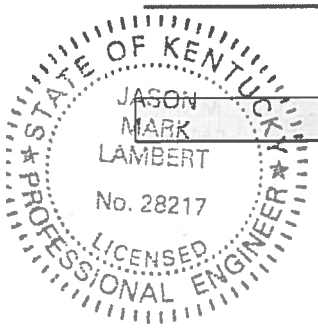
Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
185.00	6' Lightning Rod	20	195.931	9.8865	0.0027	7228
170.00	(4) Panel-96x12x3	20	165.671	9.2221	0.0020	2406
155.00	(4) Panel-96x12x3	20	136.581	8.5237	0.0013	1197
140.00	(4) Panel-96x12x3	20	109.828	7.7573	0.0008	793

Base Plate Design Data

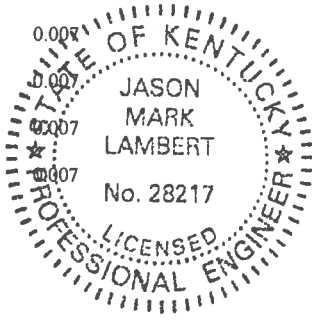
Plate Thickness in	Number of Anchor Bolts	Anchor Bolt Size in	Actual Allowable Ratio Bolt Tension lb	Actual Allowable Ratio Bolt Compression lb	Actual Allowable Ratio Plate Stress ksi	Actual Allowable Ratio Stiffener Stress ksi	Controlling Condition	Ratio
3.0000	18	2.2500	210332.37 223654.40 0.94	217690.20 371266.30 0.59	34.180 45.000 0.76		Bolt T	0.94 ✓

Compression Checks

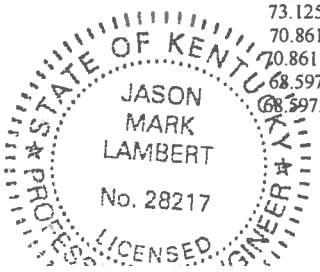


Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
L1	185 - 182.447	TP32.7x22x0.1875	53.00	0.00	0.0	13.2879	-2196.06	940137.00	0.002
	182.447 - 179.895					13.5946	-2461.18	954875.00	0.003
	179.895 - 177.342					13.9012	-2731.43	969299.00	0.003
	177.342 - 174.789					14.2079	-3006.76	983408.00	0.003
	174.789 - 172.237					14.5146	-3287.10	997204.00	0.003
	172.237 - 169.684					14.8213	-5135.56	1010690.00	0.005
	169.684 - 167.132					15.1280	-5433.24	1023850.00	0.005
	167.132 - 164.579					15.4347	-5738.30	1036710.00	0.006
	164.579 - 162.026					15.7414	-6050.72	1049250.00	0.006
	162.026 - 159.474					16.0481	-6370.29	1061470.00	0.006
	159.474 - 156.921					16.3548	-6696.80	1073380.00	0.006
	156.921 - 154.368					16.6615	-8669.19	1084980.00	0.008
	154.368 - 151.816					16.9682	-9023.20	1096260.00	0.008
	151.816 - 149.263					17.2749	-9386.14	1107230.00	0.008
	149.263 - 146.711					17.5816	-9757.80	1117890.00	0.009
	146.711 - 144.158					17.8883	-10137.90	1128230.00	0.009
	144.158 - 141.605					18.1950	-10526.00	1138250.00	0.009
	141.605 - 139.053					18.5016	-12672.00	1147970.00	0.011
	139.053 - 136.5					18.8083	-13094.90	1157360.00	0.011
	136.5 - 132					19.3490	-5509.91	1173170.00	0.005
L2	136.5 - 132	TP37.1198x31.4165x0.3125	28.25	0.00	0.0	31.7524	-8879.32	2344980.00	0.004
	132 - 130.972					31.9582	-14674.60	2356220.00	0.006
	130.972 - 129.944					32.1640	-14937.10	2367420.00	0.006
	129.944 - 128.917					32.3698	-15201.10	2378560.00	0.006
	128.917 - 127.889					32.5756	-15466.60	2389660.00	0.006
	127.889 - 126.861					32.7814	-15733.40	2400700.00	0.007
	126.861 - 125.833					32.9873	-16001.70	2411690.00	0.007
	125.833 - 124.806					33.1931	-16271.40	2422630.00	0.007
	124.806 - 123.778					33.3989	-16542.50	2433520.00	0.007
	123.778 - 122.75					33.6047	-16815.00	2444360.00	0.007
	122.75 -					33.8105	-17088.90	2455150.00	0.007

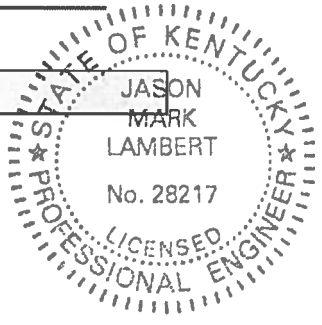


Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
	121.722								
	121.722 - 120.694					34.0163	-17364.20	2465880.00	0.007
	120.694 - 119.667					34.2221	-17640.80	2476570.00	0.007
	119.667 - 118.639					34.4279	-17918.70	2487210.00	0.007
	118.639 - 117.611					34.6337	-18198.00	2497790.00	0.007
	117.611 - 116.583					34.8395	-18478.70	2508320.00	0.007
	116.583 - 115.556					35.0453	-18760.70	2518800.00	0.007
	115.556 - 114.528					35.2511	-19044.00	2529240.00	0.008
	114.528 - 113.5					35.4570	-19328.60	2539620.00	0.008
	113.5 - 108.25					36.5083	-10958.80	2591850.00	0.004
L3	113.5 - 108.25	TP39.4726x35.4349x0.3125	20.00	0.00	0.0	35.8883	-10551.60	2561210.00	0.004
	108.25 - 107.222					36.0941	-21831.80	2571430.00	0.008
	107.222 - 106.194					36.2999	-22124.90	2581600.00	0.009
	106.194 - 105.167					36.5058	-22419.40	2591730.00	0.009
	105.167 - 104.139					36.7116	-22715.10	2601800.00	0.009
	104.139 - 103.111					36.9174	-23012.00	2611810.00	0.009
	103.111 - 102.083					37.1232	-23310.20	2621780.00	0.009
	102.083 - 101.056					37.3290	-23609.60	2631700.00	0.009
	101.056 - 100.028					37.5348	-23910.20	2641570.00	0.009
	100.028 - 99					37.7406	-24212.00	2651380.00	0.009
	99 - 93.5					38.8420	-12433.10	2703040.00	0.005
L4	99 - 93.5	TP48.4373x37.7373x0.375	53.00	0.00	0.0	45.7921	-14375.20	3380520.00	0.004
	93.5 - 91.2361					46.3361	-27563.80	3410160.00	0.008
	91.2361 - 88.9722					46.8801	-28313.50	3439550.00	0.008
	88.9722 - 86.7083					47.4241	-29069.80	3468700.00	0.008
	86.7083 - 84.4444					47.9681	-29832.60	3497600.00	0.009
	84.4444 - 82.1806					48.5121	-30601.80	3526250.00	0.009
	82.1806 - 79.9167					49.0561	-31377.40	3554650.00	0.009
	79.9167 - 77.6528					49.6001	-32159.40	3582810.00	0.009
	77.6528 - 75.3889					50.1441	-32947.70	3610720.00	0.009
	75.3889 - 73.125					50.6881	-33742.30	3638380.00	0.009
	73.125 - 70.8611					51.2321	-34543.10	3665790.00	0.009
	70.8611 - 68.5972					51.7761	-35350.20	3692960.00	0.010
	68.5972 -					52.3201	-36163.50	3719880.00	0.010

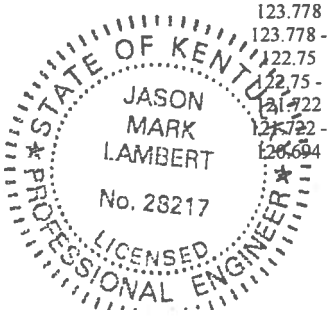


Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
	66.3333								
	66.3333 - 64.0694					52.8641	-36982.90	3746560.00	0.010
	64.0694 - 61.8056					53.4081	-37808.50	3772990.00	0.010
	61.8056 - 59.5417					53.9521	-38640.20	3799170.00	0.010
	59.5417 - 57.2778					54.4961	-39478.00	3825100.00	0.010
	57.2778 - 55.0139					55.0401	-40321.90	3850780.00	0.010
	55.0139 - 52.75					55.5841	-41171.80	3876220.00	0.011
	52.75 - 46					57.2061	-21382.60	3950610.00	0.005
L5	52.75 - 46	TP56.9741x46.3245x0.4375	52.75	0.00	0.0	65.6122	-24167.90	4777630.00	0.005
	46 - 43.5789					66.2909	-46588.20	4813260.00	0.010
	43.5789 - 41.1579					66.9697	-47614.10	4848600.00	0.010
	41.1579 - 38.7368					67.6484	-48647.70	4883660.00	0.010
	38.7368 - 36.3158					68.3271	-49689.00	4918440.00	0.010
	36.3158 - 33.8947					69.0059	-50738.10	4952930.00	0.010
	33.8947 - 31.4737					69.6846	-51794.90	4987140.00	0.010
	31.4737 - 29.0526					70.3633	-52859.30	5021070.00	0.011
	29.0526 - 26.6316					71.0420	-53931.40	5054720.00	0.011
	26.6316 - 24.2105					71.7208	-55011.10	5088090.00	0.011
	24.2105 - 21.7895					72.3995	-56098.30	5121170.00	0.011
	21.7895 - 19.3684					73.0782	-57193.10	5153970.00	0.011
	19.3684 - 16.9474					73.7570	-58295.50	5186480.00	0.011
	16.9474 - 14.5263					74.4357	-59405.30	5218720.00	0.011
	14.5263 - 12.1053					75.1144	-60522.60	5250670.00	0.012
	12.1053 - 9.68421					75.7932	-61647.40	5282340.00	0.012
	9.68421 - 7.26316					76.4719	-62779.50	5313730.00	0.012
	7.26316 - 4.84211					77.1506	-63919.10	5344830.00	0.012
	4.84211 - 2.42105					77.8293	-65066.10	5375650.00	0.012
	2.42105 - 0					78.5081	-66220.40	5406190.00	0.012

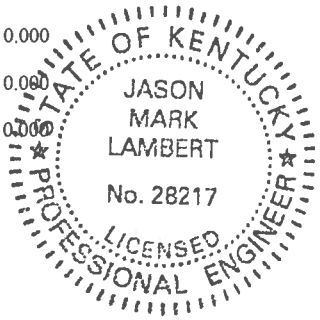
Pole Bending Design Data



Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	185 - 182.447	TP32.7x22x0.1875	19301.00	431418.33	0.045	0.00	431418.33	0.000
	182.447 - 179.895		38886.83	448379.17	0.087	0.00	448379.17	0.000
	179.895 - 177.342		59000.50	465504.17	0.127	0.00	465504.17	0.000
	177.342 - 174.789		79648.67	482782.50	0.165	0.00	482782.50	0.000
	174.789 - 172.237		100837.50	500205.00	0.202	0.00	500205.00	0.000
	172.237 - 169.684		124229.17	517761.67	0.240	0.00	517761.67	0.000
	169.684 - 167.132		159777.50	535441.67	0.298	0.00	535441.67	0.000
	167.132 - 164.579		195875.83	553235.83	0.354	0.00	553235.83	0.000
	164.579 - 162.026		232527.50	571133.33	0.407	0.00	571133.33	0.000
	162.026 - 159.474		269735.00	589124.17	0.458	0.00	589124.17	0.000
	159.474 - 156.921		307500.83	607198.33	0.506	0.00	607198.33	0.000
	156.921 - 154.368		349052.50	625346.67	0.558	0.00	625346.67	0.000
	154.368 - 151.816		400910.83	643557.50	0.623	0.00	643557.50	0.000
	151.816 - 149.263		453317.50	661821.67	0.685	0.00	661821.67	0.000
	149.263 - 146.711		506274.17	680130.00	0.744	0.00	680130.00	0.000
	146.711 - 144.158		559777.50	698470.83	0.801	0.00	698470.83	0.000
	144.158 - 141.605		613827.50	716835.00	0.856	0.00	716835.00	0.000
	141.605 - 139.053		673120.83	735211.67	0.916	0.00	735211.67	0.000
	139.053 - 136.5		740884.17	753591.67	0.983	0.00	753591.67	0.000
	136.5 - 132		332888.33	785970.00	0.424	0.00	785970.00	0.000
L2	136.5 - 132	TP37.1198x31.4165x0.3125	529041.67	1540750.00	0.343	0.00	1540750.00	0.000
	132 - 130.972		889883.33	1558266.67	0.571	0.00	1558266.67	0.000
	130.972 - 129.944		917941.67	1575850.00	0.583	0.00	1575850.00	0.000
	129.944 - 128.917		946091.67	1593500.00	0.594	0.00	1593500.00	0.000
	128.917 - 127.889		974350.00	1611208.33	0.605	0.00	1611208.33	0.000
	127.889 - 126.861		1002708.33	1628975.00	0.616	0.00	1628975.00	0.000
	126.861 - 125.833		1031166.67	1646800.00	0.626	0.00	1646800.00	0.000
	125.833 - 124.806		1059733.33	1664691.67	0.637	0.00	1664691.67	0.000
	124.806 - 123.778		1088391.67	1682633.33	0.647	0.00	1682633.33	0.000
	123.778 - 122.75		1117150.00	1700641.67	0.657	0.00	1700641.67	0.000
	122.75 - 121.722		1146016.67	1718708.33	0.667	0.00	1718708.33	0.000
	121.722 - 120.694		1174975.00	1736825.00	0.677	0.00	1736825.00	0.000



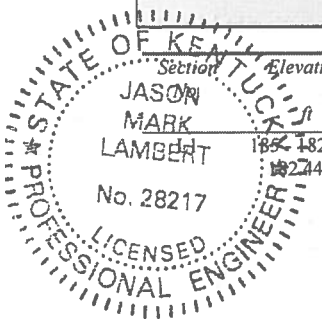
Section No.	Elevation ft	Size	M_{ux} lb-ft	ϕM_{nx} lb-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} lb-ft	ϕM_{ny} lb-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	120.694 - 119.667		1204041.67	1755000.00	0.686	0.00	1755000.00	0.000
	119.667 - 118.639		1233200.00	1773233.33	0.695	0.00	1773233.33	0.000
	118.639 - 117.611		1262466.67	1791516.67	0.705	0.00	1791516.67	0.000
	117.611 - 116.583		1291833.33	1809858.33	0.714	0.00	1809858.33	0.000
	116.583 - 115.556		1321291.67	1828250.00	0.723	0.00	1828250.00	0.000
	115.556 - 114.528		1350858.33	1846700.00	0.731	0.00	1846700.00	0.000
	114.528 - 113.5		1380516.67	1865200.00	0.740	0.00	1865200.00	0.000
	113.5 - 108.25		787077.50	1960491.67	0.401	0.00	1960491.67	0.000
L3	113.5 - 108.25	TP39.4726x35.4349x0.3125	746910.83	1904141.67	0.392	0.00	1904141.67	0.000
	108.25 - 107.222		1564408.33	1922800.00	0.814	0.00	1922800.00	0.000
	107.222 - 106.194		1594925.00	1941508.33	0.821	0.00	1941508.33	0.000
	106.194 - 105.167		1625525.00	1960258.33	0.829	0.00	1960258.33	0.000
	105.167 - 104.139		1656216.67	1979066.67	0.837	0.00	1979066.67	0.000
	104.139 - 103.111		1687008.33	1997916.67	0.844	0.00	1997916.67	0.000
	103.111 - 102.083		1717883.33	2016816.67	0.852	0.00	2016816.67	0.000
	102.083 - 101.056		1748850.00	2035758.33	0.859	0.00	2035758.33	0.000
	101.056 - 100.028		1779908.33	2054750.00	0.866	0.00	2054750.00	0.000
	100.028 - 99		1811058.33	2073791.67	0.873	0.00	2073791.67	0.000
	99 - 93.5		926558.33	2176391.67	0.426	0.00	2176391.67	0.000
L4	99 - 93.5	TP48.4373x37.7373x0.375	1053266.67	2669408.33	0.395	0.00	2669408.33	0.000
	93.5 - 91.2361		2050266.67	2725116.67	0.752	0.00	2725116.67	0.000
	91.2361 - 88.9722		2121150.00	2781183.33	0.763	0.00	2781183.33	0.000
	88.9722 - 86.7083		2192475.00	2837600.00	0.773	0.00	2837600.00	0.000
	86.7083 - 84.4444		2264233.33	2894366.67	0.782	0.00	2894366.67	0.000
	84.4444 - 82.1806		2336425.00	2951475.00	0.792	0.00	2951475.00	0.000
	82.1806 - 79.9167		2409041.67	3008916.67	0.801	0.00	3008916.67	0.000
	79.9167 - 77.6528		2482083.33	3066683.33	0.809	0.00	3066683.33	0.000
	77.6528 - 75.3889		2555533.33	3124775.00	0.818	0.00	3124775.00	0.000
	75.3889 - 73.125		2629400.00	3183175.00	0.826	0.00	3183175.00	0.000
	73.125 - 70.8611		2703675.00	3241883.33	0.834	0.00	3241883.33	0.000
	70.8611 - 68.5972		2778358.33	3300883.33	0.842	0.00	3300883.33	0.000
	68.5972 - 66.3333		2853433.33	3360183.33	0.849	0.00	3360183.33	0.000
	66.3333 - 64.0694		2928908.33	3419766.67	0.856	0.00	3419766.67	0.000



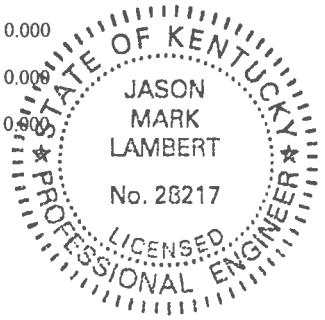
Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		lb-ft	lb-ft		lb-ft	lb-ft	
	64.0694 - 61.8056		3004775.00	3479625.00	0.864	0.00	3479625.00	0.000
	61.8056 - 59.5417		3081025.00	3539750.00	0.870	0.00	3539750.00	0.000
	59.5417 - 57.2778		3157650.00	3600141.67	0.877	0.00	3600141.67	0.000
	57.2778 - 55.0139		3234658.33	3660791.67	0.884	0.00	3660791.67	0.000
	55.0139 - 52.75		3312041.67	3721691.67	0.890	0.00	3721691.67	0.000
	52.75 - 46		1682500.00	3904675.00	0.431	0.00	3904675.00	0.000
L5	52.75 - 46	TP56.9741x46.3245x0.4375	1863266.67	4635558.33	0.402	0.00	4635558.33	0.000
	46 - 43.5789		3630658.33	4718875.00	0.769	0.00	4718875.00	0.000
	43.5789 - 41.1579		3715941.67	4802641.67	0.774	0.00	4802641.67	0.000
	41.1579 - 38.7368		3801616.67	4886833.33	0.778	0.00	4886833.33	0.000
	38.7368 - 36.3158		3887650.00	4971450.00	0.782	0.00	4971450.00	0.000
	36.3158 - 33.8947		3974050.00	5056491.67	0.786	0.00	5056491.67	0.000
	33.8947 - 31.4737		4060800.00	5141933.33	0.790	0.00	5141933.33	0.000
	31.4737 - 29.0526		4147883.33	5227775.00	0.793	0.00	5227775.00	0.000
	29.0526 - 26.6316		4235300.00	5314008.33	0.797	0.00	5314008.33	0.000
	26.6316 - 24.2105		4323033.33	5400616.67	0.800	0.00	5400616.67	0.000
	24.2105 - 21.7895		4411066.67	5487608.33	0.804	0.00	5487608.33	0.000
	21.7895 - 19.3684		4499408.33	5574958.33	0.807	0.00	5574958.33	0.000
	19.3684 - 16.9474		4588025.00	5662666.67	0.810	0.00	5662666.67	0.000
	16.9474 - 14.5263		4676925.00	5750724.67	0.813	0.00	5750724.67	0.000
	14.5263 - 12.1053		4766083.33	5839116.67	0.816	0.00	5839116.67	0.000
	12.1053 - 9.68421		4855500.00	5927841.33	0.819	0.00	5927841.33	0.000
	9.68421 - 7.26316		4945158.33	6016891.33	0.822	0.00	6016891.33	0.000
	7.26316 - 4.84211		5035058.33	6106250.00	0.825	0.00	6106250.00	0.000
	4.84211 - 2.42105		5125175.00	6195916.67	0.827	0.00	6195916.67	0.000
	2.42105 - 0		5215508.33	6285874.67	0.830	0.00	6285874.67	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		lb	lb		lb-ft	lb-ft	
	185 - 182.447	TP32.7x22x0.1875	7570.59	470068.00	0.016	0.00	863891.67	0.000
	182.447 -		7776.34	477437.00	0.016	0.00	897858.33	0.000

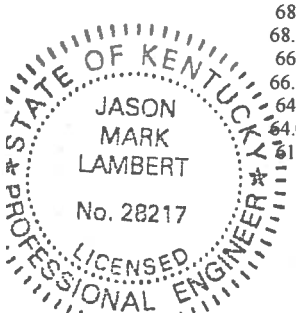


Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	179.895							
	179.895 - 177.342		7984.82	484649.00	0.016	0.00	932150.00	0.000
	177.342 - 174.789		8195.88	491704.00	0.017	0.00	966750.00	0.000
	174.789 - 172.237		8409.42	498602.00	0.017	0.00	1001633.33	0.000
	172.237 - 169.684		13822.10	505343.00	0.027	0.00	1036791.67	0.000
	169.684 - 167.132		14038.00	511927.00	0.027	0.00	1072191.67	0.000
	167.132 - 164.579		14255.10	518353.00	0.028	0.00	1107825.00	0.000
	164.579 - 162.026		14473.30	524623.00	0.028	0.00	1143666.67	0.000
	162.026 - 159.474		14692.50	530736.00	0.028	0.00	1179691.67	0.000
	159.474 - 156.921		14912.50	536691.00	0.028	0.00	1215883.33	0.000
	156.921 - 154.368		20218.90	542490.00	0.037	0.00	1252225.00	0.000
	154.368 - 151.816		20436.00	548131.00	0.037	0.00	1288691.67	0.000
	151.816 - 149.263		20652.60	553616.00	0.037	0.00	1325266.67	0.000
	149.263 - 146.711		20868.80	558943.00	0.037	0.00	1361925.00	0.000
	146.711 - 144.158		21084.50	564114.00	0.037	0.00	1398650.00	0.000
	144.158 - 141.605		21299.70	569127.00	0.037	0.00	1435425.00	0.000
	141.605 - 139.053		26467.40	573983.00	0.046	0.00	1472225.00	0.000
	139.053 - 136.5		26674.40	578682.00	0.046	0.00	1509025.00	0.000
	136.5 - 132		10615.10	586584.00	0.018	0.00	1573858.33	0.000
L2	136.5 - 132	TP37.1198x31.4165x0.3125	16554.30	1172490.00	0.014	0.00	3085266.67	0.000
	132 - 130.972		27255.70	1178110.00	0.023	0.00	3120350.00	0.000
	130.972 - 129.944		27354.50	1183710.00	0.023	0.00	3155558.33	0.000
	129.944 - 128.917		27453.20	1189280.00	0.023	0.00	3190891.67	0.000
	128.917 - 127.889		27551.80	1194830.00	0.023	0.00	3226350.00	0.000
	127.889 - 126.861		27650.30	1200350.00	0.023	0.00	3261933.33	0.000
	126.861 - 125.833		27748.70	1205850.00	0.023	0.00	3297633.33	0.000
	125.833 - 124.806		27847.10	1211320.00	0.023	0.00	3333450.00	0.000
	124.806 - 123.778		27945.30	1216760.00	0.023	0.00	3369391.67	0.000
	123.778 - 122.75		28043.40	1222180.00	0.023	0.00	3405441.67	0.000
	122.75 - 121.722		28141.40	1227570.00	0.023	0.00	3441608.33	0.000
	121.722 - 120.694		28239.30	1232940.00	0.023	0.00	3477891.67	0.000
	120.694 - 119.667		28337.20	1238290.00	0.023	0.00	3514291.67	0.000



tnxTower	Job	Page
	SO19101; Tower 200053; Foundation 200054	50 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	Project NP 185' - Evarts - Harlan Co., KY	Date 10:23:47 07/25/13
	Client WesTower Communications, Inc.	Designed by BL TNX V. 6.0.0.8

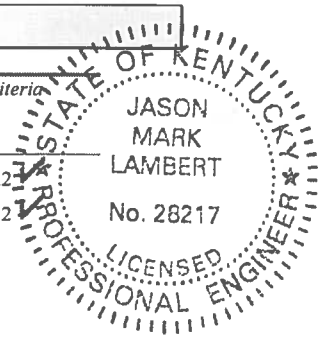
Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	119.667 - 118.639		28434.90	1243600.00	0.023	0.00	3550800.00	0.000
	118.639 - 117.611		28532.40	1248890.00	0.023	0.00	3587416.67	0.000
	117.611 - 116.583		28629.90	1254160.00	0.023	0.00	3624141.67	0.000
	116.583 - 115.556		28727.20	1259400.00	0.023	0.00	3660975.00	0.000
	115.556 - 114.528		28824.50	1264620.00	0.023	0.00	3697916.67	0.000
	114.528 - 113.5		28921.60	1269810.00	0.023	0.00	3734958.33	0.000
	113.5 - 108.25		15309.60	1295920.00	0.012	0.00	3925775.00	0.000
L3	113.5 - 108.25	TP39.4726x35.4349x0.3125	14279.90	1280600.00	0.011	0.00	3812941.67	0.000
	108.25 - 107.222		29658.00	1285720.00	0.023	0.00	3850300.00	0.000
	107.222 - 106.194		29747.30	1290800.00	0.023	0.00	3887758.33	0.000
	106.194 - 105.167		29836.40	1295860.00	0.023	0.00	3925316.67	0.000
	105.167 - 104.139		29925.40	1300900.00	0.023	0.00	3962975.00	0.000
	104.139 - 103.111		30014.10	1305910.00	0.023	0.00	4000725.00	0.000
	103.111 - 102.083		30102.70	1310890.00	0.023	0.00	4038566.67	0.000
	102.083 - 101.056		30191.10	1315850.00	0.023	0.00	4076500.00	0.000
	101.056 - 100.028		30279.30	1320780.00	0.023	0.00	4114533.33	0.000
	100.028 - 99		30367.40	1325690.00	0.023	0.00	4152650.00	0.000
	99 - 93.5		14684.70	1351520.00	0.011	0.00	4358116.67	0.000
L4	99 - 93.5	TP48.4373x37.7373x0.375	16377.20	1690260.00	0.010	0.00	5345350.00	0.000
	93.5 - 91.2361		31249.30	1705080.00	0.018	0.00	5456900.00	0.000
	91.2361 - 88.9722		31445.40	1719780.00	0.018	0.00	5569166.67	0.000
	88.9722 - 86.7083		31639.40	1734350.00	0.018	0.00	5682141.33	0.000
	86.7083 - 84.4444		31831.50	1748800.00	0.018	0.00	5795816.67	0.000
	84.4444 - 82.1806		32021.50	1763120.00	0.018	0.00	5910174.67	0.000
	82.1806 - 79.9167		32209.60	1777320.00	0.018	0.00	6025191.33	0.000
	79.9167 - 77.6528		32395.70	1791400.00	0.018	0.00	6140874.67	0.000
	77.6528 - 75.3889		32579.80	1805360.00	0.018	0.00	6257191.33	0.000
	75.3889 - 73.125		32761.90	1819190.00	0.018	0.00	6374133.33	0.000
	73.125 - 70.8611		32942.00	1832900.00	0.018	0.00	6491691.33	0.000
	70.8611 - 68.5972		33120.20	1846480.00	0.018	0.00	6609850.00	0.000
	68.5972 - 66.3333		33296.40	1859940.00	0.018	0.00	6728583.33	0.000
	66.3333 - 64.0694		33470.50	1873280.00	0.018	0.00	6847891.33	0.000
	64.0694 - 61.8056		33642.80	1886490.00	0.018	0.01	6967758.00	0.000



Section No.	Elevation ft	Size	Actual V_u lb	ϕV_n lb	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u lb-ft	ϕT_n lb-ft	Ratio $\frac{T_u}{\phi T_n}$
	61.8056 - 59.5417		33813.00	1899580.00	0.018	0.01	7088158.00	0.000
	59.5417 - 57.2778		33981.30	1912550.00	0.018	0.01	7209091.33	0.000
	57.2778 - 55.0139		34147.60	1925390.00	0.018	0.01	7330541.33	0.000
	55.0139 - 52.75		34312.00	1938110.00	0.018	0.01	7452483.33	0.000
	52.75 - 46		16822.30	1975300.00	0.009	0.00	7818900.00	0.000
L5	52.75 - 46	TP56.9741x46.3245x0.4375	18239.00	2388820.00	0.008	0.00	9282416.67	0.000
	46 - 43.5789		35200.40	2406630.00	0.015	0.01	9449333.33	0.000
	43.5789 - 41.1579		35360.80	2424300.00	0.015	0.01	9617000.00	0.000
	41.1579 - 38.7368		35516.70	2441830.00	0.015	0.01	9785583.33	0.000
	38.7368 - 36.3158		35668.30	2459220.00	0.015	0.01	9955083.33	0.000
	36.3158 - 33.8947		35815.40	2476470.00	0.014	0.01	10125333.33	0.000
	33.8947 - 31.4737		35958.20	2493570.00	0.014	0.01	10296416.67	0.000
	31.4737 - 29.0526		36096.60	2510540.00	0.014	0.01	10468333.33	0.000
	29.0526 - 26.6316		36230.70	2527360.00	0.014	0.01	10641000.00	0.000
	26.6316 - 24.2105		36360.40	2544040.00	0.014	0.01	10814416.67	0.000
	24.2105 - 21.7895		36485.70	2560580.00	0.014	0.01	10988666.67	0.000
	21.7895 - 19.3684		36606.70	2576980.00	0.014	0.01	11163583.33	0.000
	19.3684 - 16.9474		36723.30	2593240.00	0.014	0.01	11339166.67	0.000
	16.9474 - 14.5263		36835.60	2609360.00	0.014	0.01	11515500.00	0.000
	14.5263 - 12.1053		36943.50	2625340.00	0.014	0.01	11692500.00	0.000
	12.1053 - 9.68421		37047.20	2641170.00	0.014	0.01	11870166.67	0.000
	9.68421 - 7.26316		37146.50	2656860.00	0.014	0.01	12048500.00	0.000
	7.26316 - 4.84211		37241.60	2672420.00	0.014	0.01	12227416.00	0.000
	4.84211 - 2.42105		37332.30	2687830.00	0.014	0.01	12407000.00	0.000
	2.42105 - 0		37418.70	2703100.00	0.014	0.01	12587082.67	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	185 - 182.447	0.002	0.045	0.000	0.016	0.000	0.047 ✓	1.000	4.8.2 ✓
	182.447 -	0.003	0.087	0.000	0.016	0.000	0.090 ✓	1.000	4.8.2 ✓



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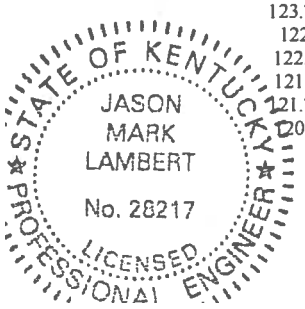
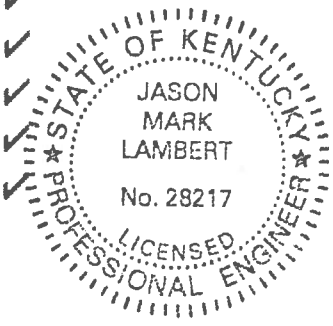
	SO19101; Tower 200053; Foundation 200054	52 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	Project NP 185' - Evarts - Harlan Co., KY	Date 10:23:47 07/25/13
	Client WesTower Communications, Inc.	Designed by BL TNX V. 6.0.0.8

Section No.	Elevation ft	Ratio $P_u/\phi P_n$	Ratio $M_{ux}/\phi M_{nx}$	Ratio $M_{uy}/\phi M_{ny}$	Ratio $V_u/\phi V_n$	Ratio $T_u/\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	179.895								
	179.895 - 177.342	0.003	0.127	0.000	0.016	0.000	0.130 ✓	1.000	4.8.2 ✓
	177.342 - 174.789	0.003	0.165	0.000	0.017	0.000	0.168 ✓	1.000	4.8.2 ✓
	174.789 - 172.237	0.003	0.202	0.000	0.017	0.000	0.205 ✓	1.000	4.8.2 ✓
	172.237 - 169.684	0.005	0.240	0.000	0.027	0.000	0.246 ✓	1.000	4.8.2 ✓
	169.684 - 167.132	0.005	0.298	0.000	0.027	0.000	0.304 ✓	1.000	4.8.2 ✓
	167.132 - 164.579	0.006	0.354	0.000	0.028	0.000	0.360 ✓	1.000	4.8.2 ✓
	164.579 - 162.026	0.006	0.407	0.000	0.028	0.000	0.414 ✓	1.000	4.8.2 ✓
	162.026 - 159.474	0.006	0.458	0.000	0.028	0.000	0.465 ✓	1.000	4.8.2 ✓
	159.474 - 156.921	0.006	0.506	0.000	0.028	0.000	0.513 ✓	1.000	4.8.2 ✓
	156.921 - 154.368	0.008	0.558	0.000	0.037	0.000	0.568 ✓	1.000	4.8.2 ✓
	154.368 - 151.816	0.008	0.623	0.000	0.037	0.000	0.633 ✓	1.000	4.8.2 ✓
	151.816 - 149.263	0.008	0.685	0.000	0.037	0.000	0.695 ✓	1.000	4.8.2 ✓
	149.263 - 146.711	0.009	0.744	0.000	0.037	0.000	0.755 ✓	1.000	4.8.2 ✓
	146.711 - 144.158	0.009	0.801	0.000	0.037	0.000	0.812 ✓	1.000	4.8.2 ✓
	144.158 - 141.605	0.009	0.856	0.000	0.037	0.000	0.867 ✓	1.000	4.8.2 ✓
	141.605 - 139.053	0.011	0.916	0.000	0.046	0.000	0.929 ✓	1.000	4.8.2 ✓
	139.053 - 136.5	0.011	0.983	0.000	0.046	0.000	0.997 ✓	1.000	4.8.2 ✓
	136.5 - 132	0.005	0.424	0.000	0.018	0.000	0.429 ✓	1.000	4.8.2 ✓
L2	136.5 - 132	0.004	0.343	0.000	0.014	0.000	0.347 ✓	1.000	4.8.2 ✓
	132 - 130.972	0.006	0.571	0.000	0.023	0.000	0.578 ✓	1.000	4.8.2 ✓
	130.972 - 129.944	0.006	0.583	0.000	0.023	0.000	0.589 ✓	1.000	4.8.2 ✓
	129.944 - 128.917	0.006	0.594	0.000	0.023	0.000	0.601 ✓	1.000	4.8.2 ✓
	128.917 - 127.889	0.006	0.605	0.000	0.023	0.000	0.612 ✓	1.000	4.8.2 ✓
	127.889 - 126.861	0.007	0.616	0.000	0.023	0.000	0.623 ✓	1.000	4.8.2 ✓
	126.861 - 125.833	0.007	0.626	0.000	0.023	0.000	0.633 ✓	1.000	4.8.2 ✓
	125.833 - 124.806	0.007	0.637	0.000	0.023	0.000	0.644 ✓	1.000	4.8.2 ✓
	124.806 - 123.778	0.007	0.647	0.000	0.023	0.000	0.654 ✓	1.000	4.8.2 ✓
	123.778 - 122.75	0.007	0.657	0.000	0.023	0.000	0.664 ✓	1.000	4.8.2 ✓
	122.75 - 121.722	0.007	0.667	0.000	0.023	0.000	0.674 ✓	1.000	4.8.2 ✓
	121.722 - 120.694	0.007	0.677	0.000	0.023	0.000	0.684 ✓	1.000	4.8.2 ✓



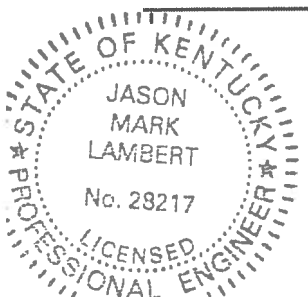
tnxTower	Job	Page
	SO19101; Tower 200053; Foundation 200054	53 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	Project NP 185' - Evarts - Harlan Co., KY	Date 10:23:47 07/25/13
	Client WesTower Communications, Inc.	Designed by BL TNX V. 6.0.0.8

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	120.694 - 119.667	0.007	0.686	0.000	0.023	0.000	0.694 ✓	1.000	4.8.2 ✓
	119.667 - 118.639	0.007	0.695	0.000	0.023	0.000	0.703 ✓	1.000	4.8.2 ✓
	118.639 - 117.611	0.007	0.705	0.000	0.023	0.000	0.712 ✓	1.000	4.8.2 ✓
	117.611 - 116.583	0.007	0.714	0.000	0.023	0.000	0.722 ✓	1.000	4.8.2 ✓
	116.583 - 115.556	0.007	0.723	0.000	0.023	0.000	0.731 ✓	1.000	4.8.2 ✓
	115.556 - 114.528	0.008	0.731	0.000	0.023	0.000	0.740 ✓	1.000	4.8.2 ✓
	114.528 - 113.5	0.008	0.740	0.000	0.023	0.000	0.748 ✓	1.000	4.8.2 ✓
	113.5 - 108.25	0.004	0.401	0.000	0.012	0.000	0.406 ✓	1.000	4.8.2 ✓
L3	113.5 - 108.25	0.004	0.392	0.000	0.011	0.000	0.396 ✓	1.000	4.8.2 ✓
	108.25 - 107.222	0.008	0.814	0.000	0.023	0.000	0.823 ✓	1.000	4.8.2 ✓
	107.222 - 106.194	0.009	0.821	0.000	0.023	0.000	0.831 ✓	1.000	4.8.2 ✓
	106.194 - 105.167	0.009	0.829	0.000	0.023	0.000	0.838 ✓	1.000	4.8.2 ✓
	105.167 - 104.139	0.009	0.837	0.000	0.023	0.000	0.846 ✓	1.000	4.8.2 ✓
	104.139 - 103.111	0.009	0.844	0.000	0.023	0.000	0.854 ✓	1.000	4.8.2 ✓
	103.111 - 102.083	0.009	0.852	0.000	0.023	0.000	0.861 ✓	1.000	4.8.2 ✓
	102.083 - 101.056	0.009	0.859	0.000	0.023	0.000	0.869 ✓	1.000	4.8.2 ✓
	101.056 - 100.028	0.009	0.866	0.000	0.023	0.000	0.876 ✓	1.000	4.8.2 ✓
	100.028 - 99	0.009	0.873	0.000	0.023	0.000	0.883 ✓	1.000	4.8.2 ✓
	99 - 93.5	0.005	0.426	0.000	0.011	0.000	0.430 ✓	1.000	4.8.2 ✓
L4	99 - 93.5	0.004	0.395	0.000	0.010	0.000	0.399 ✓	1.000	4.8.2 ✓
	93.5 - 91.2361	0.008	0.752	0.000	0.018	0.000	0.761 ✓	1.000	4.8.2 ✓
	91.2361 - 88.9722	0.008	0.763	0.000	0.018	0.000	0.771 ✓	1.000	4.8.2 ✓
	88.9722 - 86.7083	0.008	0.773	0.000	0.018	0.000	0.781 ✓	1.000	4.8.2 ✓
	86.7083 - 84.4444	0.009	0.782	0.000	0.018	0.000	0.791 ✓	1.000	4.8.2 ✓
	84.4444 - 82.1806	0.009	0.792	0.000	0.018	0.000	0.801 ✓	1.000	4.8.2 ✓
	82.1806 - 79.9167	0.009	0.801	0.000	0.018	0.000	0.810 ✓	1.000	4.8.2 ✓
	79.9167 - 77.6528	0.009	0.809	0.000	0.018	0.000	0.819 ✓	1.000	4.8.2 ✓
	77.6528 - 75.3889	0.009	0.818	0.000	0.018	0.000	0.827 ✓	1.000	4.8.2 ✓
	75.3889 - 73.125	0.009	0.826	0.000	0.018	0.000	0.836 ✓	1.000	4.8.2 ✓
	73.125 - 70.8611	0.009	0.834	0.000	0.018	0.000	0.844 ✓	1.000	4.8.2 ✓
	70.8611 - 68.5972	0.010	0.842	0.000	0.018	0.000	0.852 ✓	1.000	4.8.2 ✓
	68.5972 -	0.010	0.849	0.000	0.018	0.000	0.859 ✓	1.000	4.8.2 ✓



tnxTower	Job	Page
	SO19101; Tower 200053; Foundation 200054	54 of 55
Nello Corporation 211 W. Washington Street, Suite 2000 South Bend, IN 46601 Phone: (574) 288-3632 FAX: (574) 288-5860	**Project** NP 185' - Evarts - Harlan Co., KY	**Date** 10:23:47 07/25/13
	Client WesTower Communications, Inc.	**Designed by** BL TNX V. 6.0.0.8

Section No.	Elevation ft	Ratio $P_u / \phi P_n$	Ratio $M_{ux} / \phi M_{nx}$	Ratio $M_{uy} / \phi M_{ny}$	Ratio $V_u / \phi V_n$	Ratio $T_u / \phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	66.3333								
	66.3333 - 64.0694	0.010	0.856	0.000	0.018	0.000	0.867 ✓	1.000	4.8.2 ✓
	64.0694 - 61.8056	0.010	0.864	0.000	0.018	0.000	0.874 ✓	1.000	4.8.2 ✓
	61.8056 - 59.5417	0.010	0.870	0.000	0.018	0.000	0.881 ✓	1.000	4.8.2 ✓
	59.5417 - 57.2778	0.010	0.877	0.000	0.018	0.000	0.888 ✓	1.000	4.8.2 ✓
	57.2778 - 55.0139	0.010	0.884	0.000	0.018	0.000	0.894 ✓	1.000	4.8.2 ✓
	55.0139 - 52.75	0.011	0.890	0.000	0.018	0.000	0.901 ✓	1.000	4.8.2 ✓
	52.75 - 46	0.005	0.431	0.000	0.009	0.000	0.436 ✓	1.000	4.8.2 ✓
L5	52.75 - 46	0.005	0.402	0.000	0.008	0.000	0.407 ✓	1.000	4.8.2 ✓
	46 - 43.5789	0.010	0.769	0.000	0.015	0.000	0.779 ✓	1.000	4.8.2 ✓
	43.5789 - 41.1579	0.010	0.774	0.000	0.015	0.000	0.784 ✓	1.000	4.8.2 ✓
	41.1579 - 38.7368	0.010	0.778	0.000	0.015	0.000	0.788 ✓	1.000	4.8.2 ✓
	38.7368 - 36.3158	0.010	0.782	0.000	0.015	0.000	0.792 ✓	1.000	4.8.2 ✓
	36.3158 - 33.8947	0.010	0.786	0.000	0.014	0.000	0.796 ✓	1.000	4.8.2 ✓
	33.8947 - 31.4737	0.010	0.790	0.000	0.014	0.000	0.800 ✓	1.000	4.8.2 ✓
	31.4737 - 29.0526	0.011	0.793	0.000	0.014	0.000	0.804 ✓	1.000	4.8.2 ✓
	29.0526 - 26.6316	0.011	0.797	0.000	0.014	0.000	0.808 ✓	1.000	4.8.2 ✓
	26.6316 - 24.2105	0.011	0.800	0.000	0.014	0.000	0.811 ✓	1.000	4.8.2 ✓
	24.2105 - 21.7895	0.011	0.804	0.000	0.014	0.000	0.815 ✓	1.000	4.8.2 ✓
	21.7895 - 19.3684	0.011	0.807	0.000	0.014	0.000	0.818 ✓	1.000	4.8.2 ✓
	19.3684 - 16.9474	0.011	0.810	0.000	0.014	0.000	0.822 ✓	1.000	4.8.2 ✓
	16.9474 - 14.5263	0.011	0.813	0.000	0.014	0.000	0.825 ✓	1.000	4.8.2 ✓
	14.5263 - 12.1053	0.012	0.816	0.000	0.014	0.000	0.828 ✓	1.000	4.8.2 ✓
	12.1053 - 9.68421	0.012	0.819	0.000	0.014	0.000	0.831 ✓	1.000	4.8.2 ✓
	9.68421 - 7.26316	0.012	0.822	0.000	0.014	0.000	0.834 ✓	1.000	4.8.2 ✓
	7.26316 - 4.84211	0.012	0.825	0.000	0.014	0.000	0.837 ✓	1.000	4.8.2 ✓
	4.84211 - 2.42105	0.012	0.827	0.000	0.014	0.000	0.839 ✓	1.000	4.8.2 ✓
	2.42105 - 0	0.012	0.830	0.000	0.014	0.000	0.842 ✓	1.000	4.8.2 ✓



Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
L1	185 - 132	Pole	TP32.7x22x0.1875	1	-13094.90	1157360.00	99.7	Pass
L2	132 - 108.25	Pole	TP37.1198x31.4165x0.3125	2	-19328.60	2539620.00	74.8	Pass
L3	108.25 - 93.5	Pole	TP39.4726x35.4349x0.3125	3	-24212.00	2651380.00	88.3	Pass
L4	93.5 - 46	Pole	TP48.4373x37.7373x0.375	4	-41171.80	3876220.00	90.1	Pass
L5	46 - 0	Pole	TP56.9741x46.3245x0.4375	5	-66220.40	5406190.00	84.2	Pass
							Summary	
						Pole (L1)	99.7	Pass
						Base Plate	94.0	Pass
						RATING =	**99.7**	**Pass**

Program Version 6.0.0.8 - 9/7/2011 File:N:/eri/2000/200053.eri

PIER AND PAD FOUNDATION FOR MONOPOLE

Template := "PierPadPole.mcd"
Version := 2.1

NELLO CORPORATION
211 W. Washington Street
Suite 2000
South Bend, IN 46601
574-288-3632 (voice)
574-288-5860 (fax)

PROJECT DATA

Sales Order:	SO19101
Project:	200054
Site:	Evarts - Harlan Co., KY
Model:	NTP 57" x 185'
Client:	WesTower Communications, Inc.

DESIGN CODES AND STANDARDS

- ANSI/TIA/EIA-222-G, "TIA/EIA Standard - Structural Standards for Steel Antenna Towers and Antenna Supporting Structures," 2005.
- ACI 318-05, "Building Code Requirements for Structural Concrete," 2005.

FOUNDATION DESIGN REACTIONS

Overdesign Factor: $\alpha := 1.00$

Shear:	$S := 37.353 \cdot kips \cdot \alpha$	$S = 37.4\,kips$
Moment:	$M := 5215.506 \cdot ft \cdot kips \cdot \alpha$	$M = 5215.5\,ft \cdot kips$
Weight:	$Wt_t := 66.258 \cdot kips \cdot \alpha$	$Wt_t = 66.3\,kips$
Compression:	$C := Wt_t$	$C = 66.3\,kips$
Uplift:	$U := 0 \cdot kips \cdot \alpha$	$U = 0.0\,kips$

Allow for reduction in required development length due to excess reinforcement per ACI 12.2.5, 12.3.3.1, and 12.5.3.4?

$red := 0$ 0 - No Reduction (Design Mode)
1 - Allow Reduction (Analysis Mode)

SITE & GEOTECHNICAL DATA

Soil Parameters: Design based on geotechnical report dated 5/9/2013 by Environmental Corporation of America; Project No. L-1055b.

Assumed Soil Type: (1=Sand, 2=Clay) $SoilType := 2$

Soil Unit Weight: $\gamma := 115 \cdot pcf$

* Soil unit weight will be re-defined later if groundwater level is above the depth of the foundation

Angle of Internal Friction:

$$\phi := \begin{cases} 30 \cdot deg & \text{if } SoilType = 1 \\ 15 \cdot deg & \text{otherwise} \end{cases} \qquad \phi = 15\,deg$$

Allowable Bearing Pressure $B_a := 5.000\,ksf$

Factor of Safety: $FS := 2.0$

Ultimate Bearing Pressure: $B_c := B_a \cdot FS$ $\qquad B_c = 10.000\,ksf$

$B_{type} := 0$ 0 for Net Bearing Pressure
1 for Gross Bearing Pressure

Cohesion:

$$c := \begin{cases} 0 \cdot ksf & \text{if } SoilType = 1 \\ 0.500 \cdot ksf & \text{otherwise} \end{cases} \qquad c = 0.500\,ksf$$

Seismic Design Category: $Seismic := "C"$

$$Z := \begin{cases} 0 & \text{if } Seismic = "A" \\ 0 & \text{if } Seismic = "B" \\ 1 & \text{if } Seismic = "C" \\ 2 & \text{if } Seismic = "D" \\ 2 & \text{if } Seismic = "E" \\ 2 & \text{if } Seismic = "F" \\ "Error" & \text{otherwise} \end{cases} \qquad Z = 1$$

Passive Pressure Coefficient: $K_p := \tan\left(\frac{\phi}{2} + 45 \cdot deg\right)^2$ $\qquad K_p = 1.70$

Sliding Friction Coefficient: $\mu := 0.25$

Depth Neglected: $D_n := 2.5 \cdot ft$

Depth of Water: $D_w := \infty \cdot ft$

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MATERIAL SPECIFICATIONS

Concrete

Compressive Strength: $f'_c := 4000 \cdot psi$ Clear Cover: $cc := 3 \cdot in$

Unit Weight: $\gamma_{conc} := 0.150 \cdot kcf$ * Concrete unit weight will be re-defined later if groundwater level is above the depth of the foundation

Check Concrete Strength:

$$Check_{conc} := if\left(Z \geq 2, if\left(f'_c \geq 3000 \cdot psi, "OK", "NO\ GOOD"\right), if\left(f'_c \geq 2500 \cdot psi, "OK", "NO\ GOOD"\right)\right)$$

$Check_{conc} = "OK"$

Rebar

Yield Strength $F_y := 60 \cdot ksi$ Elastic Modulus: $E := 29000 \cdot ksi$

DIMENSIONS

Pier Extension: $E := 0.5 \cdot ft$

Depth: $D := 7.0 \cdot ft$

Pad Thickness: $T := 2.5 \cdot ft$

Pier Diameter: $D_p := 8.0 \cdot ft$

Pad Width: $W := 24.5 \cdot ft$

Offset of Tower: $ecc := 0 \cdot ft$

Pole Wall Thickness: $t_w := 0.4375in$

Pole Base Outer Diameter: $OD_{pole} := 57.0in$

Anchor Bolt Circle Diameter: $BC := OD_{pole} + 7 \cdot in$ $BC = 64\,in$

Embedment Plate Diameter: $OD_{pl} := BC + 5in$ $OD_{pl} = 69\,in$

(Try a pier diameter of at least $OD_{pl} + 11 \cdot in = 6.667\,ft$. This is checked later.

(Guess Width to be $\sqrt[3]{\frac{2 \cdot (1.5 \cdot M)}{T \cdot \gamma_{conc} + (D - T) \cdot \gamma}} = 26\,ft$)

$ecc = 0\,ft$

Distance from Leg to Concrete Edge: $edge := \frac{W}{2}$ $edge = 12.25\,ft$

WEIGHT

Concrete Pad Volume: $V_{pad} := W^2 \cdot T$ $V_{pad} = 1501\,ft^3$ $V_{pad} = 55.6\,yd^3$

Concrete Pier Volume: $V_{pier} := \frac{\pi}{4} \cdot D_p^{\,2} \cdot (D + E - T)$ $V_{pier} = 251\,ft^3$ $V_{pier} = 9.3\,yd^3$

Concrete Volume: $V_{conc} := V_{pad} + V_{pier}$ $V_{conc} = 1752\,ft^3$ $V_{conc} = 64.9\,yd^3$

Concrete Weight:

$$Wt_{conc} := \begin{cases} \gamma_{conc} \cdot V_{conc} & \text{if } D_w > D \\ \left(\gamma_{conc} - 62.4 \cdot pcf\right) \cdot V_{conc} & \text{if } D_w \leq D - T \\ \gamma_{conc} \cdot \left(V_{pier}\right) + \left(D - D_w\right) \cdot W^2 \cdot \left(\gamma_{conc} - 62.4 \cdot pcf\right) + \left[T - \left(D - D_w\right)\right] \cdot W^2 \cdot \gamma_{conc} & \text{otherwise} \end{cases}$$

$Wt_{conc} = 262.8\,kips$

Soil Volume: $V_{soil} := \left(W^2 - \frac{\pi}{4} \cdot D_p^{\,2}\right) \cdot (D - T)$ $V_{soil} = 2475\,ft^3$ $V_{soil} = 91.7\,yd^3$

Soil Weight:

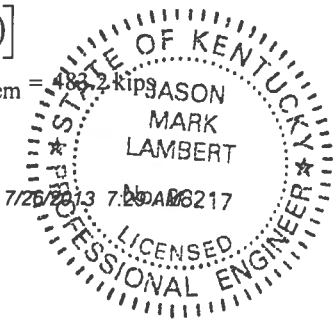
$$Wt_{soil} := \begin{cases} V_{soil} \cdot \gamma & \text{if } D_w \geq D - T \\ \left(W^2 - \frac{\pi}{4} \cdot D_p^{\,2}\right) \cdot D_w \cdot \gamma + \left[(D - T) - D_w\right] \cdot \left(W^2 - \frac{\pi}{4} \cdot D_p^{\,2}\right) \cdot \left(\gamma - 62.4 \cdot pcf\right) & \text{otherwise} \end{cases}$$

$Wt_{soil} = 284.6\,kips$

Soil Weight Removed: $Wt_{soil.rem} := if\left[D_w \geq D, W^2 \cdot D \cdot \gamma, W^2 \cdot D_w \cdot \gamma + \left(D - D_w\right) \cdot W^2 \cdot \left(\gamma - 62.4 \cdot pcf\right)\right]$

$Wt_{soil.rem} = 483.2\,kips$

Total Download: $P := Wt_t + Wt_{conc} + Wt_{soil}$ $P = 613.668\,kips$



LATERAL CAPACITY

Ultimate Passive Pressure: $P_{pn} := K_p \cdot \gamma \cdot D_n + 2 \cdot c \cdot \sqrt{K_p}$ $\quad P_{pn} = 1.792 \text{ ksf}$

$P_{pt} := K_p \cdot \gamma \cdot (D - T) + 2 \cdot c \cdot \sqrt{K_p}$ $\quad P_{pt} = 2.182 \text{ ksf}$

$P_{ptn} := \text{if}\left(D_n < D - T, P_{pt}, P_{pn}\right)$ $\quad P_{ptn} = 2.182 \text{ ksf}$

$P_{pb} := K_p \cdot \gamma \cdot D + 2 \cdot c \cdot \sqrt{K_p}$ $\quad P_{pb} = 2.67 \text{ ksf}$

$P_p := \text{mean}\left(P_{ptn}, P_{pb}\right)$ $\quad P_p = 2.426 \text{ ksf}$

Effective Pad Thickness: $T_e := \text{if}\left(D_n < D - T, T, D - D_n\right)$ $\quad T_e = 2.5 \text{ ft}$

Effective Pad Area: $A_e := W \cdot T_e$ $\quad A_e = 61.25 \text{ ft}^2$

Resistance Factor for Lateral Resistance: $\phi_l := 0.75$ $\quad \phi_l = 0.75$

Lateral Capacity: $S_{all} := \phi_l \left(P_p \cdot A_e + P \cdot \mu\right)$ $\quad S_{all} = 226.52 \text{ kips}$

Check: $Check_{lateral} := \text{if}\left(S_{all} \geq S, \text{"OK"}, \text{"NO GOOD"}\right)$ $\quad Check_{lateral} = \text{"OK"}$

$Ratio_{lateral} := \dfrac{S}{S_{all}}$ $\quad Ratio_{lateral} = 0.165$

OVERTURNING

Weight of Soil Wedge on Back Face: $Wt_{sw} := W \cdot D \cdot \dfrac{D \cdot \tan(\phi)}{2} \cdot \gamma$ $\quad Wt_{sw} = 18.496 \text{ kips}$

Moment Resistance from Weight: $M_{r.wt} := \left(Wt_{conc} + Wt_{soil}\right) \cdot \dfrac{W}{2} + \dfrac{0.9}{1.2} \cdot Wt_t \cdot \left(\dfrac{W}{2} - ecc\right)$ $\quad M_{r.wt} = 7315 \text{ ft} \cdot \text{kips}$

Moment Resistance from Soil Wedge: $M_{r.sw} := Wt_{sw} \cdot \left(W + \dfrac{D \cdot \tan(\phi)}{3}\right)$ $\quad M_{r.sw} = 465 \text{ ft} \cdot \text{kips}$

Moment Resistance from Passive Pressure: $M_{r.pp} := \left(P_p \cdot A_e\right) \cdot \dfrac{T_e}{3}$ $\quad M_{r.pp} = 124 \text{ ft} \cdot \text{kips}$

Total Moment Resistance: $M_r := M_{r.wt} + M_{r.sw} + M_{r.pp}$ $\quad M_r = 7903 \text{ ft kips}$

Overturning Moment: $M_{ot} := M + S \cdot (D + E)$ $\quad M_{ot} = 5496 \text{ ft} \cdot \text{kips}$

Resistance Factor for Overturning: $\phi_o := 0.75$

Allowable Overturning Moment: $M_{all} := \phi_o \cdot M_r$ $\quad M_{all} = 5927.3 \text{ ft} \cdot \text{kips}$

Allowable Overturning Moment: $M_{all} := \phi_o \cdot M_r$ $\quad M_{all} = 5927.3 \text{ ft} \cdot \text{kips}$

Check: $Check_{over} := \text{if}\left(M_{all} \geq M_{ot}, \text{"OK"}, \text{"NO GOOD"}\right)$ $\quad Check_{over} = \text{"OK"}$

$Ratio_{over} := \dfrac{M_{ot}}{M_{all}}$ $\quad Ratio_{over} = 0.927$

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BEARING PRESSURE

CASE 1: Entire Mat is in Positive Bearing

Sum Moments: $\left[\frac{1}{2}\cdot(q_{max} - q_{min})\right]\cdot\left(\frac{W^2}{3}\right) + (q_{min})\cdot\left(\frac{W^2}{2}\right) = (Wt_{soil} + Wt_{conc})\cdot\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M_{ot}$

Sum Forces: $\frac{1}{2}\cdot(q_{max} + q_{min})\cdot W = Wt_{soil} + Wt_{conc} + Wt_t$

Combine Equations:

$$\left(\frac{Wt_{soil} + Wt_{conc} + Wt_t}{W} - q_{min}\right)\cdot\left(\frac{W^2}{3}\right) + q_{min}\cdot\left(\frac{W^2}{2}\right) = (Wt_{soil} + Wt_{conc})\cdot\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M_{ot}$$

Guess: $q_{min} := 10\cdot\frac{kips}{ft}$

Solve:

$$q_{min} := root\left[\left(\frac{Wt_{soil} + Wt_{conc} + Wt_t}{W} - q_{min}\right)\cdot\left(\frac{W^2}{3}\right) + q_{min}\cdot\left(\frac{W^2}{2}\right) - \left[(Wt_{soil} + Wt_{conc})\cdot\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M\right.\right.$$

$q_{min1} := \frac{1}{W}\cdot q_{min}$ $\quad q_{min1} = -1.22\,ksf$

$q_{max1} := \frac{1}{W}\cdot\left[\frac{2\cdot(Wt_{soil} + Wt_{conc} + Wt_t)}{W} - q_{min}\right]$ $\quad q_{max1} = 3.265\,ksf$

CASE 2: Back Edge of Mat is Uplifting

Sum Moments: $\left(\frac{1}{2}\cdot q_{max}\cdot B\right)\cdot\left(\frac{B}{3}\right) = (Wt_{soil} + Wt_{conc})\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M_{ot}$

Sum Forces: $\frac{1}{2}\cdot q_{max}\cdot B = Wt_{soil} + Wt_{conc} + Wt_t$

Combine Equations: $(Wt_{soil} + Wt_{conc} + Wt_t)\cdot\left(\frac{B}{3}\right) = (Wt_{soil} + Wt_{conc})\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M_{ot}$

Bearing Width: $B_2 := 3\cdot\frac{(Wt_{soil} + Wt_{conc})\cdot\left(\frac{W}{2}\right) + Wt_t\cdot\left(\frac{W}{2} - ecc\right) - M_{ot}}{Wt_{soil} + Wt_{conc} + Wt_t}$ $\quad B_2 = 9.884\,ft$

$q_{min2} := 0\cdot ksf$ $\quad q_{min2} = 0\,ksf$

$q_{max2} := \frac{2\cdot(Wt_{soil} + Wt_{conc} + Wt_t)}{B_2\cdot W}$ $\quad q_{max2} = 5.068\,ksf$

Maximum Gross Bearing Pressure: $Q_{max.gross} := if(q_{min1} < 0\cdot ksf, q_{max2}, q_{max1})$ $\quad Q_{max.gross} = 5.068\,ksf$

Minimum Gross Bearing Pressure: $Q_{min.gross} := if(q_{min1} < 0\cdot ksf, q_{min2}, q_{min1})$ $\quad Q_{min.gross} = 0\,ksf$

Maximum Net Bearing Pressure: $Q_{max.net} := Q_{max.gross} - \frac{Wt_{soil.rem}}{w^2}$ $\quad Q_{max.net} = 4.263\,ksf$

Maximum Bearing Pressure: $Q_{max} := if(B_{type} = 0, Q_{max.net}, Q_{max.gross})$ $\quad Q_{max} = 4.263\,ksf$

Resistance Factor for Bearing: $\phi_b := 0.75$ $\quad B_c = 10\,ksf$

Check: $Check_{bear} := if(\phi_b\cdot B_c \geq Q_{max}, "OK", "NO\ GOOD")$ $\quad Check_{bear} = "OK"$

$Ratio_{bear} := \frac{Q_{max}}{\phi_b\cdot B_c}$ $\quad Ratio_{bear} = 0.568$

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CONCRETE STRENGTH CAPACITY

CONCRETE SHEAR CAPACITY

Shear Strength Reduction Factor: $\phi_s := 0.75$ [ACI 9.3.2.3]

Effective Shear Depth: $d := T - cc - 0.5 \cdot in$ $d = 26.5\,in$

ONE-WAY SHEAR

Effective Shear Width: $b_w := W$ $b_w = 24.5\,ft$

Factored Shear Force: $V_{u1} := \frac{C}{2}$ $V_{u1} = 33.129\,kips$

Nominal Shear Strength from Concrete: $V_{c1} := 2 \cdot \sqrt{f'_c} \cdot b_w \cdot d \cdot \sqrt{psi}$ $V_{c1} = 985\,kips$

Nominal Shear Strength from Reinforcement: $V_{s1} := 0 \cdot kips$

Nominal Shear Strength: $V_{n1} := V_{c1} + V_{s1}$ $V_{n1} = 985\,kips$ [ACI 11.1.1, Eqn. 11-2]

Check: $Check_{shear.1} := if\left(\phi_s \cdot V_{n1} \geq V_{u1}, "OK", "NO\ GOOD"\right)$ $Check_{shear.1} = "OK"$

$Ratio_{shear.1} := \frac{V_{u1}}{\phi_s \cdot V_{n1}}$ $Ratio_{shear.1} = 0.045$

TWO-WAY SHEAR

Shear Perimeter: $b_o := \pi \cdot \left(D_p + d\right)$ $b_o = 32.07\,ft$ [ACI 11.12.1.2]

Factored Shear Force: $V_{u2} := C$ $V_{u2} = 66.258\,kips$

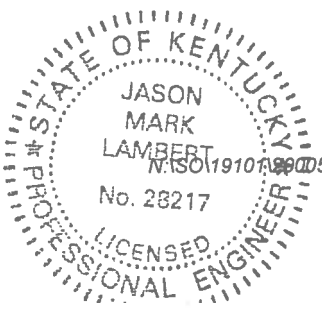
Nominal Shear Strength from Concrete: $V_{c2} := 4 \cdot \sqrt{f'_c} \cdot b_o \cdot d \cdot \sqrt{psi}$ $V_{c2} = 2580\,kips$

Nominal Shear Strength from Reinforcement: $V_{s2} := 0 \cdot kips$

Nominal Shear Strength: $V_{n2} := V_{c2} + V_{s2}$ $V_{n2} = 2580\,kips$ [ACI 11.1.1, Eqn. 11-2]

Check: $Check_{shear.2} := if\left(\phi_s \cdot V_{n2} \geq V_{u2}, "OK", "NO\ GOOD"\right)$ $Check_{shear.2} = "OK"$

$Ratio_{shear.2} := \frac{V_{u2}}{\phi_s \cdot V_{n2}}$ $Ratio_{shear.2} = 0.034$



PAD REINFORCEMENT

Bar Quantity: $n_p := 25$ per layer per direction

Bar Size: $s_p := 9$

Bar Diameter: $d_p := dia_{s_p}$ $d_p = 1.128\,in$

Bar Area: $A_p := area_{s_p}$ $A_p = 1\,in^2$

Bar Weight: $wt_p := w_{s_p}$ $wt_p = 3.4\,\frac{lb}{ft}$

Steel Area: $A_{tp} := n_p \cdot A_p$ $A_{tp} = 25\,in^2$ per layer per direction

Total Quantity: $n_{tp} := 4 \cdot n_p$ $n_{tp} = 100$

Bar Length: $L_p := W - 2 \cdot cc$ $L_p = 24\,ft$

Bar Weight: $Wt_p := L_p \cdot wt_p$ $Wt_p = 81.6\,lb$

Total Weight: $Wt_{tp} := n_{tp} \cdot Wt_p$ $Wt_{tp} = 8160\,lb$

Bar Spacing: $sp_{p.ctr} := \frac{W - 2 \cdot cc - d_p}{n_p - 1}$ $sp_{p.ctr} = 11.953\,in$

$sp_{p.cl} := sp_{p.ctr} - d_p$ $sp_{p.cl} = 10.825\,in$

Check Max Spacing: $Check_{sp.p.ctr} := if\left(sp_{p.ctr} < \min(18 \cdot in, 3 \cdot T), "OK", "NO\ GOOD"\right)$ $Check_{sp.p.ctr} = "OK"$

Check Min Spacing: $Check_{min.sp.p.ctr} := if\left(sp_{p.ctr} < 1 \cdot in, "NO\ GOOD", if\left(sp_{p.ctr} < d_p, "NO\ GOOD", "OK"\right)\right)$

$Check_{min.sp.p.ctr} = "OK"$

FLEXURAL STRENGTH

Flexural Strength Reduction Factor: $\phi_f := 0.90$ [ACI 9.3.2.1]

Effective Flexural Depth: $d_f := T - cc - 1.5 d_p$ $d_f = 25.308\,in$

Effective Flexural Width: $b_p := W$ $b_p = 24.5\,ft$

Depth of Compressive Zone: $a := \frac{\frac{b_p}{W} \cdot A_{tp} \cdot F_y}{0.85 \cdot f'_c \cdot b_p}$ $a = 1.501\,in$

Nominal Flexural Strength: $M_n := \frac{b_p}{W} \cdot A_{tp} \cdot F_y \cdot \left(d_f - \frac{a}{2}\right)$ $M_n = 3070\,ft \cdot kips$

Concrete Strength Factor: $\beta_1 := \min\left(0.85, \max\left(0.65, 0.85 - 0.05 \cdot \frac{f'_c - 4000 \cdot psi}{1000 \cdot psi}\right)\right)$ $\beta_1 = 0.85$ [ACI 10.2.7.3]

Check: $Check_{yield} := if\left[\frac{a}{d_f} \le \beta_1 \cdot \left(\frac{87 \cdot ksi}{87 \cdot ksi + F_y}\right), "OK", "NO\ GOOD - Steel\ Not\ Yielding"\right]$ $Check_{yield} = "OK"$

Factored Moment: $M_u := \frac{M + S \cdot (D + E - T)}{2}$ $M_u = 2701\,ft \cdot kips$

Check: $Check_{flex} := if\left(\phi_f M_n \ge M_u, "OK", "NO\ GOOD"\right)$ $Check_{flex} = "OK"$

$Ratio_{flex} := \frac{M_u}{\phi_f M_n}$ $Ratio_{flex} = 0.978$

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MINIMUM REINFORCEMENT

Minimum Reinforcement Ratio: $\rho_{min.p} := if(F_y \geq 60 \cdot ksi, 0.0018, 0.0020)$ $\rho_{min.p} = 0.0018$

Minimum Steel Area Required: $A_{min.p} := \rho_{min.p} \cdot W \cdot \frac{T}{2}$ $A_{min.p} = 7.938\ in^2$

Check: $Check_{min.p} := if(A_{tp} \geq A_{min.p}, "OK", "NO GOOD")$ $Check_{min.p} = "OK"$

$Ratio_{min.p} := \frac{A_{min.p}}{A_{tp}}$ $Ratio_{min.p} = 0.318$

DEVELOPMENT LENGTH

Reinforcement Location Factor: $\alpha := 1.0$ [ACI 12.2.4]

Coating Factor: $\beta := 1.0$ [ACI 12.2.4]

Lightweight Aggregate Concrete Factor: $\lambda := 1.0$ [ACI 12.2.4]

Reinforcement Size Factor: $\gamma_p := if(s_p \leq 6, 0.8, 1.0)$ $\gamma_p = 1$ [ACI 12.2.4]

Transverse Reinforcement Index: $K_{tr} := 0 \cdot in$ [ACI 12.2.4]

Maximum Spacing or Cover Dimension: $c_p := \min\left(cc + \frac{d_p}{2}, \frac{sp_{p.ctr}}{2}\right)$ $c_p = 3.564\ in$ [ACI 12.2.4]

Development Length: $l_{dp} := \max\left(12 \cdot in, d_p \cdot \frac{3}{40} \cdot \frac{F_y}{\sqrt{f'_c} \cdot \sqrt{psi}} \cdot \frac{\alpha \cdot \beta \cdot \gamma_p \cdot \lambda}{\min\left(2.5, \frac{c_p + K_{tr}}{d_p}\right)}\right)$ $l_{dp} = 32.103\ in$

[ACI 12.2.3, Eqn. 12-1]

$l_{dp} := \max(12 \cdot in, l_{dp} \cdot if(red = 1, Ratio_{flex}, 1))$ $l_{dp} = 32.103\ in$ [ACI 12.2.5]

Development Length Available: $l_{ap} := edge - cc$ $l_{ap} = 144\ in$

Check: $Check_{dev.p} := if(l_{ap} \geq l_{dp}, "OK", "NO GOOD")$ $Check_{dev.p} = "OK"$

$Ratio_{dev.p} := \frac{l_{dp}}{l_{ap}}$ $Ratio_{dev.p} = 0.223$

PIER REINFORCEMENT

Gross Area: $A_g := \frac{\pi}{4}\cdot D_p^{\,2}$ $A_g = 50.265\,ft^2$

Bar Quantity: $n_c := 45$

Bar Size: $s_c := 10$

Bar Diameter: $d_c := dia_{s_c}$ $d_c = 1.27\,in$

Bar Area: $A_c := area_{s_c}$ $A_c = 1.27\,in^2$

Bar Weight: $wt_c := w_{s_c}$ $wt_c = 4.303\,\frac{lb}{ft}$

Steel Area: $A_{tc} := n_c \cdot A_c$ $A_{tc} = 57.15\,in^2$

Total Quantity: $n_{tc} := n_c$ $n_{tc} = 45$

Hook Length: $hook_c := 12\cdot d_c$ $hook_c = 15.24\,in$

90 degree hook [ACI 7.1.2]

Bend Radius:
$$bend_c := \begin{cases} 3\cdot d_c & \text{if } s_c \le 8 \\ 5\cdot d_c & \text{if } s_c > 11 \\ 4\cdot d_c & \text{otherwise} \end{cases}$$

$bend_c = 5.08\,in$

Tie Quantity: $n_t := 7$

Tie Size: $s_t := 4$

Tie Diameter: $d_t := dia_{s_t}$ $d_t = 0.5\,in$

Tie Area: $A_t := area_{s_t}$ $A_t = 0.2\,in^2$

Tie Weight: $wt_t := w_{s_t}$ $wt_t = 0.668\,\frac{lb}{ft}$

Tie Spacing: $sp_t := \frac{D + E - T - cc - 5\cdot in}{n_t - 2}$

$sp_t = 10.4\,in$

Maximum Tie Spacing:

$sp_{t.max} := \min\left[16\cdot d_c, 48\cdot d_t, D_p, (D + E - T)\right]$

$sp_{t.max} = 20.32\,in$

Check: $Check_{tie} := if\left(sp_{t.max} \ge sp_t, "OK", "NO\ GOOD"\right)$

$Check_{tie} = "OK"$

Overlap Length: $L_{o.t} := 22\cdot in$

Hook Extension: $ext_t := \max\left(3\cdot in, 6\cdot d_t\right)$ $ext_t = 3\,in$

Bend Radius: $bend_t := 3\cdot d_t$ $bend_t = 1.5\,in$

Standard Tie Length: $L_{t.std} := \pi\cdot\left(D_p - 2\cdot cc - d_t\right) + L_{o.t}$ $L_{t.std} = 25.264\,ft$

Seismic Tie Length: $L_{t.seis} := \pi\cdot\left(D_p - 2\cdot cc - d_t\right) + \frac{\pi}{2}\cdot\left(2\cdot bend_t + d_t\right) + 2\cdot ext_t$ $L_{t.seis} = 24.389\,ft$

Tie Length: $L_t := if\left(Z \le 1, L_{t.std}, L_{t.seis}\right)$ $L_t = 25.264\,ft$

Bar Length: $L_c := \left(D + E - 2\cdot cc - 2\cdot d_p - bend_c\right) + hook_c + \frac{\pi}{2}\cdot bend_c$

$L_c = 8.324\,ft$

Bar Weight: $Wt_c := L_c \cdot wt_c$ $Wt_c = 35.8\,lb$

Tie Weight: $Wt_t := L_t \cdot wt_t$ $Wt_t = 16.9\,lb$

Total Weight: $Wt_{tc} := n_{tc}\cdot Wt_c$ $Wt_{tc} = 2 \times 10^3\,lb$

Total Weight: $Wt_{tt} := n_t \cdot Wt_t$ $Wt_{tt} = 118\,lb$

Bar Spacing: $sp_{c.ctr} := \frac{\pi\cdot\left(D_p - 2\cdot cc - 2\cdot d_t - d_c\right)}{n_c}$ $sp_{c.ctr} = 6.125\,in$

$sp_{c.cl} := sp_{c.ctr} - d_c$ $sp_{c.cl} = 4.855\,in$

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MINIMUM REINFORCEMENT

Minimum Steel Area Required: $A_{min.c} := if(Z \geq 2, 0.01 \cdot A_g, 0.005 \cdot A_g)$ $A_{min.c} = 36.191\ in^2$ [ACI 10.8.4 & 10.9.1]

Maximum Steel Area Required: $A_{max.c} := 0.08 \cdot A_g$ $A_{max.c} = 579.058\ in^2$ [ACI 10.9.1]

Check: $Check_{min.c} := if(A_{tc} \geq A_{min.c}, "OK", "NO GOOD")$ $Check_{min.c} = "OK"$

$$Ratio_{min.c} := \frac{A_{min.c}}{A_{tc}}$$ $Ratio_{min.c} = 0.633$

$Check_{tie.size} := if(s_c \leq 10, if(s_t \geq 3, "OK", "NO GOOD"), if(s_t \geq 4, "OK", "NO GOOD"))$ ACI 7.10.5.1

$Check_{tie.size} = "OK"$

$Check_{bar.qty} := if(n_c < 4, "NO GOOD", "OK")$ ACI 10.9.2

$Check_{bar.qty} = "OK"$

$Check_{pier.min} := if(sp_{c.cl} < 1.5 \cdot d_c, "NO GOOD", if(sp_{c.cl} < 1.5 \cdot in, "NO GOOD", "OK"))$ ACI 7.6.3

$Check_{pier.min} = "OK"$

Constructability Check: $Check_{pier.const.min} := if(sp_{c.cl} < cc, "NO GOOD", "OK")$

$Check_{pier.const.min} = "OK"$

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COMPRESSIVE STRENGTH

Compressive Strength Reduction Factor: $\phi_c := 0.65$ [ACI 9.3.2.2]

Nominal Compressive Strength: $P_n := 0.8 \cdot \phi_c \cdot \left[0.85 \cdot f'_c \cdot \left(A_g - A_{tc}\right) + F_y \cdot A_{tc}\right]$ $P_n = 1.4 \times 10^4$ kips [ACI 10.3.5.1, Eqn. 10

Factored Compression: $P_u := C$ $P_u = 66.258$ kips

Check: $Check_{comp} := if\left(\phi_c \cdot P_n \geq P_u, "OK", "NO\ GOOD"\right)$ $Check_{comp} = "OK"$

$Ratio_{comp} := \frac{P_u}{\phi_c \cdot P_n}$ $Ratio_{comp} = 0.007$

REINFORCEMENT STRESS

The stress within the rebar is found by finding the cross-sectional properties of a pipe with an equivalent area and diameter as the circle of vertical reinforcement.

Diameter of Reinforcement Circle: $d_e := D_p - 2 \cdot cc - 2d_t - d_c$ $d_e = 87.73$ in

Equivalent Pipe Thickness: $t_e := 2 \cdot \frac{A_{tc}}{\pi \cdot d_e}$ $t_e = 0.415$ in

Equivalent Outer Diameter: $OD_e := d_e + \frac{t_e}{2}$ $OD_e = 87.937$ in

Equivalent Inner Diameter: $ID_e := d_e - \frac{t_e}{2}$ $ID_e = 87.523$ in

Check: $Check_{math} := if\left[\frac{\pi}{4} \cdot \left(OD_e^{\,2} - ID_e^{\,2}\right) = A_{tc}, "OK", "NO\ GOOD"\right]$ $Check_{math} = "OK"$

Equivalent Section Modulus: $SM := \frac{\pi}{32} \frac{OD_e^{\,4} - ID_e^{\,4}}{OD_e}$ $SM = 1250\,in^3$

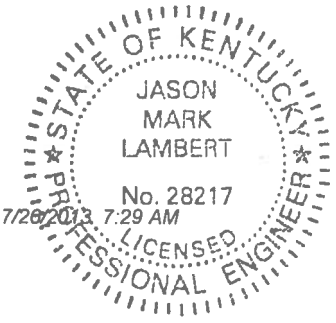
Reinforcement Stress: $f_t := \frac{M + S \cdot (D + E - T)}{SM} - \frac{C}{A_{tc}}$ $f_t = 50.682$ ksi

Resistance Factor for Tension: $\phi_t := 0.9$

Allowable Stress: $F_t := \phi_t \cdot F_y$ $F_t = 54$ ksi

Check: $Check_{pier} := if\left(F_t \geq f_t, "OK", "NO\ GOOD"\right)$ $Check_{pier} = "OK"$

$Ratio_{pier} := \frac{f_t}{F_t}$ $Ratio_{pier} = 0.939$



COMPRESSIVE DEVELOPMENT LENGTH

Basic Development Length: $l_{db.cc} := \max\left(8\cdot in, 0.02\cdot d_c\cdot\frac{F_y}{\sqrt{f'_c}\cdot\sqrt{psi}}, 0.0003\cdot d_c\cdot\frac{F_y}{psi}\right)$ $l_{db.cc} = 24.097\,in$ [ACI 12.3.2]

Development Length: $l_{d.cc} := \max\left(8\cdot in, l_{db.cc}\cdot if\left(s_t = 4 \wedge sp_t \le 4\cdot in, 0.75, 1\right)\right)$ $l_{d.cc} = 24.097\,in$ [ACI 12.3.3.2]

$l_{d.cc} := \max\left(8\cdot in, l_{d.cc}\cdot if\left(red = 1, Ratio_{pier}, 1\right)\right)$ $l_{d.cc} = 24.097\,in$ [ACI 12.3.3.1]

Development Length Available: $l_{a.cc1} := D + E - T - cc$ $l_{a.cc1} = 57\,in$

$l_{a.cc2} := T - cc$ $l_{a.cc2} = 27\,in$

Check: $Check_{dev.cc1} := if\left(l_{a.cc1} \ge l_{d.cc}, "OK", "NO\ GOOD"\right)$ $Check_{dev.cc1} = "OK"$

$Ratio_{dev.cc1} := \frac{l_{d.cc}}{l_{a.cc1}}$ $Ratio_{dev.cc1} = 0.423$

Check: $Check_{dev.cc2} := if\left(l_{a.cc2} \ge l_{d.cc}, "OK", "NO\ GOOD"\right)$ $Check_{dev.cc2} = "OK"$

$Ratio_{dev.cc2} := \frac{l_{d.cc}}{l_{a.cc2}}$ $Ratio_{dev.cc2} = 0.892$

TENSILE DEVELOPMENT LENGTH

Reinforcement Location Factor: $\alpha := 1.0$ [ACI 12.2.4]

Coating Factor: $\beta := 1.0$ [ACI 12.2.4]

Lightweight Aggregate Concrete Factor: $\lambda := 1.0$ [ACI 12.2.4]

Reinforcement Size Factor: $\gamma_c := if\left(s_c \le 6, 0.8, 1.0\right)$ $\gamma_c = 1$ [ACI 12.2.4]

Transverse Reinforcement Index: $K_{tr} := 0\cdot in$ [ACI 12.2.4]

Maximum Spacing or Cover Dimension: $c_c := \min\left(cc + d_t + \frac{d_c}{2}, \frac{sp_{c.ctr}}{2}\right)$ $c_c = 3.062\,in$ [ACI 12.2.4]

Development Length: $l_{d.ct} := \max\left(12\cdot in, d_c\cdot\frac{3}{40}\cdot\frac{F_y}{\sqrt{f'_c}\cdot\sqrt{psi}}\cdot\frac{\alpha\cdot\beta\cdot\gamma_c\cdot\lambda}{\min\left(2.5, \frac{c_c + K_{tr}}{d_c}\right)}\right)$ $l_{d.ct} = 37.474\,in$ [ACI 12.2.3, Eqn. 12-1]

$l_{d.ct} := \max\left(12\cdot in, l_{d.ct}\cdot if\left(red = 1, Ratio_{pier}, 1\right)\right)$ $l_{d.ct} = 37.474\,in$ [ACI 12.2.5]

Development Length Available: $l_{a.ct1} := D + E - T - 2cc$ $l_{a.ct1} = 54\,in$

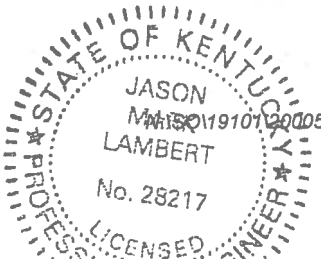
$l_{a.ct2} := T - cc - 2\cdot d_p$ $l_{a.ct2} = 24.744\,in$

Check: $Check_{dev.ct1} := if\left(l_{a.ct1} \ge l_{d.ct}, "OK", "NO\ GOOD"\right)$ $Check_{dev.ct1} = "OK"$

$Ratio_{dev.ct1} := \frac{l_{d.ct}}{l_{a.ct1}}$ $Ratio_{dev.ct1} = 0.694$

Check: $Check_{dev.ct2} := if\left(l_{a.ct2} \ge l_{d.ct}, "OK\ without\ Hook", "HOOK\ REQUIRED"\right)$ $Check_{dev.ct2} = "HOOK\ REQUIRED"$

$Ratio_{dev.ct2} := \frac{l_{d.ct}}{l_{a.ct2}}$ $Ratio_{dev.ct2} = 1.514$



ANCHOR EMBEDMENT

Anchor Bolt Diameter: $d_{ab} := 2.25 \cdot in$

Anchor Bolt Length: $L_{ab} := 72 \cdot in$

Anchor Bolt PN: AnchorPN = 108742

Number of Bolts: BOLTQTY := 18

Anchor Bolt Exposed: $E_{ab} := 12 \cdot in + 2 \cdot in$

Embedment Part No: TempPN := 208447

Embedment Plate Diameter: $OD_{pl} = 69\,in$

Embedment Plate Thickness (max): $t_{pl} := 0.375 \cdot in$

Pier Rebar Engaged by Anchor Bolts: $l_{a.b} := L_{ab} - E_{ab} - cc - d_{ab} - t_{pl} - \frac{1}{2}in - \left(\frac{D_p}{2} - \frac{BC + d_{ab}}{2} - cc\right)$

$l_{a.b} = 40\,in$

Check: $Check_{anc} := if\left(l_{a.b} \geq l_{d.ct}, "OK", "NO\ GOOD"\right)$ $Check_{anc} = "OK"$

$Ratio_{anc} := \frac{l_{d.ct}}{l_{a.b}}$ $Ratio_{anc} = 0.937$

Space Left between Embedment Plate and Rebar: $sp_{pl} := \frac{D_p - 2 \cdot cc - 2 \cdot d_t - 2 \cdot d_c - OD_{pl}}{2}$ $sp_{pl} = 8.73\,in$

Space Required for Ease of Installation: $sp_{pl.req} := 1 \cdot in$

Check: $Check_{pl} := if\left(sp_{pl} \geq sp_{pl.req}, "OK", "NO\ GOOD"\right)$ $Check_{pl} = "OK"$

ANCHOR BOLT/EMBEDMENT PLATE PULLOUT CHECK

Concrete Compressive Strength: $f'_c = 4000\,psi$

Modulus of Elasticity: $E_a := 29000ksi$

Material: ASTM A615, #18J Rebar

Yield Stress: $F_{y.a} := if\left(d_{ab} < 2.25 \cdot in, 105 \cdot ksi, 75 \cdot ksi\right)$ $F_{y.a} = 75\,ksi$

Specified Minimum Tensile Strength of Bolt: $F_{ub} := if\left(d_{ab} < 2.25 \cdot in, 125ksi, 100 \cdot ksi\right)$ $F_{ub} = 100\,ksi$

Bolt Length: $L_{bolt} := if\left(d_{ab} = 0.75 \cdot in, 48 \cdot in, if\left(d_{ab} = 1 \cdot in, 60 \cdot in, if\left(d_{ab} = 1.25 \cdot in, 72 \cdot in, if\left(d_{ab} = 2.25 \cdot in, 72 \cdot in, 0\right)\right)\right)\right)$

$L_{bolt} = 72\,in$

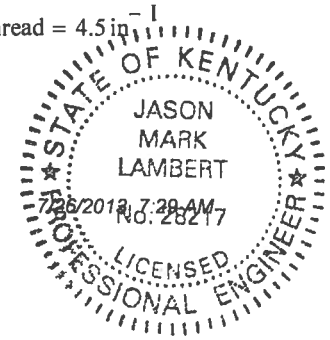
Threads Per Inch:

$Thread := if\left(d_{ab} = 0.75 \cdot in, 10 \cdot in^{-1}, if\left(d_{ab} = 1 \cdot in, 8 \cdot in^{-1}, if\left(d_{ab} = 1.25 \cdot in, 7 \cdot in^{-1}, if\left(d_{ab} = 2.25 \cdot in, 4.5 \cdot in^{-1}, 0\right)\right)\right)\right)$

$Thread = 4.5\,in^{-1}$

Embedment Plate OD: $E_{OD} := OD_{pl}$ $E_{OD} = 69\,in$

Embedment Plate ID: $E_{ID} := BC - 5in$ $E_{ID} = 59\,in$ $AnchorID := E_{ID}$



Tower Axial Load (kips): $Tower_{axial} := C$ $Tower_{axial} = 66.258\,kips$

Tower Moment (kip-ft): $Tower_{moment} := M$ $Tower_{moment} = 5.216 \times 10^{3}\,kip \cdot ft$

Pole OD (in): $Pole_{OD} := OD_{pole}$

Pole Wall Thickness (in): $Pole_{thickness} := t_w$

Pier Diameter: $Pier_{dia} := D_p$

CALCULATE MAXIMUM FORCES IN ANCHOR BOLTS

$P_{u.a} :=$

Total Axial Force (kip):	N/A
Max Single Bolt Force (kip):	223.6544
Tower Axial Load (kip):	66.258
Tower Moment (kip-ft):	5215.506
Bolt Quantity:	18
Pole OD (in):	4.75
Pole Wall Thickness (in):	0.036458

$(Tower_{axial}\ \ Tower_{moment}\ \ BOLTQTY\ \ Pole_{OD}\ \ Pole_{thickness})$

$P_{u.a} := P_{u.a} \cdot kips$ ------- Applies units to output from excel

Nominal Unthreaded Area of Bolt: $A_b := \pi \cdot \frac{d_{ab}^{2}}{4}$ $A_b = 3.976\,in^2$

Net Area of Threaded Bolt: $A_n := \frac{\pi}{4} \cdot \left(d_{ab} - \frac{0.9743}{Thread}\right)^2$

Root Diameter of Bolt: $dia_{root} := \left(d_{ab} - \frac{0.9743}{Thread}\right)$ $dia_{root} = 2.033\,in$

Total Shear Force:

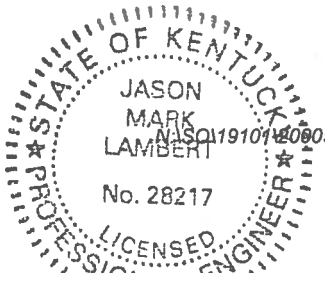
Shear Force Applied Per Bolt: $V_u := \frac{S}{BOLTQTY}$ $V_u = 2.075\,kips$

Max Axial Force Applied Per Bolt: $P_{u.a} = 223.654\,kips$

Length from Top of Pier to Bottom of Leveling Nut: $l_{ar} := 1.0 \cdot in$

Applied Moment Due to Shear (worst case lever arm): $M_{u.a} := 0.65 \cdot l_{ar} \cdot V_u$ $M_{u.a} = 0.112\,kip \cdot ft$

Plastic Section Modulus: $Z_a := \frac{dia_{root}^{3}}{6}$ $Z_a = 1.401\,in^3$



For solid round members, the effective yield stress shall be equal to the yield stress (ANSI/TIA-222-G 4.5.4.1)

$F_{y.e} := F_{y.a}$ $F_{y.e} = 75\,ksi$

Anchor Rod Detail Factor: $neta := 0.5$

FLEXURE - ANSI/TIA-222-G 4.7.1

Nominal Flexural Strength of Anchor Rod: $M_{n.a} := F_{y.e} \cdot Z_a$ $M_{n.a} = 8.759\,kip \cdot ft$

Resistance Factor for Flexure: $\phi_{f.a} := 0.9$

Design Flexural Strength of Anchor Rod: $R_{nm} := \phi_{f.a} \cdot M_{n.a}$ $R_{nm} = 7.883\,kip \cdot ft$

SHEAR - ANSI/TIA-222-G 4.9.6.3

Nominal Shear Strength of Anchor Rod: $V_n := 0.45 \cdot F_{ub} \cdot A_b$ $V_n = 178.924\,kips$

Resistance Factor for Shear: $\phi_{v.a} := 0.75$

Design Shear Strength of Anchor Rod: $R_{nv} := \phi_{v.a} \cdot V_n$ $R_{nv} = 134.193\,kips$

TENSION - ANSI/TIA-222-G 4.9.6.1

Nominal Tension Strength of Anchor Rod: $P_{n.a} := F_{ub} \cdot A_n$ $P_{n.a} = 324.768\,kips$

Resistance Factor for Tension (ANSI/TIA-222-G 4.9.9): $\phi_{t.a} := 0.75$

Design Tension Strength of Anchor Rod: $R_{nt} := \phi_{t.a} \cdot P_{n.a}$ $R_{nt} = 243.576\,kips$

CONCRETE PULLOUT STRENGTH - ACI 318-05

Side Length of Hex Head:

$$t := \begin{cases} 0.69975 & \text{if } d_{ab} = 0.75 \cdot in \\ 0.909 & \text{if } d_{ab} = 1 \cdot in \\ 1.1189 & \text{if } d_{ab} = 1.25 \cdot in \\ 1.9514 & \text{if } d_{ab} = 2.25 \cdot in \end{cases}$$

Gross Area of Hex Head: $A_{gross.hex} := \frac{3}{2} \cdot \sqrt{3} \cdot t^2$ $A_{gross.hex} = 9.893\,in^2$

Net Pullout Area of Bolt Head: $A_{net} := A_{gross.hex} - A_b$ $A_{net} = 5.917\,in^2$

Net Pullout Strength of Hex Head: $N_{po} := 8 \cdot A_{net} \cdot f'_c$ $N_{po} = 189.354\,kips$ [ACI D.5.3.4]

TENSILE DEVELOPMENT LENGTH

Anchor Spacing: $sp_{c.ctr} := \frac{\pi \cdot (BC)}{BOLTQTY}$ $sp_{c.ctr} = 11.17\,in$

Clear Cover: $cc := 3 \cdot in$

Anchor Location Factor: $\alpha := 1.0$ [ACI 12.2.4]

Coating Factor: $\beta := 1.0$ [ACI 12.2.4]

Lightweight Aggregate Concrete Factor: $\lambda := 1.0$ [ACI 12.2.4]

Reinforcement Size Factor: $\gamma_{tw} := 1$ $\gamma_c = 1$ [ACI 12.2.4]

Transverse Reinforcement Index: $K_{tw} := 0 \cdot in$ [ACI 12.2.4]

Maximum Spacing or Cover Dimension: $c_c := \min\left(\text{Pier}_{dia} - BC, \frac{sp_{c.ctr}}{2}\right)$ $c_c = 5.585\,in$ [ACI 12.2.4]

Development Length of Anchor Rod:

$$l_{d.ct} := \max\left(12\cdot in, d_{ab}\cdot\frac{3}{40}\cdot\frac{F_{y.a}}{\sqrt{f'_c}\cdot\sqrt{psi}}\cdot\frac{\alpha\cdot\beta\cdot\gamma_c\cdot\lambda}{\min\left(2.5, \frac{c_c + K_{tr}}{d_{ab}}\right)}\right)$$ $l_{d.ct} = 80.618\,in$ [ACI 12.2.3, Eqn. 12-1]

Anchor Bolt Length Exposed: $Exp := 12\cdot in$

Anchor Bolt Exposure Tolerance: $Tol := 2\cdot in$

$Anchor_{embeded} := L_{bolt} - Exp + Tol$ $Anchor_{embeded} = 62\,in$

Percentage of Force Resisted Due to Development: $Percent_{dev} := \frac{Anchor_{embeded}}{l_{d.ct}}$ $Percent_{dev} = 76.906\,\%$

Load Hex Head Needs to Resist: $P_{hex} := P_{u.a} - Percent_{dev}\cdot P_{u.a}$ $P_{hex} = 51.65\,kips$

Check Pullout:

$Check_{pullout} := if\left(N_{po} \geq P_{hex}, \text{"OK"}, \text{"EMBEDMENT PLATE NECESSARY"}\right)$

$Check_{pullout} = \text{"OK"}$

CAPACITY - ANSI/TIA-222-G 4.9.9

Anchor Bolt Capacity: $AB_{cap} := if\left[d_{ab} \leq 0.75\cdot in, \left(\frac{V_u}{R_{nv}}\right)^2 + \left(\frac{P_{u.a}}{R_{nt}} + \frac{M_{u.a}}{R_{nm}}\right)^2, \left(\frac{P_{u.a} + \frac{V_u}{neta}}{R_{nt}}\right)\right]$ $AB_{cap} = 0.935$

Check Anchor Capacity: $Check_{cap} := if\left(AB_{cap} < 1, \text{"OK"}, \text{"NO GOOD"}\right)$ $Check_{cap} = \text{"OK"}$

HOOK DEVELOPMENT LENGTH

Basic Development Length: $l_{hb} := \frac{1200\cdot d_c\cdot\sqrt{psi}}{\sqrt{f'_c}}$ $l_{hb} = 24.097\,in$ [ACI 12.5.2]

Yield Strength Factor: $\psi_y := \frac{F_y}{60\cdot ksi}$ $\psi_y = 1.00$ [ACI 12.5.3.1]

Concrete Cover Factor: $\psi_{cc} := if\left[\left(s_c \leq 11\right) \wedge \left(cc \geq 2.5\cdot in\right), 0.7, 1.0\right]$ $\psi_{cc} = 0.70$ [ACI 12.5.3.2]

Development Length: $l_{dh} := \max\left(6\cdot in, 8\cdot d_c, \psi_y\cdot\psi_{cc}\cdot l_{hb}\right)$ $l_{dh} = 16.868\,in$ [ACI 12.5.1]

$l_{dh} := \max\left(6\cdot in, 8\cdot d_c, l_{dh}\cdot if\left(red = 1, Ratio_{pier}, 1\right)\right)$ $l_{dh} = 16.868\,in$ [ACI 12.5.3.4]

Development Length Available: $l_{a.ct2} := T - cc$ $l_{a.ct2} = 27\,in$

Check: $Check_{dev.ch} := if\left(l_{a.ct2} \geq l_{dh}, \text{"OK"}, \text{"NO GOOD"}\right)$ $Check_{dev.ch} = \text{"OK"}$

$$Ratio_{dev.ch} := \frac{l_{dh}}{l_{a.ct2}}$$

$Ratio_{dev.ch} = 0.625$

7/26/2013 7:29 AM

SPACE FOR HOOK

Space Available for Hook: $sp_{a.ch} := l_{ap} - \left(\frac{D_p}{2} - cc\right) + d_t$ $sp_{a.ch} = 99.5\,in$

Space Required for Hook: $sp_{r.ch} := hook_c + bend_c$ $sp_{r.ch} = 20.32\,in$

Check: $Check_{sp.ch} := if(sp_{a.ch} \geq sp_{r.ch}, "OK", "NO GOOD")$ $Check_{sp.ch} = "OK"$

$Ratio_{sp.ch} := \frac{sp_{r.ch}}{sp_{a.ch}}$ $Ratio_{sp.ch} = 0.204$

CHECK ANCHOR STEEL IN PAD

$Anchor_{embeded} := L_{ab} - E_{ab}$ $Anchor_{embeded} = 58\,in$

$Pier_{Allowable} := D - T + E$ $Pier_{Allowable} = 60\,in$

$Check_{anchor.embeded} := if(Anchor_{embeded} > Pier_{Allowable}, "NO GOOD", "OK")$

$Check_{anchor.embeded} = "OK"$

DESIGN SUMMARY

FOUNDATION DIMENSIONS

Pole Diameter: $Pole_{OD} = 4.75\,ft$

Pier Extension: $E = 0.5\,ft$

Depth: $D = 7\,ft$

Pad Width: $W = 24.5\,ft$

Pad Thickness: $T = 2.5\,ft$

Pier Diameter: $D_p = 8\,ft$

Clear Cover: $cc = 3\,in$

Volume: $V_{conc} = 64.9\,yd^3$

PAD REINFORCEMENT

Quantity: $n_p = 25$ per layer per direction

$n_{tp} = 100$ total

Size: $s_p = 9$

Length: $L_p = 24\,ft$ $L_p = 288\,in$

Weight: $Wt_p = 81.6\,lb$ per bar

$Wt_{tp} = 8160\,lb$ total

PIER REINFORCEMENT

Quantity: $n_c = 45$ total

Size: $s_c = 10$

Length: $L_c = 8.324\,ft$ $L_c = 99.884\,in$

Weight: $Wt_c = 35.8\,lb$ per bar

$Wt_{tc} = 1612\,lb$ total

Hook Length: $hook_c = 15.24\,in$

Bend Radius: $bend_c = 5.08\,in$

TIE REINFORCEMENT

Quantity: $n_t = 7$ total

Size: $s_t = 4$

Length: $L_t = 25.264\,ft$ $L_t = 303.173\,in$

Weight: $Wt_t = 16.9\,lb$ per tie

$Wt_{tt} = 118.1\,lb$ total

Hook Bend Radius: $bend_t = 1.5\,in$

Hook Extension: $ext_t = 3\,in$

Overlap Length: $L_{o.t} = 22\,in$

MATERIAL SPECIFICATIONS

Concrete Strength: $f'_c = 4000\,psi$

Concrete Weight: $\gamma_{conc} = 150\,pcf$

Rebar Yield Strength $F_y = 60\,ksi$

ANCHORING DETAILS

AnchorPN = 108742

AnchorQty = 18

AnchorLength = 72 in

TempPN = 208447

AnchorOD = 69 in

AnchorBC = 64 in

AnchorID = 59 in

CHECKS

$Check_{lateral}$ = "OK"

$Check_{over}$ = "OK"

$Check_{bear}$ = "OK"

$Check_{shear.1}$ = "OK"

$Check_{shear.2}$ = "OK"

$Check_{sp.p.ctr}$ = "OK"

$Check_{min.sp.p.ctr}$ = "OK"

$Check_{yield}$ = "OK"

$Check_{flex}$ = "OK"

$Check_{min.p}$ = "OK"

$Check_{dev.p}$ = "OK"

$Check_{tie}$ = "OK"

$Check_{min.c}$ = "OK"

$Check_{tie.size}$ = "OK"

$Check_{bar.qty}$ = "OK"

$Check_{pier.min}$ = "OK"

$Check_{pier.const.min}$ = "OK"

$Check_{comp}$ = "OK"

$Check_{pier}$ = "OK"

$Check_{dev.cc1}$ = "OK"

$Check_{dev.cc2}$ = "OK"

$Check_{dev.ct1}$ = "OK"

$Check_{dev.ct2}$ = "HOOK REQUIRED"

$Check_{anc}$ = "OK"

$Check_{pl}$ = "OK"

$Check_{pullout}$ = "OK"

$Check_{cap}$ = "OK"

$Check_{dev.ch}$ = "OK"

$Check_{sp.ch}$ = "OK"

$Check_{anchor.embeded}$ = "OK"

$Check_{conc}$ = "OK"

BACKFILL COMPACTION NOTE:

Loose Lift Thickness: LIFT := 8·in

Percent Compaction: pct := 95%

ASTM Standard: ASTM := "D698"

Optimum Moisture Content Tolerance: OMC := 2%

omc := –2%

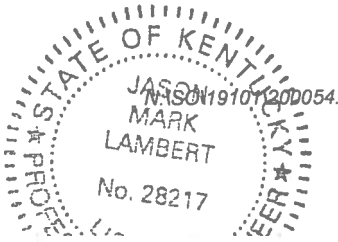
ADDITIONAL FOUNDATION NOTES:

- Difficult excavation will be encountered due to very dense silty sand/partially weathered bedrock found approximately 5 feet below ground surface upon drilling of test boring. The contractor should be prepared to remove such material and determine the appropriate excavation equipment necessary.
- Earthwork operations and foundation installation methods shall be in accordance with the geotechnical report.

STATE OF KENTUCKY
JASON MARK LAMBERT
No. 28217
LICENSED PROFESSIONAL ENGINEER

PPPolePierExtension	6
PPPoleDepth	84
PPPolePadWidth	294
PPPolePadThickness	30
PPPolePierDiameter	96
PPPoleConcVolume	64.93523
PPPolePadRebarQtyPer	25
PPPolePadRebarSize	9
PPPolePadRebarLength	288
PPPolePierRebarQty	45
PPPolePierRebarSize	10
PPPolePierRebarLength	99.88365
PPPolePierHookLength	15.24
PPPolePierBendRadius	5.08
PPPoleTieQty	7
PPPoleTieSize	4
PPPoleTieLength	303.1725
PPPoleTieBendRadius	1.5
PPPoleTieHookExtension	3
PPPoleTieOverlap	22
PPPoleConcreteStrength	4000
PPPClearCover	3
PPPShear	37.353
PPPMoment	5215.506
PPPWeight	66.258
PPPTemplatePN	208447
PPPTemplateThickness	0.375
PPPAnchorQty	18
PPPAnchorDiameter	2.25
PPPAnchorLength	72
PPPEmbedOD	69
PPPAnchorBC	64
PPPAnchorID	59
PPPAnchorPN	108742
FlatWasherODx75e1p469x1	6.75
FlatWasherThicknessx75ep	0.134
NutFlatToFlatx75e1p25x1e1	1.625
NutThicknessx75ep7344x1e	0.9844
NutFilletRadiusx75ep0625x	0.125
LockWasherODx75e1p271x	1.661
LockWasherThicknessx75e	0.25
AllowableBearingPressure	5000

$$\left(12{\cdot}E \;\; 12{\cdot}D \;\; 12{\cdot}W \;\; 12{\cdot}T \;\; 12D_p \;\; \frac{V_{conc}}{26.98} \;\; n_p \;\; s_p \;\; 12L_p \;\; n_c \;\; s_c \;\; 12{\cdot}L_c \;\; 12hook_c \;\; 12bend_c \;\; n_t \;\; s_t \;\; 12{\cdot}L_t \;\; 12bend_t \;\; 12ext_t \right.$$




STATE OF KENTUCKY
JASON
MARK
LAMBERT
LICENSED
PROFESSIONAL ENGINEER

WESTOWER COMMUNICATIONS

August 5, 2013

RE: FA 10146913 / Evarts

Dear Commissioners:

The Project / Construction Manager for the proposed new communications facility will be Tommy Bailey. His contact information is (606) 316-6620 or tbailey@westower.com.

Tommy has been in the industry doing civil construction and constructing towers since 1983. He started in the industry with Andrew Corporation building MCI microwave sites across the US. He's worked for Southwest Bell, Cell One and AT&T. He has erected approximately fifty (50) cellular communications facilities and built over 1,000 civil sites for various carriers, nationwide.

He was also co-owner of EWS in Bastrop, TX for four (4) years installing radio equipment for T-Mobile and AT&T.

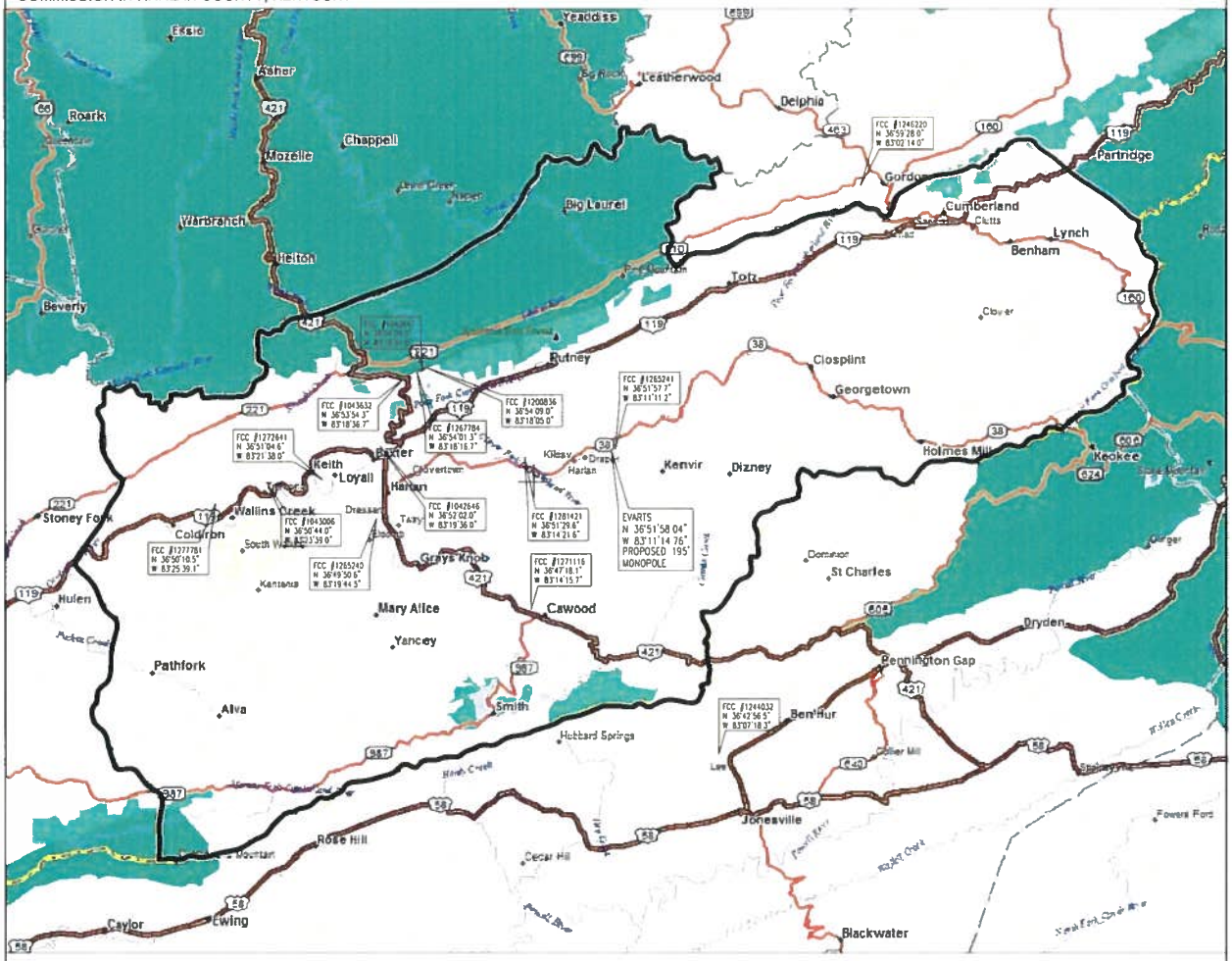
Thank you,

Paul Matuszak
Market Director, KY

EXHIBIT D
COMPETING UTILITIES, CORPORATIONS, OR PERSONS LIST AND MAP OF LIKE FACILITIES IN VICINITY

HARLAN COUNTY, KENTUCKY
AT&T SITE NAME: EVARTS
TOWER LOCATION EXHIBIT

TOWERS DEPICTED ARE ALL KNOWN "CONSTRUCTED" TOWER SITES REGISTERED WITH THE FEDERAL COMMUNICATIONS COMMISSION IN HARLAN COUNTY, KENTUCKY

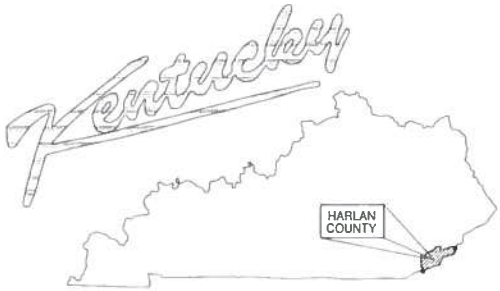


7.5 MINUTE U.S.G.S. QUADRANGLE MAP (NOT TO SCALE)

JULY 29, 2013
FSTAN JOB#: 13-8686

FCC PUBLISHED DATA SHOWN BELOW

Registration #	Status	File #	Owner Name
1042646	Constructed	A0050256	PARSONS, DONALD DBA = EASTERN BROADCASTING COMPANY INC
1042647	Constructed	A0050257	PARSONS, DONALD DBA = EASTERN BROADCASTING COMPANY INC
1043006	Constructed	A0050666	RADIO HARLAN INC WHLN
1043632	Constructed	A0588186	LITCHFIELD COUNTY CELLULAR, INC. DBA = RAMCELL OF KENTUCKY
1200836	Constructed	A0731374	Mega Communications, Inc.
1265240	Constructed	A0656464	East Kentucky Network, LLC d/b/a Appalachian Wireless
1265241	Constructed	A0656465	East Kentucky Network, LLC d/b/a Appalachian Wireless
1267784	Constructed	A0656469	East Kentucky Network, LLC d/b/a Appalachian Wireless
1271116	Constructed	A0706303	East Kentucky Network, LLC d/b/a Appalachian Wireless
1272641	Constructed	A0780791	SBA Towers IV, LLC 36-51-04.6N 83-21-38.0W
1277781	Constructed	A0715273	East Kentucky Network, LLC d/b/a Appalachian Wireless
1281421	Constructed	A0742175	East Kentucky Network, LLC d/b/a Appalachian Wireless
1246220	Constructed	A0656429	East Kentucky Network, LLC d/b/a Appalachian Wireless
1244032	Constructed	A0803719	NEW CINGULAR WIRELESS PCS, LLC



FS land
F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers
P.O. Box 17541 2313/2315 Warnock Drive Louisville, KY 40217
Phone (502) 635-1866 (502) 636-5111 Fax (502) 636-5201

License Search

Search Results

Specified Search

State = **Kentucky**
County = **HARLAN**
Radio Service = **CL, CW**

Matches **1**- **11** (of **11**)

[PA]= Pending Application(s)
[TP]= Termination Pending
[L]= Lease

	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date
1	KNKN673	NEW CINGULAR WIRELESS PCS, LLC	0003291192	CL	Active	10/01/2021
2	KNKN787	Cellco Partnership	0003290673	CL	Active	10/01/2021
3	KNLF287	New Cingular Wireless PCS, LLC	0003291192	CW	Active	06/23/2015
4	KNLF288	NEW CINGULAR WIRELESS PCS, LLC	0003291192	CW	Active	06/23/2015
5	KNLF468	GLH Communications, Inc.	0005080080	CW	Canceled	09/17/2006
6	KNLH574	SPRINTCOM, INC.	0002315950	CW	Active	04/28/2017
7	KNLH575	SPRINTCOM, INC.	0002315950	CW	Active	04/28/2017
8 [PA]	KNLH637	Bellevue Wireless, LLC	0018360941	CW	Active	04/28/2017
9	WPTB354	Cellco Partnership	0003290673	CW	Active	08/22/2021
10	WQCX688	Cook Inlet/VS GSM VII PCS, LLC	0012214029	CW	Active	06/20/2015
11	WQEF975	East Kentucky Network, LLC d/b/a Appalachian Wireless	0001786607	CW	Active	06/23/2015
	Call Sign/Lease ID	Name	FRN	Radio Service	Status	Expiration Date

EXHIBIT E
CO-LOCATION REPORT

WESTOWER COMMUNICATIONS

August 1, 2013

Kentucky Public Service Commission
211 Sower Blvd.
P.O. Box 615
Frankfort, KY 40602-0615

RE: Alternate Site Analysis Report
Application for Certificate of Public Convenience and Necessity
Applicant: AT&T Mobility
Site Location: Harlan County, Kentucky
Coordinates: 36°51'58.04" North latitude, 83°11'14.76" West longitude
Site Name: Evarts

Dear Commissioners:

This report is provided to explain the site development process used by the Applicant to identify the site selected for the new wireless communications facility proposed in the accompanying application for Certificate of Public Convenience and Necessity ("CPCN").

AT&T Mobility Site Development Process

Step 1: Problem Identification. AT&T Mobility radio frequency engineers first identified a growing coverage and capacity gap in the Evarts area of Harlan County.

Step 2: Search Ring. To help guide the site development team's task of identifying a suitable location for a new wireless communications facility site, AT&T Mobility's radio frequency engineers identified the geographic area where the antenna site must be located in order to close these gaps and issued a map (called a Search Ring) that identified the general area in which a new site must be located. In this instance, the search area was limited because the topography of the surrounding terrain interrupted the signal.

Step 3: Review of the Area. The site development team first reviewed the area within the Search Ring for a suitable tall structure for co-location. An existing tower owned by Appalachian Wireless was located, but Applicant's request for co-location was denied. There are no other tall structures within the search area.

Once the site development team determined that there are no available existing tall structures which are technically feasible and suitable for co-location, the team next reviewed the search area to identify a suitable location where a new tower might be located that would have the least-intrusive impact on surrounding properties.

In this instance, any new tower site must be located on the proposed mountain top to achieve coverage objectives.

Step 4: Preliminary Inspection and Assessment of Suitable Parcels. Once suitable parcels were identified, the site development team visited the parcels and performed a preliminary inspection. The purpose of the preliminary inspection was: (1) to confirm the availability of sufficient land space for the proposed facility; (2) to identify a specific location for the facility on the parcel; (3) to identify any recognized environmental conditions that would disqualify the parcel from consideration; (4) to identify any construction issues that would disqualify the candidate; and, (5) to assess the potential impact of the facility on neighboring properties.

Step 5: Candidate Evaluation and Selection. After the preliminary site assessments were performed, the site development team ranked the candidates based on the availability of ground space, topography, applicable environmental conditions, construction feasibility and the potential impact of the facility on neighboring properties.

In this instance, locating a site with access to a mountain top that would satisfy coverage objectives was the primary consideration. Three suitable candidates were evaluated, but two were disqualified because of inadequate access. The parcel presented in this application for the Commission's consideration and approval is the only technically and environmentally feasible site with adequate access that meets all development requirements for a wireless communications facility. It is also the parcel where a tower of the proposed height will present the least visual impact, while still providing a reliable wireless connection to the national telephone network.

Step 6: Leasing and Due Diligence. Once a suitable candidate was selected, lease negotiations were commenced and site due diligence steps were performed, as described below.

Leasehold Due Diligence:

- A Title Report was obtained and reviewed to ensure that there are no limitations on the landowner's capacity to lease and to address any title issues.
- A site survey was obtained to identify the location of parcel features, boundaries, easements and other encumbrances revealed by the title search.

Engineering Due Diligence:

- Utility access identified.
- Grounding plan designed.
- Geotechnical soil analysis performed to determine foundation requirements.
- Foundations designed to meet the Kentucky Building Code lateral and subjacent support requirements.
- Site plan developed.

Environmental Due Diligence:

A Phase I Environmental Site Assessment ("ESA") investigation was performed to establish the pre-existing types and amounts of contamination at a site, and to establish that the leaseholder is innocent of liability for the costs of performing environmental cleanup work that might arise from pollution or contamination of the site caused by a third party.

In addition to performing a Phase 1 ESA, the site was also evaluated for potential impacts under the *National Environmental Policy Act* (NEPA), submitted to the State Historic Preservation Office for review of potential impacts to historic structures or districts, and submitted to each registered Tribal Historic Preservation Office so that registered Native American nations had the opportunity to review potential impacts on native religious, ceremonial, or cultural resources.

Federal Regulatory Approvals

- Federal Aviation Administration ("FAA") compliance.
- Federal Communication Commission ("FCC") compliance.

Step 7: Application. Once a lease is obtained and all site due diligence is completed, AT&T Mobility prepared and filed the accompanying application requesting a CPCN.

Conclusion

Applicant's site identification and selection process aims to identify the least intrusive of all the technically feasible parcels in a service need area. In this case, there was only one technically feasible parcel in the area that was available for lease. It is, by far, the largest parcel in the area. It is surrounded by mature vegetation that provides a visual barrier to area land uses. To further minimize the proposed tower's visibility, the tower will have a neutral gray finish, and consistent with FAA guidelines, it will not be lighted at night.

Sincerely,

Stephani Leadingham
Site Acquisition Project Manager, NSB - KY
WesTower Communications
10400 Linn Station Road, Suite 225
Louisville, KY 40223
c:407.221.1104
e:sleadingham@westower.com

EXHIBIT F
FAA

FAA

The requirements for filing with the Federal Aviation Administration for proposed structures vary based on a number of factors including height, proximity to an airport, etc. Generally, a tower less than 200' does not require FAA review. The FAA website includes a Notice Criteria Tool to evaluate whether a new tower requires notice under CFR Title 14 Part 77.9. As per the attached exhibit, the proposed 185' monopole does not exceed notice criteria and therefore was not reviewed by the FAA.

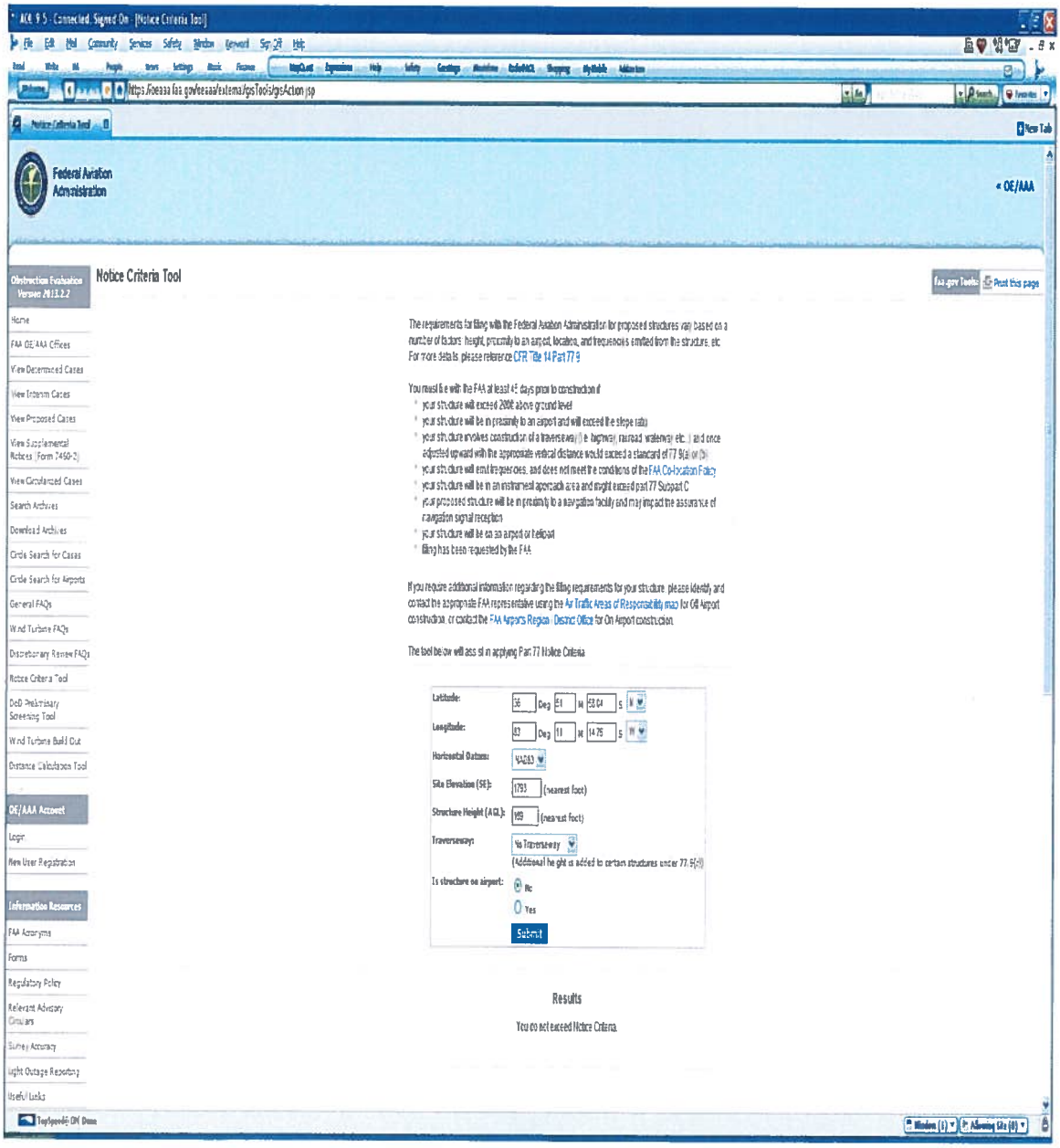


EXHIBIT G
KENTUCKY AIRPORT ZONING COMMISSION

Subj: **RE: Evarts - KAZC Review**
Date: 8/2/2013 2:58:29 P.M. Eastern Daylight Time
From: John.Houlihan@ky.gov
To: RGrantPLG@aol.com

The above subject does not require a permit from the Kentucky Airport Zoning Commission. The antenna does not exceed any of the following criteria:

602 KAR 50:030. Jurisdiction of the Kentucky Airport Zoning Commission.

RELATES TO: KRS 183.861, 183.865, 183.867, 183.870
STATUTORY AUTHORITY: KRS 183.861
NECESSITY, FUNCTION, AND CONFORMITY: KRS 183.867 specifies that the commission has jurisdiction over zoning for all public use and military airports. This administrative regulation defines the areas over which the Kentucky Airport Zoning Commission has jurisdiction for the purpose of zoning in accordance with KRS Chapter 183 and specifics when the owner or person who has control over a structure which encroaches on the jurisdiction of the Kentucky Airport Zoning Commission shall apply for a permit.

Section 1. The commission has zoning jurisdiction over that airspace over and around the public use and military airports within the Commonwealth which lies above the imaginary surface that extends outward and upward at one (1) of the following slopes:
(1) 100 to one (1) for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each public use and military airport with at least one (1) runway 3,200 feet or more in length; or
(2) Fifty (50) to one (1) for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each public use and military airport with its longest runway less than 3,200 feet in actual length.

Section 2. The commission has zoning jurisdiction over the use of land and structures within public use airports within the state.

Section 3. The commission has jurisdiction from the ground upward within the limits of the primary and approach surfaces of each public use and military airport as depicted on Airport Zoning Maps approved by the Kentucky Airport Zoning Commission.

Section 4. The commission has jurisdiction over the airspace of the Commonwealth that exceeds 200 feet in height above ground level.

Section 5. The owner or person who has control over a structure which penetrates or will penetrate the airspace over which the commission has jurisdiction shall apply for a permit from the commission in accordance with 602 KAR 50:090. (KAV-9-1; 1 Ky.R. 807; eff. 5-14-75; Am. 2 Ky.R. 306; eff. 3-10-76; 5 Ky.R. 599; eff. 3-7-79; 10 Ky.R. 445; eff. 1-4-84; 14 Ky.R. 267; eff. 9-10-87; 19 Ky.R. 800; eff. 11-4-92; 27 Ky.R. 2228; 2774; eff. 4-9-2001.)

Please keep this email for your records. Thank you.

Kentucky Airport Zoning Commission (KAZC)
John Houlihan, Administrator
90 Airport Road, Building 400
Frankfort, KY 40601
Direct Line 502-564-0310, Cell 502-330-3955, Office 502-564-4480, Fax 502-564-7953

KAZC webpage: http://transportation.ky.gov/Aviation/Pages/Zoning-Commission.aspx

From: RGrantPLG@aol.com [mailto:RGrantPLG@aol.com]
Sent: Friday, August 02, 2013 2:54 PM
To: Houlihan, John (KYTC)
Cc: PikeLegal@aol.com; kriggsplg@aol.com; LentzPLG@aol.com
Subject: Evarts - KAZC Review

John Houlihan
Zoning Administrator
Kentucky Airport Zoning Commission
90 Airport Road, Building 400
Frankfort, KY 40601

RE: Evarts - 185' Tower

John,

As a follow-up to our telephone discussion we have attached a copy of the 1-A Certification for a proposed new 185' tower in Harlan County, Kentucky. This documents contain the coordinates and site elevation as per your request. Can you please confirm that this structure will not require KAZC review?

Sincerely,
Robert W. Grant
Pike Legal Group PLLC
1578 Highway 44 East, Suite 6
PO Box 369
Shepherdsville, KY 40165-0369
Telephone: 502-955-4400 or 800-516-4293
Telefax: 502-543-4410 or 800-541-4410
Mobile: 502-836-0729
Email: rgrantplg@aol.com
Web Site: www.pikelegal.com
Pike Legal Group, PLLC - Kentucky, Indiana, Ohio, Tennessee, West Virginia, Georgia, Arkansas & Alaska licensed attorneys - no charge for travel time
Proud supporter of the Alaskan dog-sledding tradition, mushing families, and canine athletes since 2000 - The Pike Legal Group, PLLC is a diverse workplace.

EXHIBIT H
GEOTECHNICAL REPORT

ENVIRONMENTAL CORPORATION OF AMERICA

ENVIRONMENTAL | GEOTECHNICAL | WETLANDS | ECOLOGY | CULTURAL RESOURCES

Geotechnical Investigation

AT&T Site LX6137
(Evarts)

Off Ball Cemetery Road
Evarts, Kentucky
Harlan County

ECA Project No. L-1055b

SUBMITTED TO:

Westower Communications
10400 Linn Station Road, Suite 225
Louisville, KY 40223

PREPARED BY:

Environmental Corporation of America
1375 Union Hill Industrial Court, Suite A
Alpharetta, GA 30004

May 9, 2013

Westower Communications
10400 Linn Station Road, Suite 225
Louisville, KY 40223

Attention: Ms. Stephani Leadingham

Subject: **Report of Geotechnical Investigation**
AT&T Site LX6137 (Evarts)
Off Ball Cemetery Lane
Evarts, Harlan County, Kentucky
ECA Project No. L-1055b

Dear Ms. Leadingham:

Environmental Corporation of America (ECA) is pleased to submit this report of our investigation for the proposed project. Our services were provided as authorized via email dated April 19, 2013.

This report presents a review of the information provided to us, a description of the site and subsurface conditions, and our recommendations. The appendices contain a Boring Location Plan and a Boring Log.

Purpose and Scope of Work

The purpose of this exploration was to obtain specific subsurface data at the site and to provide geotechnical-related design parameters and construction recommendations for the proposed tower.

Our scope of work included the following:

- One soil test boring was drilled to a depth of 11.2 feet below the ground surface (bgs). Figure 1 shows the approximate boring location. Standard penetration tests (SPTs) were conducted to obtain soil samples and SPT (N) values, in accordance with ASTM D1586.

- The depth to groundwater, if any, was measured in the boring after drilling was completed.

- The soil samples were visually classified and a boring log was prepared. The soil conditions were evaluated by a registered professional engineer and this geotechnical report was prepared with our recommendations.

No physical testing of soil samples has been conducted to calculate site specific bearing capacities or settlements. We have recommended design parameters and settlements based on the SPT (N) values, an examination of the soil samples, and our experience with similar soil conditions and structures.

Project Information

We were provided with a survey of the Property by FStan dated August 23, 2010. The Property is located in a wooded area.

We understand that plans call for the construction of a 185-foot monopole on the site. We assume that the equipment building/cabinets will be pre-fabricated structures supported on a turned-down slab foundation.

Site Conditions

The fieldwork was conducted on May 6, 2013. Information obtained from the borings was used to help us evaluate the subsurface conditions and to assist in formulating our recommendations. A path to the boring location had been cleared by others prior to our arrival.

Subsurface Conditions

The subsurface conditions were explored with one soil test boring drilled approximately as shown on Figure 1.

The boring encountered sandy silt and silty sand overlying apparent bedrock at 11.2 ft. The soil classified as ML and SM soil types based on the Unified Soil Classification System (USCS). The N-values ranged from 6 to over 100 blows per foot (bpf). Auger refusal was encountered at 11.2 feet.

Groundwater was not present in the boring at the time of completion. Further, the deepest samples were dry, not indicating a groundwater condition.

Recommendations

Tower Foundations: The subsurface conditions are suitable for support of the tower using a mat foundation. Due to the relatively shallow depth to bedrock, a caisson foundation would not be feasible.

For a mat foundation, the soils are capable of a maximum, net allowable design bearing pressure of 5.0 ksf with the base bearing at or below 5-feet from existing grade. Total and differential settlement should be less than 1-inch and ½-inch, respectively. Soil parameters that may be of use in design are as follows:

Cohesion	500 psf
Angle of internal friction	15°
Unit weight of soil	115 pcf

Groundwater should not be encountered in a mat foundation excavation.

Building Foundations: The proposed equipment cabinet(s) can be supported on a spread footing foundation. A maximum allowable net bearing pressure of 2.0 kips per ft^2 should be used to design the building/cabinet foundation. Total and differential settlements should be less than 1/2-inch and 1/4-inch, respectively.

Foundation Excavations: To avoid softening of the shallow soils exposed at the foundation bearing level, excavations should not be left open for extended periods, prior to placing reinforcing steel and concrete. If rain or freezing weather is expected, excavations should not be completed. Leaving the excavations at least 1 ft above final grade should protect the bearing soils from deterioration.

If the excavation must remain open overnight or if rainfall becomes imminent while the bearing soils are exposed, we recommend that a 2 to 4-inch thick "mud-mat" of "lean" (2000 psi) concrete be placed on the bearing soils before the placement of reinforcing steel. If the bearing soils are softened by surface water intrusion or exposure, the softened soils must be removed from the foundation excavation bottom immediately prior to placement of concrete.

Fill Placement: The amount of fill required for this project depends on the planned final grades, but we expect it to be minimal. Any required fill should be placed in maximum 8-inch thick lifts. The soil moisture content should be close to the optimum moisture content. The soil should be compacted to at least 98% of the maximum dry density, as determined by the standard Proctor method (ASTM D-698).

In areas supporting floor slabs or pavements, the upper 18 inches of fill should be compacted to 100% of the standard Proctor density. As no laboratory testing has been conducted, we do not know the capability of the surficial soil to support pavements. However, we suggest that the upper soils be replaced by granular fill in areas of heavy traffic to improve the subgrade support capabilities and moisture sensitivity.

Field density tests should be conducted at routine intervals, as the fill is being placed, to verify that adequate compaction is achieved.

Prior to placing any new fill, any soft or loose near surface soils should be removed and the area proofrolled with a heavy vehicle to confirm that any unsuitable soil conditions have been discovered.

Basis for Recommendations

The subsurface conditions encountered at the boring location are shown on the Boring Log in Appendix B. This Boring Log represents our interpretation of the subsurface conditions based on the field logs and visual examination of field samples by an engineer. The lines designating the interface between various strata on the Boring Log represent the approximate interface locations. In addition, the transition between strata may be gradual. The water level shown on the Boring Log, if any, represents the condition only at the time of our exploration.

The recommendations contained herein are based in part on project information provided to us and only apply to the specific project and site discussed in this report. If the project information section in this report contains incorrect information or if additional information is available, please let us know so that we may review the validity of our recommendations.

Regardless of the thoroughness of a geotechnical investigation, there is always a possibility that conditions between borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to solve the problems created. ECA is best qualified to provide this service based on our familiarity with the project, the subsurface conditions, and the intent of the recommendations and design.

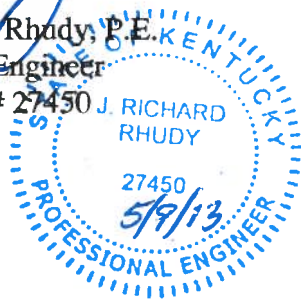
We wish to remind you that we will store the soil samples for 30 days. The samples will then be discarded unless you request otherwise.

We will be happy to discuss our recommendations with you and look forward to providing the additional studies or services necessary to complete this project. We appreciate the opportunity to be of service. Please call us with any questions at (770) 667-2040.

Sincerely,
Environmental Corporation of America

Kelby Williams, EIT
Project Engineer

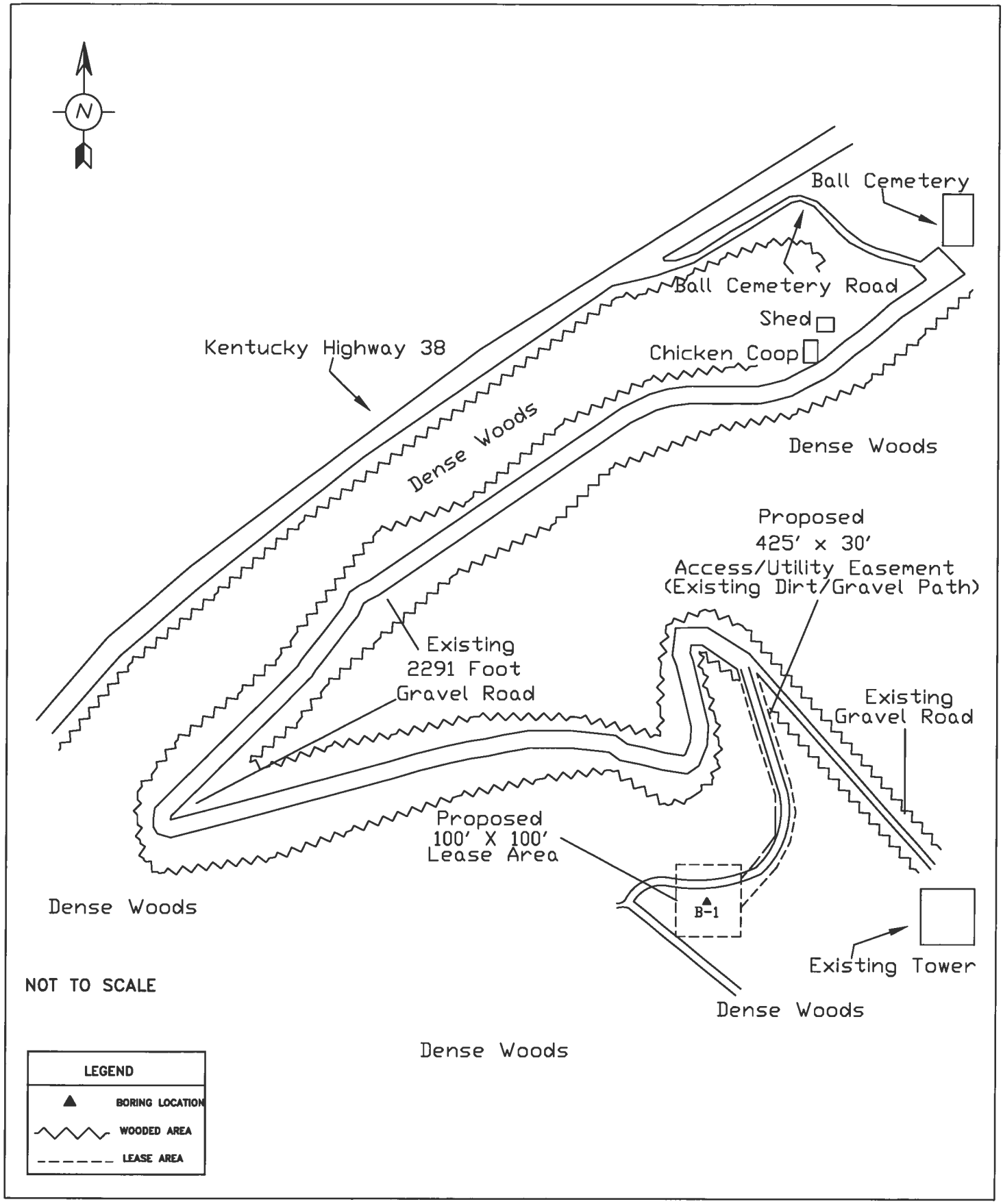
J. Richard Rhudy, P.E.
Principal Engineer
KY Reg. # 27450



Appendix A Boring Location Plan
Appendix B Boring Log

APPENDIX A

Boring Location Plan



AT&T Site LX6137 (Evarts)
Off Ball Cemetery Road
Evarts, Harlan County, Kentucky

Figure 1: Boring Location Plan

SOURCE: F.S.tan Survey and 09/9/2010 ECA Site Visit	DRAWN BY: AAD/KLW DATE: 5/8/2013 FILE NAME: F:\%\L1055.dwg

ECA Project # L-1055b

APPENDIX B

Boring Log

Project: AT&T Site LX6137 (Evarts)

City, State Evarts, Kentucky

Client: Westower

ECA Job No: L-1055b

Log of Boring: B-1

Drill Date: May 6, 2013

Field Rep: Glenn Powers

Elevation (ft)	Depth	Symbol	SUBSURFACE PROFILE: Description	SAMPLE: Blow Counts (per ft)	SPT Values (blows/ft) 10 20 30 40	Remarks	Water depth
0	0		Ground Surface				
			Firm tan slightly clayey very sandy to sandy SILT (ML) (gravel at surface)	6 7			
-3							
	5		***Partially Weathered Rock*** Very dense tan silty SAND (SM) with gravel	100+ 100+			
	10			100+			
-11.2			Boring Terminated			Auger refusal at 11.2 ft	
	15						
	20						
	25						
	30						
	35						
	40						

Drilled By: Vector Engineers

Borehole Size: 2.25" OD

Drill Method: Hollow Stem Augers

Depth to Water: N/A

Total Depth: 11.2 ft

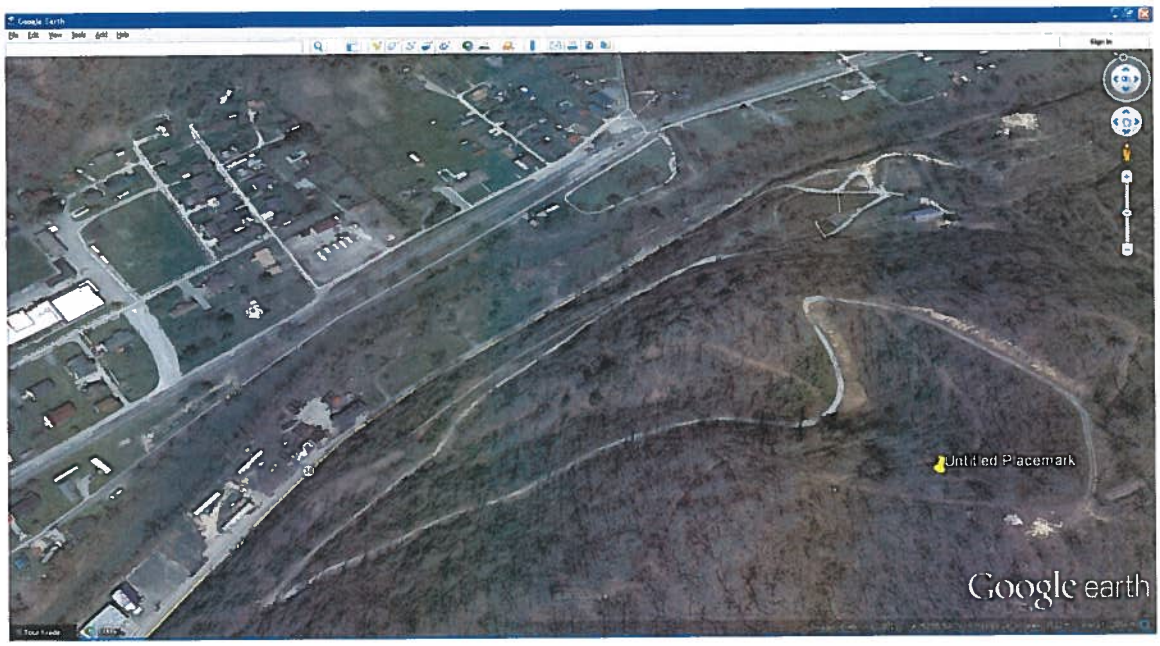
Sheet: 1 of 1

Environmental Corp. of America
1375 Union Hill Indus. Ct., Ste A
Alpharetta, GA 30004
(770) 667-2040

EXHIBIT I
DIRECTIONS TO WCF SITE

Driving Directions to Proposed Tower Site:

1. Beginning at the Harlan County seat located at 210 E. Central Street, Harlan, Kentucky 4083;
2. Start out going west on E. Central Street towards N. 2nd Street;
3. Turn left onto S. 1st Street;
4. Turn left onto E. Clover Street;
5. Turn left onto KY Highway 38;
6. Travel 8.4 miles and turn right onto Ball Cemetery Road;
7. Proceed up the hill 700' and turn right;
8. Travel 2,600' up the mountain to the site;
9. The proposed tower site is located on the right and is marked with a notice sign.
10. The site coordinates are:
    a. N 36 deg 51 min 58.04 sec
    b. W 83 deg 11 min 14.76 sec



Prepared by:
Robert W. Grant
Pike Legal Group PLLC
1578 Highway 44 East, Suite 6
PO Box 369
Shepherdsville, KY 40165-0369
Telephone: 502-955-4400 or 800-516-4293

EXHIBIT J
COPY OF REAL ESTATE AGREEMENT

MEMORANDUM OF LEASE

90189

Prepared by:
Rick Elms
SBA Network Services Inc.
910 Twin Elms Ct.
Nashville, TN 37210

FILED
AT 9:45 AM
OCT 24 2011
HARLAN COUNTY, CLERK
DONNA G. HOSKINS

Return to:
Rick Elms
SBA Network Services 910 Twin Elms Ct Nashville, TN 37210

Re: Cell Site #LX6137; Cell Site Name: Evarts
Fixed Asset # 10146913
State:Kentucky
County: Harlan

MEMORANDUM
OF
LEASE

This Memorandum of Lease is entered into on this 4th day of August, 2011, by and between Terry Wayne Williams, an individual, having a mailing address of 110 Nolan Street Evarts, Kentucky 40828 (hereinafter referred to as "**Landlord**") and New Cingular Wireless PCS, LLC, a Delaware limited liability company, having a mailing address of 12555 Cingular Way, Suite 1300, Alpharetta, GA 30004 (hereinafter referred to as "**Tenant**").

1. Landlord and Tenant entered into a certain Option and Lease Agreement ("**Agreement**") on the 4th day of August, 2011, for the purpose of installing, operating and maintaining a communications facility and other improvements. All of the foregoing are set forth in the Agreement.

2. The initial lease term will be five (5) years ("**Initial Term**") commencing on the effective date of written notification by Tenant to Landlord of Tenant's exercise of the Option, with four (4) successive five (5) year options to renew.

3. The portion of the land being leased to Tenant (the "**Premises**") is described in **Exhibit 1** annexed hereto.

4. This Memorandum of Lease is not intended to amend or modify, and shall not be deemed or construed as amending or modifying, any of the terms, conditions or provisions of the Agreement, all of which are hereby ratified and affirmed. In the event of a conflict between the provisions of this Memorandum of Lease and the provisions of the Agreement, the provisions of the Agreement shall control. The Agreement shall be binding upon and inure to the benefit of the parties and their respective heirs, successors, and assigns, subject to the provisions of the Agreement.

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IN WITNESS WHEREOF, the parties have executed this Memorandum of Lease as of the day and year first above written.

[SIGNATURES APPEAR ON THE NEXT PAGE]

"LANDLORD"

Terry Wayne Williams

By: Terry Wayne Williams
Its: Owner
Date: 8-17-2010

"TENANT"

New Cingular Wireless PCS, LLC,
a Delaware limited liability company
By: AT&T Mobility Corporation
Its: Manager

By: _____
Print Name: Daniel Toth
Its: Manager - Real Estate + Construction
Date: 8/4/11

[ACKNOWLEDGMENTS APPEAR ON THE NEXT PAGE]

TENANT ACKNOWLEDGMENT

STATE OF Tennessee)
) ss:
COUNTY OF Williamson)

On the 4th day of August, 2009, before me personally appeared Daniel Toth, and acknowledged under oath that he/she is the Mgr. Real Est + Construction of AT&T Mobility Corporation, the Manager of New Cingular Wireless PCS, LLC, the Tenant named in the attached instrument, and as such, was authorized to execute this instrument on behalf of the Tenant.

ERIN WOODARD
STATE OF TENNESSEE NOTARY PUBLIC
ROBERTSON COUNTY
My Commission Expires May 4, 2015

Erin Woodard
Notary Public: Erin Woodard
My Commission Expires: May 4, 2015

LANDLORD ACKNOWLEDGMENT

STATE OF Kentucky)
) ss:
COUNTY OF Harlan)

On the 17 day of August, 2009 before me, personally appeared Mark R. Doerr, who acknowledged under oath, that he/she is the person/officer named in the within instrument, and that he/she executed the same in his/her stated capacity as the voluntary act and deed of Landlord for the purposes therein contained.

Franklin Buell ID# 421875
Notary Public:
My Commission Expires: 7-14-2014

EXHIBIT 1

DESCRIPTION OF PREMISES

to the Memorandum of Lease dated August 4, 2011, by and between Terry Wayne Williams, as Landlord, and New Cingular Wireless PCS, LLC, a Delaware limited liability company, as Tenant.

The Premises are described and/or depicted as follows:

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SHEET 1
S1 - VICINITY AND 500' STRUCTURAL MAP
S2 - U.S.G.S. QUAD MAP
SHEET 2
- ABUTTING PROPERTY OWNERS
SHEET 3
- PROPOSED LEASE AREA
- FLOOD ZONE DATA
SHEET 4
- LEGAL DESCRIPTIONS

UNDERGROUND UTILITIES
CALL 2 WORKING DAYS
BEFORE YOU DIG
INDIANA 1-800-382-5544
KENTUCKY 1-800-752-6007
UTILITIES PROTECTION SERVICE
NON-MEMBERS MUST CALL DIRECTLY

The utility information shown on this plat, prepared by FSLAN was obtained from existing records and or by field locations. It is the contractor's responsibility to verify their existence and location, and to contact the appropriate utility company for field locations.

LAND SURVEYOR'S CERTIFICATE

TYPE "A" SURVEY: UNADJUSTED BEARINGS CLOSURE BETTER THAN 1 IN 15,000

TO ALL PARTIES INTERESTED IN TITLE TO PREMISES SURVEYED
I hereby certify that this plat and survey were made under my supervision, and that the angular and linear measurements, as witnessed by monuments shown hereon, are true and correct to the best of my knowledge and belief.
This survey and plat meets or exceeds the minimum standards of the governing authorities.
This property is subject to any recorded easements or right of ways not shown hereon.

Frank L. Sallinger, II — Ky. Reg. No. 3262

SURVEYORS NOTES

SOURCE OF BEARING IS A G.P.S. OBSERVATION ON JULY 20, 2010.

SITE SHOWN SUBJECT TO RIGHT OF WAYS AND EASEMENTS SHOWN HEREON OR NOT.

NO SEARCH OF PUBLIC RECORDS HAS BEEN PERFORMED BY THIS FIRM TO DETERMINE ANY DEFECTS AND/OR ANOMALIES IN THE TITLE OF THE PARENT TRACT.

THIS DRAWING DOES NOT REPRESENT A BOUNDARY SURVEY.

EXISTING CONTOURS ARE AT ONE FOOT INTERVALS.

COORDINATE POINT LOCATION
NAD 1983
LATITUDE: 36° 51' 58.04"
LONGITUDE: 83° 11' 14.76"
NAVD 1988
ELEVATION: 1793'± AMSL
STATE PLANE COORDINATE SOUTH ZONE
(BLUE MARBLE GEOGRAPHIC CALCULATOR VERSION 3.0)
NORTHING: 1844563.4860
EASTING: 2389971.5157

POWER POLE
UTILITY COMPANY: KENTUCKY UTILITIES CO.
IDENTIFICATION #: UNKNOWN

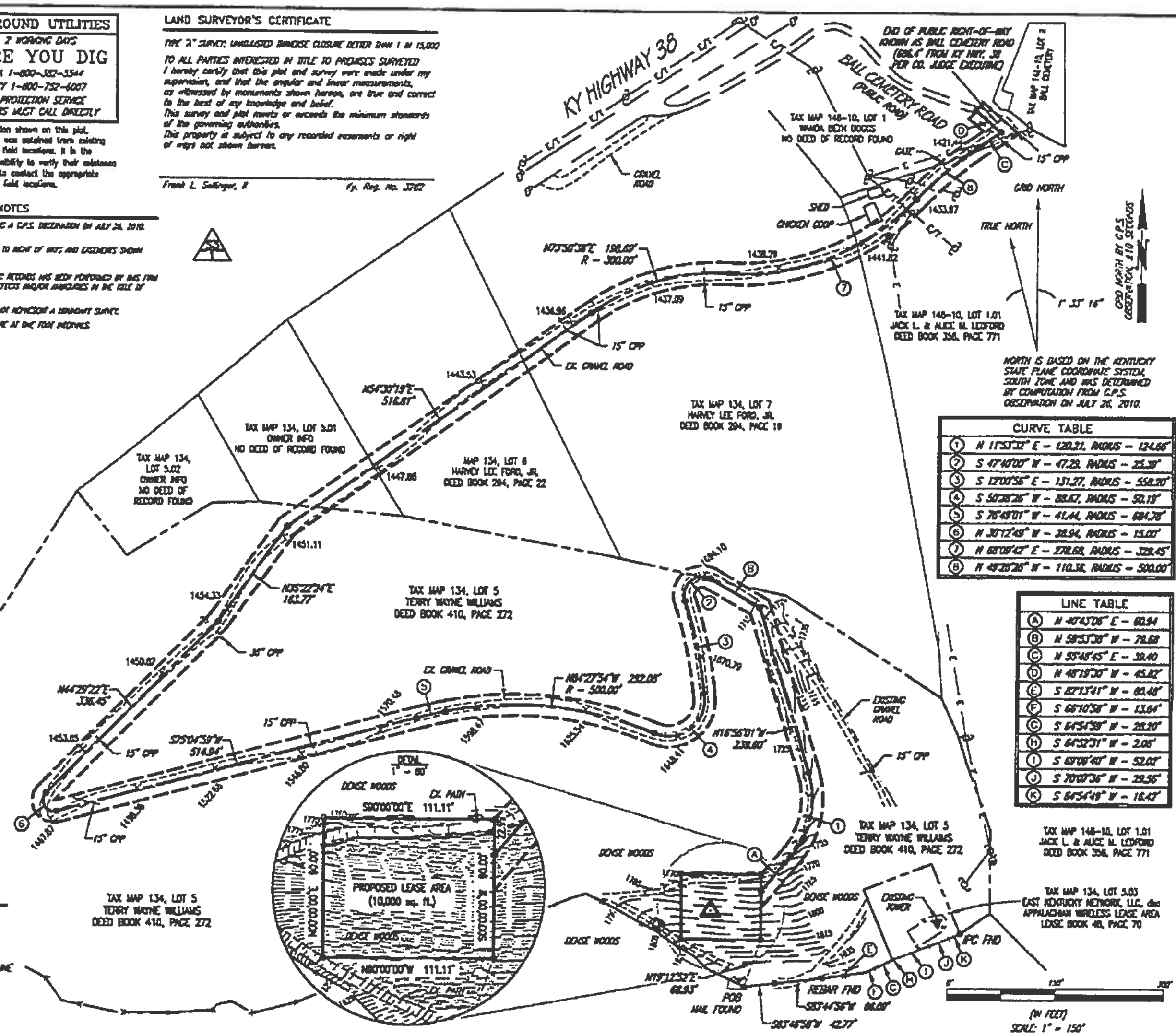
PROJECT BENCHMARK
NORTH: 1844541.464
EAST: 2389939.794
ELEVATION: 1803.699' AMSL
LOCATION: BEING A TRAVERSE POINT 30.72' WEST AND 17.96' SOUTH OF THE SOUTHWEST LEASE AREA CORNER

SYMBOL LEGEND
- WOOD POWER POLE
- LIGHT POLE
- GUY ANCHOR
- DRAIN SEWER MANHOLE
- MANHOLE
- ELECTRIC BOX
- F.P. FENCE POST
- 1500.00 SPOT ELEVATION
- SET 5/8 REBAR (UNLESS OTHERWISE NOTED)
- EXISTING 5/8 REBAR (UNLESS OTHERWISE NOTED)

ABBREVIATIONS
- EP EDGE OF PAVEMENT
- ROW RIGHT OF WAY
- ℄ CENTERLINE
- RCP REINFORCED CONCRETE PIPE
- CONC CONCRETE
- CMP CORRUGATED METAL PIPE
- R SUBJECT PROPERTY LINE
- POB POINT OF BEGINNING
- IPC IRON PIN CAPPED

LINE LEGEND
- OVERHEAD ELECTRIC
- UNDERGROUND GAS LINE
- UNDERGROUND WATER LINE
- OVERHEAD ELECTRIC & TELEPHONE LINE
- OVERHEAD TELEPHONE LINE
- DRAINAGE/STORM SEWER LINE
- EXISTING FENCE
- PROPOSED FENCE
- SUBJECT PROPERTY BOUNDARY
- RIGHT OF WAY CENTERLINE

NOTE: SYMBOLS, ABBREVIATIONS, OR LINESTYLES DO NOT NECESSARILY APPEAR ON DRAWING(S). USE ONLY AS APPLICABLE



NORTH IS BASED ON THE KENTUCKY STATE PLANE COORDINATE SYSTEM, SOUTH ZONE AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON JULY 20, 2010.

CURVE TABLE	
1	N 11°53'32" E – 120.21, RADIUS – 124.66'
2	S 47°40'00" W – 47.29, RADIUS – 25.39'
3	S 12°00'56" E – 131.27, RADIUS – 558.20'
4	S 50°28'26" W – 88.67, RADIUS – 50.19'
5	S 76°49'01" W – 41.44, RADIUS – 684.78'
6	N 30°12'45" W – 38.94, RADIUS – 15.00'
7	N 68°09'42" E – 278.68, RADIUS – 328.45'
8	N 49°28'26" W – 110.38, RADIUS – 500.00'

LINE TABLE	
A	N 47°45'06" E – 60.94
B	N 58°53'38" W – 78.68
C	N 55°48'45" E – 39.40
D	N 48°19'30" W – 45.82'
E	S 82°13'41" W – 60.48'
F	S 68°10'58" W – 13.64'
G	S 64°54'59" W – 28.20'
H	S 64°52'31" W – 2.05'
I	S 69°08'40" W – 52.07'
J	S 70°07'36" W – 29.55'
K	S 64°54'49" W – 16.43'

I HAVE REVIEWED THE FLOOD INSURANCE RATE MAPS (FIRM) MAP NO. 21013C 0165D DATED 8-16-06 AND THE PROPOSED LEASE AREA DOES NOT APPEAR TO BE IN A FLOOD PRONE AREA. THE PROPOSED LEASE AREA IS LOCATED IN ZONE X.

"CELLULAR COMMUNICATION TOWER SITE SURVEY"
REFERENCED AS "EXHIBIT B"

OWNER APPROVAL: ______________________ DATE: __________
AT&T APPROVAL: ______________________ DATE: __________

at&t
Nsoro — It's just good business. A MasTec COMPANY

FS·LAN — Formerly F.S. Land & T. Alan Neal Company — Land Surveyors and Consulting Engineers

SITE NUMBER: LXG137
SITE NAME: EVARTS
SITE ADDRESS: 110 NOLAN ST. EVARTS, KY 40828
PROPOSED LEASE AREA: AREA = 10,000 sq. ft.
PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828
MAP NUMBER: 134
PARCEL NUMBER: 5
SOURCE OF TITLE: DEED BOOK 410, PAGE 272

DWG BY:	CHK'D BY:	DATE:
KLH	FSI	08.23.10

FSLAN PROJECT NO.: 10-6628

SHEET 3 OF 4

REVISIONS:

C2

SHEET 1
1 - VICINITY AND 500' STRUCTURAL MAP
2 - U.S.G.S. QUAD MAP
SHEET 2
3 - ABUTTING PROPERTY OWNERS
SHEET 3
4 - PROPOSED LEASE AREA
5 - FLOOD ZONE DATA
SHEET 4
6 - LEGAL DESCRIPTIONS

LEGAL DESCRIPTIONS:

This is a description for AT&T, of an area to be leased from the property conveyed to Terry Wayne Williams, as recorded in Deed Book 410, Page 272, in the Office of the Clerk of Harlan County, which is further described as follows:

PROPOSED LEASE AREA

Beginning at a Found Nail in a concrete pad corner along a ridge line, corner to the property conveyed to Terry Wayne Williams as recorded in Deed Book 410, Page 272 in the Office of the Clerk of the County Court of Harlan County, Kentucky, said Nail being following calls from an IPC Found stamped "Summit Engineering LS #2661" at the southeast corner of the existing East Kentucky Network, LLC, dba Appalachian Wireless Lease Area as recorded in Lease Book 48, Page 70 in the aforesaid Clerks Office, S 64°54'49" W - 16.42' to a point; thence S 70°07'36" W - 29.56' to a point; thence S 69°09'40" W - 52.02' to a point; thence S 64°52'31" W - 2.06' to a point at the southwest corner of said existing lease area; thence continuing along the south line of said Williams property S 64°54'50" W - 28.20' to a point; thence S 66°10'58" W - 13.64' to a point; thence S 82°13'41" W - 60.48' to a Rebar Found; thence S 83°44'56" W - 66.09' to a Rebar Found; thence S 83°46'56" W - 42.77' to the point of beginning; thence traversing said Williams property N 19°12'52" E - 68.93' to a set #5 rebar with a cap stamped "FSTAN #3282" and the TRUE POINT OF BEGINNING of the Proposed Lease Area; thence N 90°00'00" W - 111.00' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 00°00'00" E - 90.00' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence S 90°00'00" E - 111.00' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence S 00°00'00" W passing a set #5 rebar with a cap stamped "FSTAN #3282" at 22.99', in all 90.00' to the true point of beginning containing 10,000 square feet as per survey by Frank L. Sellinger, II, PLS No. 3282 with F.S./Ten Land Surveyors and Consulting Engineers dated August 23, 2010.

CENTERLINE OF PROPOSED 20' ACCESS EASEMENT

Beginning at a Found Nail in a concrete pad corner along a ridge line, corner to the property conveyed to Terry Wayne Williams as recorded in Deed Book 410, Page 272 in the Office of the Clerk of the County Court of Harlan County, Kentucky, said Nail being following calls from an IPC Found stamped "Summit Engineering LS #2661" at the southeast corner of the existing East Kentucky Network, LLC, dba Appalachian Wireless Lease Area as recorded in Lease Book 48, Page 70 in the aforesaid Clerks Office, S 64°54'49" W - 16.42' to a point; thence S 70°07'36" W - 29.56' to a point; thence S 69°09'40" W - 52.02' to a point; thence S 64°52'31" W - 2.06' to a point at the southwest corner of said existing lease area; thence continuing along the south line of said Williams property S 64°54'59" W - 28.20' to a point; thence S 66°10'58" W - 13.64' to a point; thence S 82°13'41" W - 60.48' to a Rebar Found; thence S 83°44'56" W - 66.09' to a Rebar Found; thence S 83°46'56" W - 42.77' to the point of beginning; thence traversing said Williams property N 19°12'52" E - 68.93' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 00°00'00" E - 77.01' to a set #5 rebar with a cap stamped "FSTAN #3282" and the TRUE POINT OF BEGINNING of the Centerline of the Proposed 30' Access & Utility Easement; thence following said centerline N 40°43'06" E - 60.94' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 124.66', chord bearing N 11°53'32" E - 120.21' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 16°56'01" W - 239.60' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 59°53'38" W - 79.68' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 25.39', chord bearing S 47°40'00" W - 47.29' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 558.20', chord bearing S 12°00'56" E - 131.27' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 50.19', chord bearing S 50°28'26" W - 88.67' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 500.00', chord bearing N 84°27'54" W - 292.08' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 684.78', chord bearing S 76°49'01" W - 41.44' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence S 75°04'38" W - 514.94' to a set #5 rebar with a cap stamped "FSTAN #3282" to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the right having a radius of 15.00', chord bearing N 30°12'49" W - 28.94' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 44°29'22" E - 338.45' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 35°22'24" E - 163.77' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 54°30'19" E passing through Tax Map 134, Lot 5.01 (Owner and Source of Title Unknown), the property conveyed to Harvey Lee Ford, Jr. as recorded in Deed Book 294, Page 22 in the aforesaid Clerks Office and the property conveyed to Harvey Lee Ford, Jr. as recorded in Deed Book 294, Page 19 in the aforesaid Clerks Office, 516.81' to a set #5 rebar with a cap stamped "FSTAN #3282" on said Lee property (Deed Book 294, Page 19); thence following a curve to the right having a radius of 300.00', chord bearing N 73°50'38" E - 198.69' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence following a curve to the left having a radius of 329.45', chord bearing N 88°09'42" E - 278.68' to a set #5 rebar with a cap stamped "FSTAN #3282" on the property conveyed to Jack L. and Alice M. Ledford as recorded in Deed Book 358, Page 771 in the aforesaid Clerks Office; thence following a curve to the right having a radius of 500.00', chord bearing N 49°28'26" E - 110.36' to a set #5 rebar with a cap stamped "FSTAN #3282" on the property conveyed to Wanda Beth Boggs (No Deed of Record Found) in the aforesaid Clerks Office; thence N 55°48'45" E - 39.40' to a set #5 rebar with a cap stamped "FSTAN #3282"; thence N 48°19'30" W - 45.82' to a set Spike in the centerline of Ball Cemetery Road and the end of said easement as per survey by Frank L. Sellinger, II, PLS No. 3282 with F.S./Ten Land Surveyors and Consulting Engineers dated August 23, 2010.

3/5

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It's just good business.
A MasTec COMPANY

FS/Ten
Formerly F.S. Land & T. Alan Neal Company
Land Surveyors and Consulting Engineers

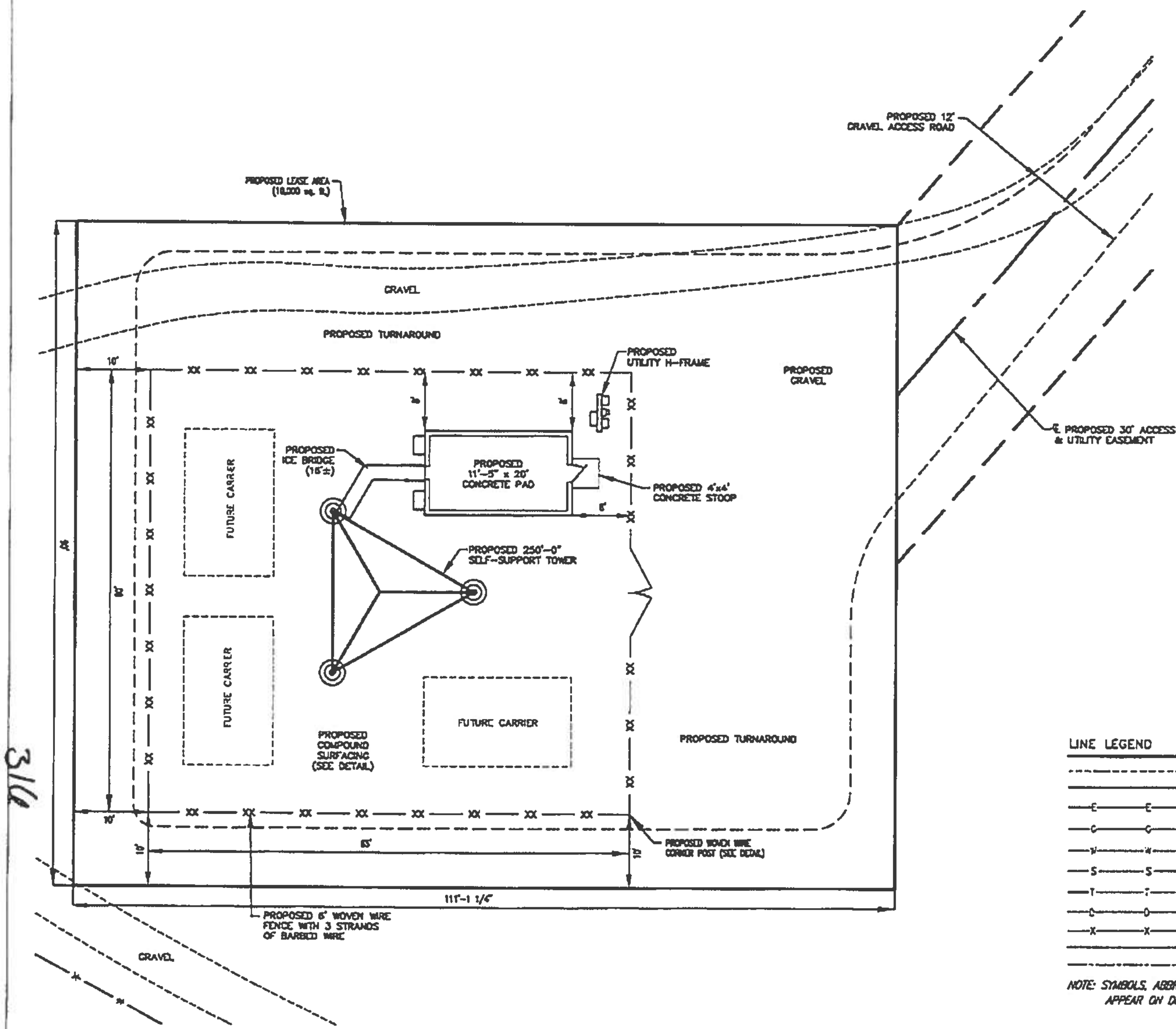
SITE NUMBER:	LX6137
SITE NAME:	EVARTS
SITE ADDRESS:	110 NOLAN ST. EVARTS, KY 40828
PROPOSED LEASE AREA:	AREA = 10,000 sq. ft.
PROPERTY OWNER:	TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828
MAP NUMBER:	134
PARCEL NUMBER:	5
SOURCE OF TITLE:	DEED BOOK 410, PAGE 272
DWG BY: KLH	CHKD BY: FSII
DATE:	08.23.10
FSTAN PROJECT NO.:	10-6628

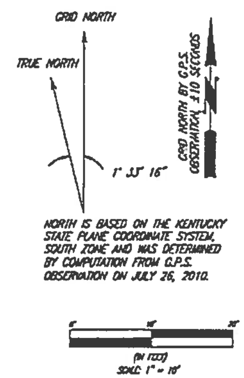
SHEET 4 OF 4

REVISIONS:

C2.1

3/16





NORTH IS BASED ON THE KENTUCKY STATE PLANE COORDINATE SYSTEM, SOUTH ZONE AND WAS DETERMINED BY COMPUTATION FROM G.P.S. OBSERVATION ON JULY 26, 2010.

NOTES

1. REMOVE ALL VEGETATION & CLEAN AREA W/ LEASE AREA (WHERE REQUIRED)
2. FINISH GRADING TO PROVIDE EFFECTIVE DRAINAGE W/ A SLOPE OF NO LESS THAN ONE EIGHTH (1/8") PER FOOT FLOWING AWAY FROM EQUIP. FOR A MIN. DISTANCE OF SIX FEET (6') IN ALL DIRECTIONS.
3. LOCATE ALL U.G. UTILITIES PRIOR TO ANY CONSTRUCTION
4. FENCE COMPOUND FINISHED SURFACES

LINE LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- OVERHEAD ELECTRIC
- UNDERGROUND GAS LINE
- UNDERGROUND WATER LINE
- PROPOSED SILT FENCE LINE
- OVERHEAD TELEPHONE LINE
- DRAINAGE/STORM SEWER LINE
- FENCE LINE
- SUBJECT PROPERTY BOUNDARY
- RIGHT OF WAY CENTERLINE

NOTE: SYMBOLS, ABBREVIATIONS, OR LINESTYLES DO NOT NECESSARILY APPEAR ON DRAWING(S). USE ONLY AS APPLICABLE

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it's just good business.
A MasTec COMPANY

FSLan
F.S. Land Company
T. Alan Neal Company
Land Surveyors and Consulting Engineers

SITE NUMBER: LX6137
SITE NAME: EVARTS
SITE ADDRESS: 110 NOLAN ST. EVARTS, KY 40828
PROPOSED LEASE AREA: AREA = 10,000 SQ. FT.
PROPERTY OWNER: TERRY WAYNE WILLIAMS 110 NOLAN ST. EVARTS, KY 40828

DWG BY:	CHKD BY:	DATE:
KLH	JAW	08.26.10

FSLAN PROJECT NO.: 10-6628

SHEET Z-3 OF 8

REVISIONS:

SITE LAYOUT

EVARTS
SITE ID# LX6137
SITE ADDRESS: 110 NOLAN ST. EVARTS, KY 40828
OWNER ADDRESS: 110 NOLAN ST. EVARTS, KY 40828

STATE OF KENTUCKY

COUNTY OF HARLAN

I, DONNA G. HOSKINS, CLERK OF THE COUNTY IN AND FOR THE COUNTY AND STATE AFORESAID, CERTIFY THAT THE FOREGOING Memorandum of Lease, WAS ON THE 24th DAY OF October, 2011. AT 9:45 A .M. LODGED FOR RECORD WHEREUPON THE SAME WITH THE FOREGOING AND THIS CERTIFICATE HAVE DULY RECORDED IN MY OFFICE IN Lease BOOK 50 PAGE 310.

WITNESSED MY HAND THIS 24th DAY OF October 2011.

DONNA G. HOSKINS, HARLAN COUNTY CLERK

BY: Kimberly Parrott D.C.
KIMBERLY PARROTT

EXHIBIT K
NOTIFICATION LISTING

Evarts Landowner Notice

Terry Wayne Williams
110 Nolan St.
Evarts, KY 40828

East Kentucky Network, LLC
dba Appalachian Wireless
204 Technology Trail
Ivel, KY 41642

Tommy L. Graham
PO Box 789
Linden, TN 37096

Harvey Lee Ford Jr.
6630 Jordan Ct., Apt. B
Fort Polk, LA 71459-7261

Harvey Lee Ford Jr.
22 Ram Drive
Cameron, NC 28326

Jack L. & Alice M. Ledford
PO Box 411
Evarts, KY 40828

Karen Cook
PO Box 1462
Harlan, KY 40831

Ball Cemetery
General Delivery
Evarts, KY 40828

Theodore Fox
105 Verda Camp Rd.
Evarts, KY 40828

Evarts Free Pentecostal Holiness Church
PO Box 444
Evarts, KY 40828

Theodore & Patsy Fox
105 Verda Camp Road
Evarts, KY 40828

Terry Williams
110 Nolan St.
Evarts, KY 408

EXHIBIT L
COPY OF PROPERTY OWNER NOTIFICATION

PIKE LEGAL

1578 Highway 44 East, Suite 6
P.O. Box 369
Shepherdsville, KY 40165-0369
Phone (502) 955-4400 or (800) 516-4293
Fax (502) 543-4410 or (800) 541-4410

Notice of Proposed Construction of
Wireless Communications Facility
Site Name: Evarts

Dear Landowner:

New Cingular Wireless PCS, LLC, a Delaware limited liability company, d/b/a AT&T Mobility has filed an application with the Kentucky Public Service Commission ("PSC") to construct a new wireless communications facility on a site located at 9811 KY Highway 38, Evarts, KY 40828 (36°51'58.04" North latitude, 83°11'14.76" West longitude). The proposed facility will include a 185-foot tall antenna tower, plus a 4-foot lightning arrestor and related ground facilities. This facility is needed to provide improved coverage for wireless communications in the area.

This notice is being sent to you because the Harlan County Property Valuation Administrator's records indicate that you may own property that is within a 500' radius of the proposed tower site or contiguous to the property on which the tower is to be constructed. You have a right to submit testimony to the Kentucky Public Service Commission ("PSC"), either in writing or to request intervention in the PSC's proceedings on the application. You may contact the PSC for additional information concerning this matter at: Kentucky Public Service Commission, Executive Director, 211 Sower Boulevard, P.O. Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2013-00300 in any correspondence sent in connection with this matter.

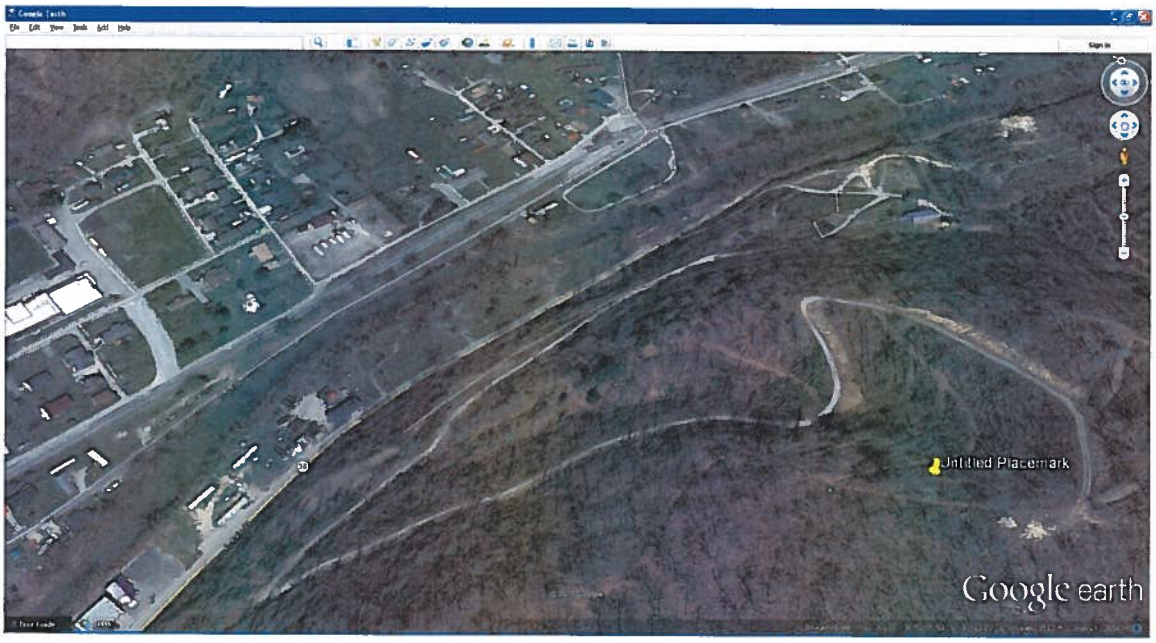
We have attached a map showing the site location for the proposed tower. AT&T Mobility's radio frequency engineers assisted in selecting the proposed site for the facility, and they have determined it is the proper location and elevation needed to provide quality service to wireless customers in the area. Please feel free to contact us toll free at (800) 516-4293 if you have any comments or questions about this proposal.

Sincerely,
David A. Pike
Attorney for AT&T Mobility

enclosure

Driving Directions to Proposed Tower Site:

1. Beginning at the Harlan County seat located at 210 E. Central Street, Harlan, Kentucky 4083;
2. Start out going west on E. Central Street towards N. 2nd Street;
3. Turn left onto S. 1st Street;
4. Turn left onto E. Clover Street;
5. Turn left onto KY Highway 38;
6. Travel 8.4 miles and turn right onto Ball Cemetery Road;
7. Proceed up the hill 700' and turn right;
8. Travel 2,600' up the mountain to the site;
9. The proposed tower site is located on the right and is marked with a notice sign.
10. The site coordinates are:
    a. N 36 deg 51 min 58.04 sec
    b. W 83 deg 11 min 14.76 sec



Prepared by:
Robert W. Grant
Pike Legal Group PLLC
1578 Highway 44 East, Suite 6
PO Box 369
Shepherdsville, KY 40165-0369
Telephone: 502-955-4400 or 800-516-4293

EXHIBIT M
COPY OF COUNTY JUDGE/EXECUTIVE NOTICE

PIKE LEGAL

1578 Highway 44 East, Suite 6
P.O. Box 369
Shepherdsville, KY 40165-0369
Phone (502) 955-4400 or (800) 516-4293
Fax (502) 543-4410 or (800) 541-4410

VIA CERTIFIED MAIL

Hon. Joe Grieshop
Harlan County Judge Executive
P.O. Box 956
Harlan, KY 40831

RE: Notice of Proposal to Construct Wireless Communications Facility
Kentucky Public Service Commission Docket No. 2013-00300
Site Name: Evarts

Dear Judge Grieshop:

New Cingular Wireless PCS, LLC, a Delaware limited liability company, d/b/a AT&T Mobility has filed an application with the Kentucky Public Service Commission ("PSC") to construct a new wireless communications facility on a site located at 9811 KY Highway 38, Evarts, KY 40828 (36°51'58.04" North latitude, 83°11'14.76" West longitude). The proposed facility will include a 185-foot tall antenna tower, plus a 4-foot lightning arrestor and related ground facilities. This facility is needed to provide improved coverage for wireless communications in the area.

You have a right to submit comments to the PSC or to request intervention in the PSC's proceedings on the application. You may contact the PSC at: Executive Director, Public Service Commission, 211 Sower Boulevard, P.O. Box 615, Frankfort, Kentucky 40602. Please refer to docket number 2013-00300 in any correspondence sent in connection with this matter.

We have attached a map showing the site location for the proposed tower. AT&T Mobility's radio frequency engineers assisted in selecting the proposed site for the facility, and they have determined it is the proper location and elevation needed to provide quality service to wireless customers in the area. Please feel free to contact us with any comments or questions you may have.

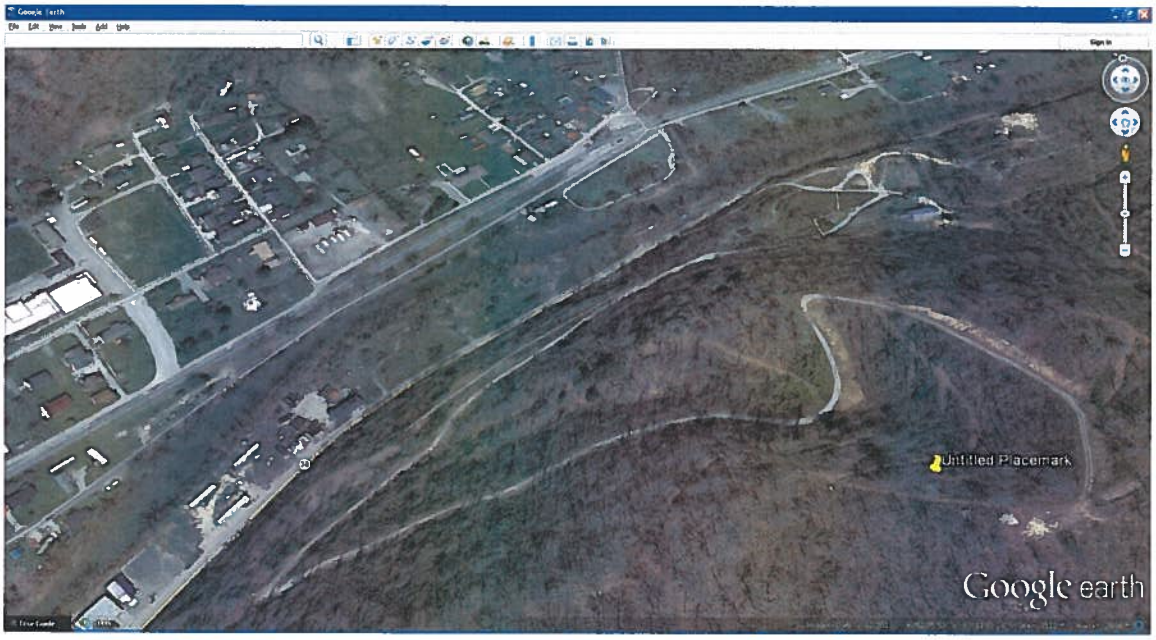
Sincerely,

David A. Pike
Attorney for AT&T Mobility

enclosure

Driving Directions to Proposed Tower Site:

1. Beginning at the Harlan County seat located at 210 E. Central Street, Harlan, Kentucky 4083;
2. Start out going west on E. Central Street towards N. 2nd Street;
3. Turn left onto S. 1st Street;
4. Turn left onto E. Clover Street;
5. Turn left onto KY Highway 38;
6. Travel 8.4 miles and turn right onto Ball Cemetery Road;
7. Proceed up the hill 700' and turn right;
8. Travel 2,600' up the mountain to the site;
9. The proposed tower site is located on the right and is marked with a notice sign.
10. The site coordinates are:
    a. N 36 deg 51 min 58.04 sec
    b. W 83 deg 11 min 14.76 sec



Prepared by:
Robert W. Grant
Pike Legal Group PLLC
1578 Highway 44 East, Suite 6
PO Box 369
Shepherdsville, KY 40165-0369
Telephone: 502-955-4400 or 800-516-4293

EXHIBIT N
COPY OF POSTED NOTICES

SITE NAME: EVARTS
NOTICE SIGNS

The signs are at least (2) feet by four (4) feet in size, of durable material, with the text printed in black letters at least one (1) inch in height against a white background, except for the word "**tower**," which is at least four (4) inches in height.

New Cingular Wireless PCS, LLC d/b/a AT&T Mobility proposes to construct a telecommunications **tower** on this site. If you have questions, please contact Pike Legal Group, PLLC, P.O. Box 369, Shepherdsville, KY 40165. (800) 516-4293, or the Executive Director, Public Service Commission, 211 Sower Boulevard, PO Box 615, Frankfort, Kentucky 40602. Please refer to docket number Case No. 2013-00300 in your correspondence.

New Cingular Wireless PCS, LLC d/b/a AT&T Mobility proposes to construct a telecommunications **tower** near this site. If you have questions, please contact Pike Legal Group, PLLC, P.O. Box 369, Shepherdsville, KY 40165 (800) 516-4293, or the Executive Director, Public Service Commission, 211 Sower Boulevard, PO Box 615, Frankfort, Kentucky 40602. Please refer to docket number Case No. 2013-00300 in your correspondence.

To Whom It May Concern:

As a friend and former co-worker of Doreen Powers I would highly recommend her for employment.

We worked together at Talk of the Town in Lawrenceburg. I was the hostess and was amazed at what a great server she is. She is great with customers and very well liked. She has a great following.

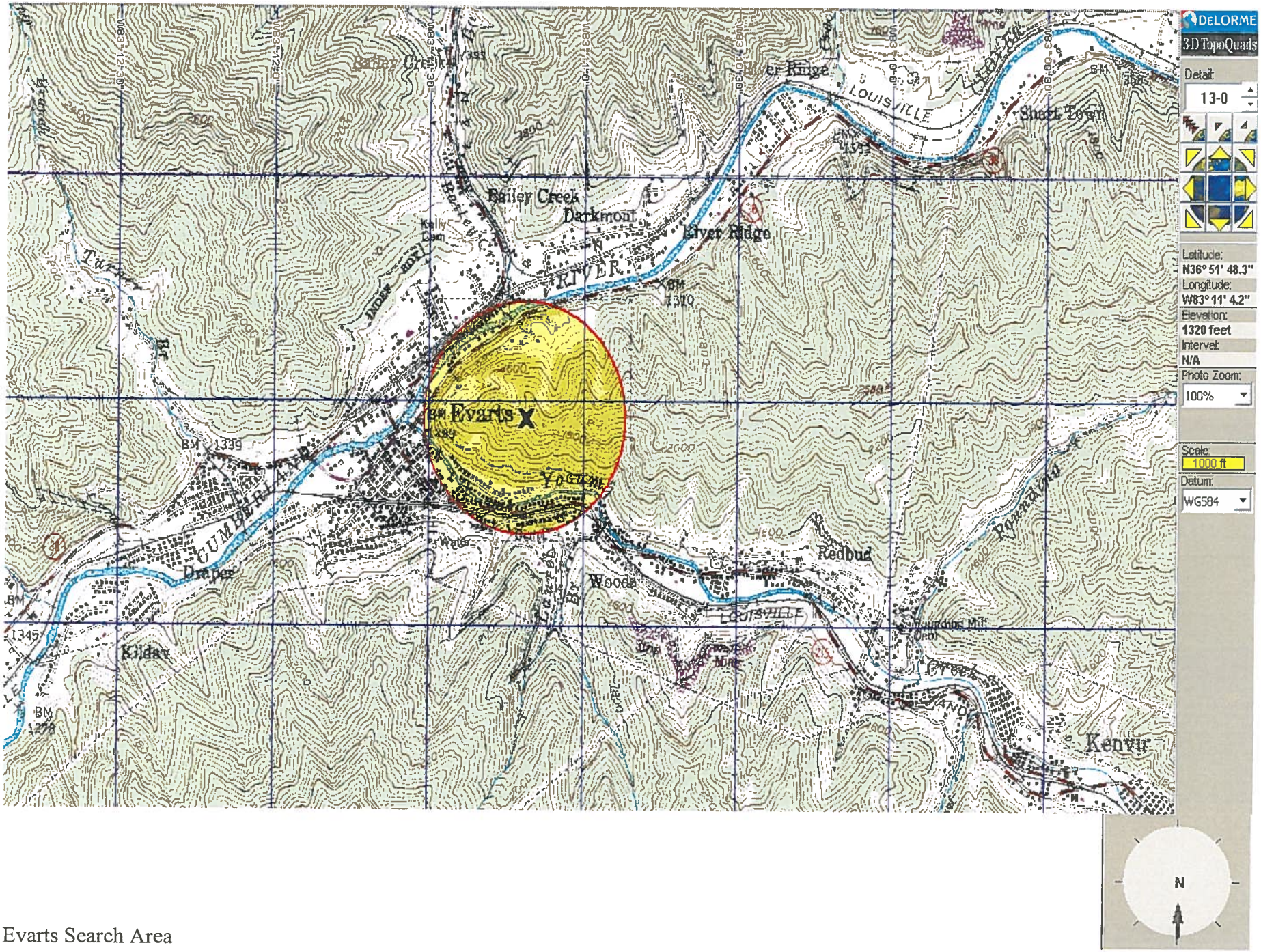
On Sunday's the restaurant would be full & she would have it all under control. At one time it seats 58 people. I have seen her wait on all those people by herself as she is the only server.

I would try to help by getting customers drink orders when they came in & she was busy. Usually I just managed to get in her way as she could multi-task.

Connie Hunt
1013 Wildcat Rd.
Lawrenceburg, Ky. 40342
859-338-6015

Sent from my iPad Connie Hunt

EXHIBIT O
COPY OF RADIO FREQUENCY DESIGN SEARCH AREA



Evarts Search Area