

RECEIVED

COMMONWEALTH OF KENTUCKY  
BEFORE THE PUBLIC SERVICE COMMISSION

FEB 16 2016

PUBLIC SERVICE  
COMMISSION

In the matter of:

THE APPLICATION OF EAST KENTUCKY NETWORK )  
LIMITED LIABILITY COMPANY FOR THE ISSUANCE )  
OF A CERTIFICATE OF PUBLIC CONVENIENCE AND ) CASE No. 2015-00420  
NECESSITY TO CONSTRUCT A TOWER IN HARLAN )  
COUNTY, KENTUCKY).

East Kentucky Network, LLC, d/b/a Appalachian Wireless, was granted authorization to provide Personal Communications Service ("PCS") in the Middlesboro-Harlan, KY Basic Trading Area (BTA295) by the Federal Communications Commission (FCC). FCC license is included as Exhibit 1. East Kentucky Network, LLC merger documents were filed with the Commission on February 2, 2001 in Case # 2001-022. East Kentucky Network, LLC is a Kentucky Limited Liability Company that was organized on June 16, 1998. East Kentucky Network, LLC is in good standing with the state of Kentucky.

In an effort to improve service in Harlan County, East Kentucky Network, LLC pursuant to KRS 278.020 Subsection 1 and 807 KAR 5:001 is seeking the Commission's approval to construct a 180 foot monopole tower on a tract of land located at McKnight Road, Benham, Harlan County, Kentucky (36°57'44.9657"N 82°56'58.3310"W). A map and detailed directions to the site can be found in Exhibit 7.

Exhibit 2 is a list of all Property owners according to the property valuation administrator's record who own property within 500 feet of the proposed tower in accordance with the Property Valuation Administrator.

Pursuant to 807 KAR 5:063 Section 1(1)(l) and Section 1(1)(m) all affected property owners according to the property valuation administrator's record who own property within 500 feet of the proposed Tower were notified by certified mail return receipt requested of East Kentucky

Network, LLC's proposed construction and informed of their right to intervene. They were given the docket number under which this application is filed. Enclosed in Exhibit 2 is a copy of that notification.

Harlan County has no formal local planning unit. In absence of this unit the Harlan County Judge Executive's office was notified by certified mail, return receipt requested of East Kentucky Network Limited Liability Company's proposal and informed of their right to intervene. They were given the docket number under which this application is filed. Enclosed in Exhibit 3 is a copy of that notification.

Notice of the location of the proposed construction was published in the Harlan Daily Enterprise, February 16, 2016, edition. Enclosed is a copy of that notice in Exhibit 3. The Harlan Daily Enterprise is the newspaper with the largest circulation in Harlan County.

Environmental Resources Management Consulting Company was employed to determine soil and rock types and to ascertain the distance to solid bedrock. The geotechnical report is enclosed as Exhibit 4.

A copy of the tower design information is enclosed as Exhibit 5. The proposed tower has been designed by engineers at TransAmerican Power Products, Inc. and will be constructed under their supervision. Their qualifications are evidenced in Exhibit 5 by the seal and signature of the registered professional engineer responsible for this project.

The tower will be erected by World Tower Company, Inc. of Mayfield, Kentucky. World Tower Company, Inc. has vast experience in the erection of communications towers.

FAA and Kentucky Airport Zoning Commission applications are included as Exhibit 6.

No Federal Communications Commission approval is required prior to construction of this facility. Once service is established from this tower we must immediately notify the Federal Communications Commission of its operation. Prior approval is needed only if the proposed

facility increases the size of the cellular geographic service area. This cell site will not expand the cellular geographic service area.

East Kentucky Network, LLC will finance the subject Construction with earned surplus in its General Fund.

Estimated Cost of Construction	\$ 350,000.00
Annual Operation Expense of Tower	\$ 12,500.00

Two notice signs meeting the requirements prescribed by 807 KAR 5:063, Section 1(2), measuring at least two (2) feet in height and four (4) feet in width and containing all required language in letters of required height, have been posted, one at a visible location on the proposed site and one on the nearest public road. The two signs were posted on December 23, 2015, and will remain posted for at least two weeks after filing of this application as specified.

Enclosed in Exhibit 8 is a copy of East Kentucky Network LLC's Lease Agreement for the site location along with a lot description.

The proposed construction site is located in the city limits of Benham on a piece of land previously developed.

East Kentucky Network LLC's operation will not affect the use of nearby land nor its value. No more suitable site exists in the area. A copy of the search area map is enclosed in Exhibit 7. No other tower capable of supporting East Kentucky Network, LLC's load exists in the general area; therefore, there is no opportunity for co-location of our facilities with anyone else.

Enclosed, and filed as Exhibit 9 is a survey of the proposed tower site signed by a Kentucky registered professional engineer.

Exhibit 11 contains a vertical sketch of the tower supplied by James W. Caudill, Kentucky registered professional engineer.

**WHEREFORE,** Applicant respectfully requests 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 proposed tower.

The foregoing document was prepared by Cindy D. McCarty, Staff Attorney for East Kentucky Network, LLC d/b/a Appalachian Wireless. All related questions or correspondence concerning this filing should be mailed to East Kentucky Network, LLC d/b/a/ Appalachian Wireless, 101 Technology Trail, Ivel, KY 41642.

SUBMITTED BY: Lynn Haney DATE: 2/12/2016  
Lynn Haney, Regulatory Compliance Director

APPROVED BY: W.A. Gillum DATE: 2/15/2016  
W.A. Gillum, General Manager

ATTORNEY: Cindy D. McCarty DATE: 2/15/2016  
Hon. Cindy D. McCarty, Attorney

**CONTACT INFORMATION:**

**W.A. Gillum, General Manager**  
**Phone: (606) 477-2355, Ext. 111**  
**Email: wagillum@ekn.com**

**Lynn Haney, Regulatory Compliance Director**  
**Phone: (606) 477-2355, Ext. 1007**  
**Email: lhaney@ekn.com**

**Cindy D. McCarty, Staff Attorney**  
**Phone: (606) 477-2355, Ext. 1006**  
**Email: cmccarty@ekn.com**

**Mailing Address:**

**East Kentucky Network, LLC**  
**d/b/a Appalachian Wireless**  
**101 Technology Trail**  
**Ivel, KY 41642**



1	FCC License
2	Copies of Cell Site Notices to Land Owners
3	Notification of County Judge Executive and Newspaper Advertisement
4	Universal Soil Bearing Analysis
5	Tower Design
6	FAA and KAZC Applications
7	Driving Directions from County Court House and Map to Suitable Scale
8	Lease for Proposed Site with Legal Description
9	Survey of Site Signed/Sealed by Professional Engineer Registered in State of Kentucky
10	Site Survey Map with Property Owners Identified in Accordance with PVA of County
11	Vertical Profile Sketch of Proposed Tower
12	



ULS License

## PCS Broadband License - WQEF975 - East Kentucky Network, LLC d/b/a Appalachian Wireless

Call Sign	WQEF975	Radio Service	CW - PCS Broadband
Status	Active	Auth Type	Regular
<b>Market</b>			
Market	MTA044 - Knoxville	Channel Block	A
Submarket	12	Associated Frequencies (MHz)	001850.00000000-001865.00000000 001930.00000000-001945.00000000
<b>Dates</b>			
Grant	05/27/2015	Expiration	06/23/2025
Effective	05/27/2015	Cancellation	
<b>Buildout Deadlines</b>			
1st		2nd	
<b>Notification Dates</b>			
1st		2nd	

### Licensee

FRN	0001786607	Type	Limited Liability Company
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### Licensee

East Kentucky Network, LLC d/b/a Appalachian Wireless 101 Technology Trail Ivel, KY 41642 ATTN W.A. Gillum, General Manager/CEO	P:(606)477-2355
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### Contact

Lukas, Nace, Gutierrez & Sachs, LLP Pamela L Gist Esq 8300 Greensboro Drive McLean, VA 22102	P:(703)584-8665 F:(703)584-8695 E:pgist@fcclaw.com
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### Ownership and Qualifications

Radio Service Type	Mobile
Regulatory Status	Common Carrier      Interconnected      Yes

### Alien Ownership

The Applicant answered "No" to each of the Alien Ownership questions.

**Basic Qualifications**

The Applicant answered "No" to each of the Basic Qualification questions.

**Tribal Land Bidding Credits**

This license did not have tribal land bidding credits.

**Demographics**

Race

Ethnicity

Gender

**EXHIBIT II: LIST OF PROPERTY OWNERS:**

**Statement Pursuant to Section 1 (1) (I) 807 KAR 5:063**

**Section 1 (1)(I) 1.** The following is a list of every property owner who according to property valuation administrator's records, owns property within 500 feet of the proposed tower and each have been: notified by certified mail, return receipt requested, of the proposed construction,

**Section 1 (1)(I) 2.** Every person listed below who, according to the property valuation administrator's records, owns property within 500 feet of the proposed tower has been: Given the Commission docket number under which the application will be processed: and

**Section 1 (1)(I) 3.** Every person listed below who, according to property valuation administrator's records owns property within 500 feet of the proposed tower has been: Informed of his right to request intervention.

LIST OF PROPERTY OWNERS

Gary D. and Mitzi G. Huff  
P.O. Box 122  
Benham, KY 40807

Pam and Wesley Sheffield  
P.O. Box 524  
Benham, KY 40807

City of Benham  
P.O. Box E  
Benham, KY 40807

Southeast Education Foundation  
700 College Road  
Cumberland, KY 40823

Benham Community Methodist Church  
P.O. Box 128  
Benham, KY 40807

Joyce Fugate  
P.O. Box 158  
St. Paul, VA 24283

Berchel and Reva H. Caudill  
P.O. Box 308  
Dungannon, VA 24245

Ernest and Jamie Marsh  
P.O. Box 361  
Benham, KY 40807

Roy Silver and Elaine Conradi  
P.O. Box G  
Benham, KY 40807

Angelo J. Sparacia  
7 Brush Hollow Road  
Holbrook, NY 11741

James Edward and Mary Jane Sneed  
242 Mcknight Street  
Benham, KY 40807

Herbert Douglas  
P.O. Box 551  
Benham, KY 40807

Shirley D. and Jimmy Hensley  
P.O. Box 303  
Benham, KY 40807

Clyde L. and Nancy Moneyhun  
P.O. Box 54  
Benham, KY 40807

Billie Jean Franks and  
Peggy Louis Duncum  
P.O. Box 403  
Benham, KY 40807

Tristan M. Curry  
181 Maggard Street  
Benham, KY 40807  
Rebecca Lewis  
C/O Michael Lewis  
P.O. Box 405  
Benham, KY 40807

Odyssey Inc.  
P.O. Box 686  
Louisa, KY 41230

Michael Hatfield  
P.O. Box 232  
Benham, KY 40807

June Schoonover  
P.O. Box 322  
Benham, KY 40807

Blair Bullock  
209 Beale Street  
Cumberland, KY 40823

Jack Martin  
P.O. Box 291  
Benham, KY 40807

Revelation Energy, LLC  
1051 Main Street  
Milton, WV 25541

Cecil B. and Missy Bowman  
182 Maggard Street  
Benham, KY 40807

Roger and Hilda Faye Raleigh  
P.O. Box 211  
Benham, KY 40807

Gary Lee and Dawne Fields  
P.O. Box 63  
Benham, KY 40807

Nona Cress and Jerry Ann Shoulter  
4585 Ward Road  
Morrow, OH 45152-9709

ACIN, LLC  
5260 Irvine Rd.  
Huntington, WV 25705

ARK Land Company



City Place One, Suite 300  
St. Louis, MO 63141



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Gary D. and Mitzi G. Huff  
P.O. Box 122  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

East Kentucky Network, LLC d/b/a Appalachian Wireless has applied to the Public Service Commission of Kentucky for a Certificate of Public Convenience and Necessity to construct and operate a new facility to provide cellular telecommunications service in Harlan County. The facility will include a 180-foot monopole tower with attached antennas extending upwards, and an equipment shelter located on a tract of land at McKnight Road, Benham, Harlan County, Kentucky. A map showing the location of the proposed new facility is enclosed. This notice is being sent to you because you may own property within a 500' radius of the proposed tower.

The Commission invites your comments regarding the proposed construction. You also have the right to intervene in this matter. The Commission must receive your initial communication within 20 days of the date of this letter as shown above.

Your comments and request for intervention should be addressed to: Executive Director's Office, Public Service Commission of Kentucky, P.O. Box 615, Frankfort, KY 40602. Please refer to Case No. 2015-00420 in your correspondence.

If you have any questions for East Kentucky Network, LLC, please direct them to my attention at the following address: East Kentucky Network, LLC, 101 Technology Trail, Ivel, KY 41642 or call me at 606-477-2355, Ext. 1007.

Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Pam and Wesley Sheffield  
P.O. Box 524  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1





VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

City of Benham  
P.O. Box E  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Southeast Education Foundation  
700 College Road  
Cumberland, KY 40823

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P: (606) 874-7550  
F: (606) 874-7531



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Benham Community Methodist Church  
P.O. Box 128  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1





VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Joyce Fugate  
P.O. Box 158  
St. Paul, VA 24283

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
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EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
PHONE: (606) 874-7550  
FAX: (606) 874-7531



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Berchel and Reva H. Caudill  
P.O. Box 308  
Dungannon, VA 24245

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1





VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Ernest and Jamie Marsh  
P.O. Box 361  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1

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101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P: (606) 874-7550  
F: (606) 874-7551



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Roy Silver and Elaine Conradi  
P.O. Box G  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
Tel: (606) 874-7550  
Fax: (606) 874-7551



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Angelo J. Sparacia  
7 Brush Hollow Road  
Holbrook, NY 11741

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T (606) 874-7550  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

James Edward and Mary Jane Sneed  
242 Mcknight Street  
Benham, KY 40807

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Lynn Haney  
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F: (606) 874-7551



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Herbert Douglas  
P.O. Box 551  
Benham, KY 40807

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Regulatory Compliance Director  
Enclosure 1

EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P: (606) 874-7550  
F: (606) 874-7551

EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Shirley D. and Jimmy Hensley  
P.O. Box 303  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

East Kentucky Network, LLC d/b/a Appalachian Wireless has applied to the Public Service Commission of Kentucky for a Certificate of Public Convenience and Necessity to construct and operate a new facility to provide cellular telecommunications service in Harlan County. The facility will include a 180-foot monopole tower with attached antennas extending upwards, and an equipment shelter located on a tract of land at McKnight Road, Benham, Harlan County, Kentucky. A map showing the location of the proposed new facility is enclosed. This notice is being sent to you because you may own property within a 500' radius of the proposed tower.

The Commission invites your comments regarding the proposed construction. You also have the right to intervene in this matter. The Commission must receive your initial communication within 20 days of the date of this letter as shown above.

Your comments and request for intervention should be addressed to: Executive Director's Office, Public Service Commission of Kentucky, P.O. Box 615, Frankfort, KY 40602. Please refer to Case No. 2015-00420 in your correspondence.

If you have any questions for East Kentucky Network, LLC, please direct them to my attention at the following address: East Kentucky Network, LLC, 101 Technology Trail, Ivel, KY 41642 or call me at 606-477-2355, Ext. 1007.

Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1

EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
I (606) 874-7550  
I (606) 874-7551



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Clyde L. and Nancy Moneyhun  
P.O. Box 54  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Billie Jean Franks and Peggy Louis Duncum  
P.O. Box 403  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
Enclosure 1

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101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
TEL: (606) 874-7550  
F: (606) 874-7551

EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Tristan M. Curry  
181 Maggard Street  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P: (606) 874-7350  
F: (606) 874-7551

EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Rebecca Lewis  
C/O Michael Lewis  
P.O. Box 405  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Odyssey Inc.  
P.O. Box 686  
Louisa, KY 41230

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
Enclosure 1

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IVEL, KY 41642  
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F (606) 874-7551



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Michael Hatfield  
P.O. Box 232  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

East Kentucky Network, LLC d/b/a Appalachian Wireless has applied to the Public Service Commission of Kentucky for a Certificate of Public Convenience and Necessity to construct and operate a new facility to provide cellular telecommunications service in Harlan County. The facility will include a 180-foot monopole tower with attached antennas extending upwards, and an equipment shelter located on a tract of land at McKnight Road, Benham, Harlan County, Kentucky. A map showing the location of the proposed new facility is enclosed. This notice is being sent to you because you may own property within a 500' radius of the proposed tower.

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Lynn Haney  
Regulatory Compliance Director  
Enclosure 1

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VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

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P.O. Box 232  
Benham, KY 40807

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Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

June Schoonover  
P.O. Box 322  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

East Kentucky Network, LLC d/b/a Appalachian Wireless has applied to the Public Service Commission of Kentucky for a Certificate of Public Convenience and Necessity to construct and operate a new facility to provide cellular telecommunications service in Harlan County. The facility will include a 180-foot monopole tower with attached antennas extending upwards, and an equipment shelter located on a tract of land at McKnight Road, Benham, Harlan County, Kentucky. A map showing the location of the proposed new facility is enclosed. This notice is being sent to you because you may own property within a 500' radius of the proposed tower.

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Blair Bullock  
209 Beale Street  
Cumberland, KY 40823

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
Enclosure 1



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P: (606) 874-7550  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Jack Martin  
P.O. Box 291  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Lynn Haney  
Regulatory Compliance Director  
Enclosure 1

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101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P (606) 874-7550  
F (606) 874-7551

EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Revelation Energy, LLC  
1051 Main Street  
Milton, WV 25541

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Cecil B. and Missy Bowman  
182 Maggard Street  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Roger and Hilda Faye Raleigh  
P.O. Box 211  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Gary Lee and Dawne Fields  
P.O. Box 63  
Benham, KY 40807

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

Nona Cress and Jerry Ann Shoulter  
4585 Ward Road  
Morrow, OH 45152-9709

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

ACIN, LLC  
5260 Irvine Rd.  
Huntington, WV 25705

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Regulatory Compliance Director  
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EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

PUBLIC NOTICE

February 15, 2016

ARK Land Company  
City Place One, Suite 300  
St. Louis, MO 63141

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

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Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure 1



# Appalachian Wireless Location Map



GPS Location

N 36 57 44.99

W 82 56 58.33

Name

Location

Benham Site

McKnight Rd. Benham, KY.

dba Appalachian Wireless  
101 Technology Trail  
Ivel, KY 41642  
Phone: 606-477-2355  
Fax: 606-791-2225

## EAST KENTUCKY NETWORK



<b>To:</b>	The Harlan Daily Enterprise	<b>From:</b>	Raina Helton
	Attn: Classifieds		Regulatory Compliance Assistant
<b>Email:</b>	ebell@civitasmedia.com	<b>Date:</b>	February 9, 2016
<b>Re:</b>	PUBLIC NOTICE ADVERTISEMENT	<b>Pages:</b>	1

Please place the following Public Notice Advertisement in The Harlan Daily Enterprise to be ran on February 16, 2016.

**PUBLIC NOTICE:**

RE: Public Service Commission of Kentucky (CASE NO. 2015-00420)

Public Notice is hereby given that East Kentucky Network, LLC, dba Appalachian Wireless has applied to the Kentucky Public Service Commission to construct a cellular telecommunications tower on a tract of land located on McKnight Road, Benham, Harlan County, Kentucky. The proposed tower will be a 180 foot monopole tower with attached antennas. If you would like to respond to this notice, please contact the Executive Director, Public Service Commission, 211 Sower Boulevard, PO Box 615, Frankfort, Kentucky 40602. Please refer to Case No. 2015-00420.

If you have any questions about the placement of the above mentioned notice, please call me at 606-477-2375, ext. 1005.

Thank you,

Raina Helton  
Regulatory Compliance Assistant

The message above and the information contained in the documents transmitted are confidential and intended only for the person(s) named above. Dissemination, distribution or copying of this communication by anyone other than the person(s) named above is prohibited. If you have received this communication in error, please notify us immediately by telephone and return the original message to us at the address listed above via regular mail. Thank you.



EAST KENTUCKY NETWORK  
101 TECHNOLOGY TRAIL  
IVEL, KY 41642  
P: (606) 874-7550  
F: (606) 874-7551

EAST KENTUCKY  
NETWORK



VIA: U.S. CERTIFIED MAIL

February 9, 2016

Dan Mosley, Judge Executive  
P.O. Box 956  
Harlan, KY 40831

RE: Public Notice-Public Service Commission of Kentucky (Case No. 2015-00420)

East Kentucky Network, LLC d/b/a Appalachian Wireless has applied to the Public Service Commission of Kentucky for a Certificate of Public Convenience and Necessity to construct and operate a new facility to provide cellular telecommunications service in Harlan County. The facility will include a 180-foot monopole tower with attached antennas extending upwards, and an equipment shelter located on a tract of land on McKnight Road, Benham, Harlan County, Kentucky. A map showing the location of the proposed new facility is enclosed. This notice is being sent to you because you are the County Judge Executive of Harlan County.

The Commission invites your comments regarding the proposed construction. You also have the right to intervene in this matter. The Commission must receive your initial communication within 20 days of the date of this letter as shown above.

Your comments and request for intervention should be addressed to: Executive Director's Office, Public Service Commission of Kentucky, P.O. Box 615, Frankfort, KY 40602. Please refer to Case No. 2015-00420 in your correspondence.

If you have any questions for East Kentucky Network, LLC, please direct them to my attention at the following address: East Kentucky Network, LLC, 101 Technology Trail, Ivel, KY 41642 or call me at 606-477-2355, Ext. 1007.

Sincerely,

Lynn Haney  
Regulatory Compliance Director  
Enclosure



# Appalachian Wireless Location Map



Location	McKnight Rd. Benham, KY.
Benham Site	

GPS Location
--------------

N 36 57 44.99
---------------

W 82 56 58.33
---------------

**APPALACHIAN WIRELESS**  
**Geotechnical Investigation on the**  
**Benham Site**  
**Located at McKnight Street,**  
**Benham, Kentucky 40807**  
**ERMC2 Project No. 165-000-0016**

PREPARED FOR:  
Appalachian Wireless.  
101 Technology Trail  
Ivel, Kentucky 41642

PREPARED BY:  
Richard Dirk Smith PE, PLS  
General Manager Appalachian Region  
**ENVIRONMENTAL RESOURCES MANAGEMENT**  
**CONSULTING COMPANY**  
230 Swartz Drive  
Hazard, Kentucky 41701



, 20215, December 15th, 2015





## **EXECUTIVE SUMMARY**

- 1.0 INTRODUCTION**
- 2.0 PROJECT DESCRIPTION**
- 3.0 SITE DESCRIPTION**
- 4.0 FIELD EXPLORATION**
  - 4.1 SITE INFORMATION
  - 4.2 BRING DATA
  - 4.3 GROUNDWATER
  - 4.4 SEISMIC SITE CLASSIFICATION
- 5.0 DISCUSSION AND RECOMMENDATIONS**
  - 5.1 GENERAL
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  - 5.3 SHALLOW FOUNDATIONS TOWER
  - 5.4 DEEP FOUNDATIONS
  - 5.5 ANCILLARY SUPPORT STRUCTURES
  - 5.6 BURIED UTILITIES
- 6.0 DISCUSSION AND RECOMMENDATIONS**
  - 6.1 SUSURFACE INVESTIGATION
  - 6.2 LABATORY AND FIELD TESTING
  - 6.3 ANALYSIS AND RECOMMENDATIONS
  - 6.4 CONSTRUCTION MONITORING
  - 6.5 GENERAL

## **SPECIFICATIONS**

- I - GENERAL**
- II – DRILLED PEIR INSTALATIONS**
- III – ENGINEERED FILL BENEATH STRUCTURES**
- IV – GUIDELINES FOR EXCAVATIONS AND TRENCHING**
- V – GENERAL CONCRETE SPECIFICATIONS**

## **APPENDIX A – BORING DATA SEISMIC DATA**

## **APPENDIX B – SITE MAPS**



## EXECUTIVE SUMMARY

A geotechnical investigation has been performed on the Benham Property. Located on McKnigh Street, in Benham Kentucky, 40807. This site is located on an empty lot and is readably accessible. A location map is shown in Figure 1 of this report. Four (4) borings were advanced to depths ranging from 15.5 ft. to 46.8 ft. The following geotechnical considerations were identified:

- Borings utilized for this study encountered coal mine reject material to a depth of 35.0 ft. at which point auger refusal was met.
- This area is an empty lot within a residential area.
- The area appears to be used as an underground coal reject dump. The borings encounter 0.7 feet of gravel, then coal mine reject material until auger refusal was met at 35.0 feet. A 10 ft. NX core was taken showing competent sandstone.
- The bearing capacities of the fill material is estimated less than 500 psf. and the underlying rock is 10 tsf. The fill material consist of coal fines with mine reject shales and clays. These materials are highly compressible and therefore shallow foundations is not recommended for this site.
- We recommend deep foundations for this site. Straight shaft drilled piers are recommended.
- The 2009 International Building Code seismic site classification utilizing rock bearing foundations for this site is "C", for shallow foundations the site classification will be "E"
- All support building for this tower will need remediated by undercutting the existing material and then backfilled with graded engineered fill as specified in this report.
- Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that ErMC2 be retained to monitor this portion of the work.

This executive summary is included to provide a general overview of the project and should not be relied upon except for the purpose it was prepared. Please rely on the complete report for the information on the findings, recommendation and all other concerns.



## 1. INTRODUCTION

Environmental Resources Management Consultant Company (ErMC2) was retained by Mr. Marty Thacker of Appalachian Wireless to prepare a geotechnical engineering report for the proposed tower site located on the McKnight Street, in Benham, Harlan County. A site location map is shown in Figure No. 1.

Four (4) borings were advanced to depths ranging from 15.5 ft. to 46.8 ft. Logs of the borings along with a boring location plan are included in Appendix A. The purpose of these services is to provide information and geotechnical engineering recommendations relative to subsurface conditions, earthwork, seismic considerations, groundwater conditions and foundation design.

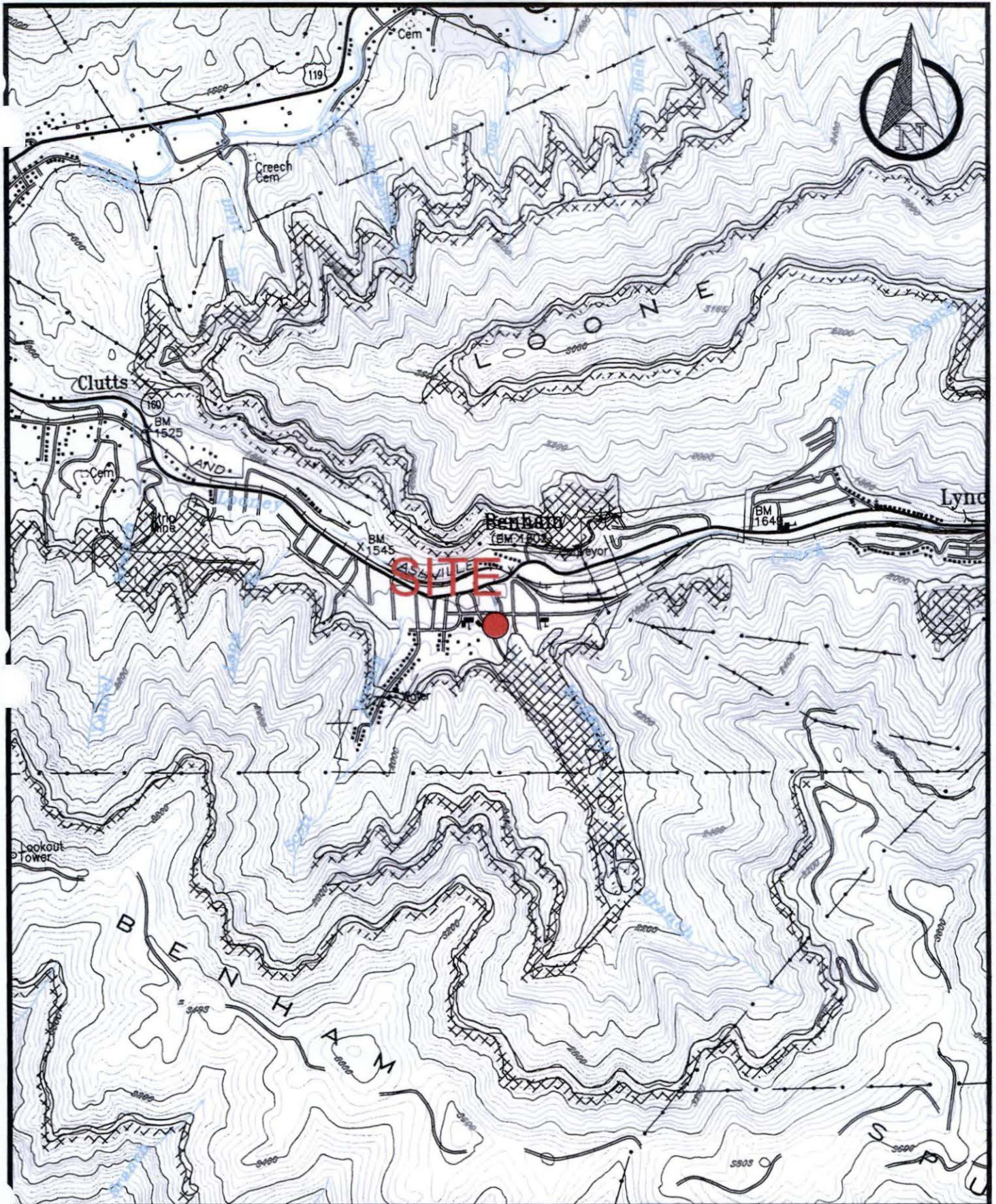
## 2.0 PROJECT DESCRIPTION

The proposed communication facility will consist of a self-supporting tower of undetermined height and ancillary support areas. The construction area will be approximately 24 ft. x 24 ft. Based upon information provided, we estimate the structural loads will be similar to the following conditions;

CONDITION	LOAD
Total Shear	40 Kips
Axial Load	50 Kips

We anticipate that overturning will govern the structural design. If the loading are significantly different than these expected values, ErMC2 should be notified to reevaluate the recommendations provided in this report.





wn:	Date: 12/2/15
Job:	Scale: 1"=2000'
Drawing:	
USGS SITE MAP	

APPALACHIAN WIRELESS  
BENHAM SITE  
FIGURE 1



921 Beasley Street, Suite 145  
Lexington, KY 40509  
(859)381-1000  
engineering@ermc2.us



### **3.0 SITE DESCRIPTION & HISTORICAL MINING**

This site is located on an empty lot and is readably accessible. Based upon review of historical documents, this site was once part of a permitted coal preparation facility. The site was last permitted by Harlan Reclamation Services, No. 848-8053. Our borings discovered fill of approximately 35.0 ft. in depth which consists primarily of coal reject materials.

ErMC2 reviewed available historical mine maps from the Kentucky Division of Mine Safety, Kentucky Mine Mapping Information System ("KMMIS"). Based on available data, no historical underground mining has occurred beneath this site..

Previous underground mining has been conducted in area(s) near the proposed tower site, however the site has not been undermined. Previous mining was conducted from the late 1930's through the late 1950's

### **4.0 FIELD EXPLORATION**

#### **4.1 SITE INFORMATION**

This site is located near residential lot on McKnight Street in Benham, Harlan County Kentucky. A boundary retracement survey was conducted on the property and provided to ErMC2. A proposed lot description and drawing is included in Appendix B of this report. The proposed tower lot was established and tied to the existing boundary. An estimated pad location was determined and boring locations were placed at the corners of proposed concrete pad for the towers support.

#### **4.2 BORING DATA**

Four (4) borings were made in the relative positions shown on the Boring Location Map in Appendix A. The boring logs and resulting data are also included in Appendix A. The borings were made with a track mounted boring rig using hollow-stem augers and employing standard penetration resistance methods (ASTM D-1586, which includes 140-pound hammer, 30-inch drop, and two-inch-O.D. split-spoon sampler) at maximum depth intervals of five feet or at major changes in stratum, whichever occurred first. The disturbed split-spoon samples were visually classified, logged,







Drawn:	Date: 12/2/15
Job:	Scale: 1"=2000'
Drawing: GQ SITE MAP	

APPALACHIAN WIRELESS  
BENHAM SITE  
FIGURE 2



921 Beasley Street, Suite 145  
Lexington, KY 40509  
(859)381-1000  
engineering@ermc2.us



sealed in moisture-proof jars, and taken to the ERM2 laboratory for study. The depths where these "A"-type split-spoon samples were collected are noted on the boring logs. The results of the natural moisture contents by boring and interval are shown in Table 1.

TABLE 1  
RESULTS OF NATURAL MOISTURE CONTENT TESTS (ASTM D-4643)

BORING NO.	DEPTH INCREMENT, (FT.)	NATURAL MOISTURE CONTENT, %
B1	4.0-5.5	18.8%
B1	9.0-10.5	21.8%
B1	14.5-10.5	14.1%
B1	19.0-20.5	20.4%
B1	24.0-25.5	12.9%
B2	0.0-1.5	10.6%
B2	4.0-5.5	11.1%
B2	9.0-10.5	10.3%
B2	14.0-15.5	16.2%
B3	0.0-1.5	7.3%
B3	4.0-5.5	14.1%
B3	9.0-10.5	15.6%
B3	14.0-15.5	15.0%
B4	0.0-1.5	10.5%
B4	4.0-5.5	9.7%
B4	9.0-10.5	22.4%
B4	14.0-15.5	15.0%

In order to determine the depth of the existing fill, boring B-1 was extended to auger refusal to a depth of 35 ft. at which point a ten foot NX core was taken in this rock.





### **4.3 GROUNDWATER**

Groundwater observations were made during the drilling operations (by noting the depth to water on the drilling tools) and in the open boreholes following withdrawal of the drilling augers. No groundwater levels were noted during drilling activities.

### **4.4 SEISMIC SITE CLASSIFICATION**

Based on using underlying rock foundations at the project site, the site classification was determined to be "Site Class C" per the Kentucky Building Code. In addition, a  $S_{DS}$  coefficient of 0.260g was calculated, and a  $S_{D1}$  coefficient of 0.107g was also calculated for design based on the aforementioned building code. If shallow foundations with remediated engineered backfill is used the site classification was determined to be "Site Class E" per the Kentucky Building Code. In addition, a  $S_{DS}$  coefficient of 0.489g was calculated, and a  $S_{D1}$  coefficient of 0.219g was also calculated for design based on the aforementioned building code.

## **5.0 DISCUSSION AND RECOMMENDATIONS**

### **5.1 GENERAL**

The structure will be a self-supporting free standing tri-pole tower. Due to wind loading, lattice tower foundations can experience both vertical loads and horizontal loads. The vertical loads act in both an upward and downward direction as the tower attempt to overturn and can act in any directions.

### **5.2 FOUNDATIONS**

It is our understanding that the foundations for these structures can be designed to bear on low bearing pressure soils. This report demonstrates the different expected bearing capacities based upon the type of material encountered from the boring logs and sampling taken at the site.

Approximately 35 feet of fill is present at this proposed location. It consists of mixture of gravel, coal mine reject material and coal fines. Standard penetrations test were conducted on five foot intervals in this material.



The approximate elevation of the surface of the site is 1635 ft. The standard penetration tests were conducted on five foot intervals within the fill material. The blow counts (N) ranged from 3 to 24 to the depth of 35.0 feet.

### 5.3 SHALLOW FOUNDATIONS TOWER

Typically we do not recommend shallow foundations on sites consisting of non-engineered fill material. Foundation design on non-cohesive soil is usually governed by acceptable settlement, and this restriction on bearing pressure is usually much lower than the ultimate bearing capacity divided by the factor of safety of 3. Generally only in the case of narrow strip foundations on loose submerged sands it is vital to determine the ultimate bearing capacity, since this may be more critical than settlement. Settlement can and is likely to occur once the final structure's loading is in place. No settlement calculations have been evaluated for this report. If shallow foundations are used it should be noted that the material type and bearing capacity can vary significantly due to the inconsistency of the underlying material. Based upon the laboratory and field testing, visual inspection of the materials and practical experience we have estimated that the bearing capacity of the soils to **be less than 500 psf.**

If shallow foundations are used we recommend that site be over excavated to a minimum of (20) twenty ft. below the footing subgrade and (20) twenty ft. outside the footing area. Any large rock and unsuitable material be removed and backfilled with a select backfill or dense grade aggregate. The material is to be placed in 8 inch horizontal lifts, compacted to not less than 95% of the maximum density as determined in accordance with the Standard Proctor dry unit weight (ASTM D-968) and within +2% and -2% of the optimum moisture content. This will not eliminate the potential for settlement but should assist in limiting differential settlement under the proposed foundation. This remediation of the site would increase the bearing capacity to an estimated value of **1500 psf.**

### 5.4 DEEP FOUNDATIONS

Auger refusal was encountered at approximately 35 feet below the surface. A rock core was taken of grey sandstone w/ shale streaks with a RQD value of 71. The bearing capacity for this is 10 tsf. Deep foundations are recommended for this site. If





deep foundation are used they should be constructed with 4000 psi reinforced concrete with a minimum of 24 in. diameter piers socketed into competent rock a minimum of 18 in. deep.

## **5.6 ANCILLARY SUPPORT STRUCTUES**

All support structures, roadways and concrete pads constructed on this site should be undercut a minimum of 3 ft. and be backfilled and compacted with graded material in 8 inch horizontal lifts.

## **5.6 BURIED UTILITES**

Excavations for buried utility pipelines should follow the guidelines set forth in this report. Depending on the pipeline material, a minimum thickness of at least 0.5 foot of select fine-grained granular bedding material should be used beneath all below-grade pipes, with a minimum cover thickness of at least 3 feet to afford an "arching" effect and reduce stresses on the pipe. The cover thickness may be reduced if the external loading condition on the pipe is relatively light or if the pipe is designed to withstand the external loading condition. It is not recommended that "pea-gravel" or other "open-work" aggregates be used for trench backfill since these materials are nearly impossible to compact and have a tendency to pond water within their interstices.

## **6.0 WARRANTY**

Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. No other warranty, express or implied, is made.

While the services of ErMC2 are a valuable and integral part of the design and construction teams, we do not warrant, guarantee, or insure the quality or completeness of services provided by other members of those teams, the quality, completeness, or satisfactory performance of construction plans and specifications which we have not prepared, nor the ultimate performance of building site materials.



## **6.1 SUBSURFACE EXPLORATION**

Subsurface exploration is normally accomplished by test borings, although test pits are sometimes employed. The method of determining the boring location and the surface elevation at the boring is noted in the report, and is presented on the Boring Location Plan or on the boring log. The location and elevation of the boring should be considered accurate only to the degree inherent with the method used.

The boring log includes sampling information, description of the materials recovered, approximate depth of boundaries between soil and rock strata and groundwater data. The boring log represents conditions specifically at the location and time the boring was made. The boundaries between different soil strata are indicated at specific depths; however, these depths are in fact approximate and are somewhat dependent upon the frequency of sampling (The transition between soil strata is often gradual). Free groundwater level readings are made at the times and under conditions stated on the boring logs (Groundwater levels change with time and season). The borehole does not always remain open sufficiently long for the measured water level to coincide with the groundwater table.

## **6.2 LABORATORY AND FIELD TESTS**

Laboratory and field tests are performed in accordance with specific ASTM standards unless otherwise indicated. All determinations included in a given ASTM standard are not always required and performed. Each test report indicates the measurements and determinations actually made.

## **6.3 ANALYSIS AND RECOMMENDATIONS**

The geotechnical report is prepared primarily to aid in the engineering design of site work and structural foundations. Although the information in the report is expected to be sufficient for these purposes, it is not intended to determine the cost of construction or to stand alone as a construction specification.

Our engineering report recommendations are based primarily on data from test borings made at the locations shown on a boring location drawing included. Soil variations may exist between borings and these variations may not become evident until construction. If significant variations are then noted, the geotechnical engineer

should be contacted so that field conditions can be examined and recommendations revised if necessary.

The geotechnical engineering report states our understanding as to the location, dimensions and structural features proposed for the site. Any significant changes in the nature, design, or location of the site improvements **MUST** be communicated to the geotechnical engineer such that the geotechnical analysis, conclusions, and recommendations can be appropriately adjusted. The geotechnical engineer should be given the opportunity to review all drawings that have been prepared based on their recommendations.

#### **6.4 CONSTRUCTION MONITORING**

Construction monitoring is a vital element of complete geotechnical services. The field engineer/inspector is the owner's "representative" observing the work of the contractor, performing tests as required in the specifications, and reporting data developed from such tests and observations. The field engineer or inspector does not direct the contractor's construction means, methods, operations or personnel. The field inspector/engineer does not interfere with the relationship between the owner and the contractor and, except as an observer, does not become a substitute owner on site. The field inspector/engineer is responsible for his own safety but has no responsibility for the safety of other personnel at the site. The field inspector/engineer is an important member of a team whose responsibility is to watch and test the work being done and report to the owner whether that work is being carried out in general conformance with the plans and specifications.

#### **6.5 GENERAL**

The scope of our services did not include an environmental assessment for the presence or absence of hazardous or toxic materials in the soil, surface water, groundwater or air, on, within or beyond the site studied. Any statements in the report or on the boring logs regarding odors, staining of soils or other unusual items or conditions observed are strictly for the information of our client.

To evaluate the site for possible environmental liabilities, we recommend an environmental assessment, consisting of a detailed site reconnaissance, a record





review, and report of findings. Additional subsurface drilling and samplings, including groundwater sampling, may be required

This report has been prepared for the exclusive use of Appalachian Wireless, for specific application to the proposed cellular tower located on the Benham Property located in Harlan County, Kentucky. Specific design and construction recommendations have been provided in the various sections of the report. The report shall, therefore, be used in its entirety. This report is not a bidding document and shall not be used for that purpose. Anyone reviewing this report must interpret and draw their own conclusions regarding specific construction techniques and methods chosen. ErMC2 is not responsible for the independent conclusions, opinions or recommendations made by others based on the field exploratory and laboratory test data presented in this report.





# **SPECIFICATIONS**

## **I – GENERAL**

### **1.0 STANDARDS AND DEFINITIONS**

**1.1 STANDARDS** - All standards refer to latest edition unless otherwise noted.

**1.1.1** ASTM D-698-70 (Method C) "Standard Test Methods for Moisture, Density Relations of Soils and Soil Aggregate Mixtures Using 5.5-lb (2.5 kg.) Rammer and 12-inch (305-mm) Drop".

**1.1.2** ASTM D-2922 "Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear methods (Shallow Depth)".

**1.1.3** ASTM D-1556 "Standard Test Method for Density of Soil in place by the Sand-Cone Method".

### **1.2 DEFINITIONS**

**1.2.1** Owner - In these specifications the word "Owner" shall mean Appalachian Wireless.

**1.2.2** Engineer - In these specifications the word "Engineer" shall mean the Owner designated engineer.

**1.2.3** Design Engineer - In these specifications the words "Design Engineer" shall mean mean the Owner designated design engineer.

**1.2.4** Contractor - In these specifications the word "Contractor" shall mean the firm or corporation undertaking the execution of any work under the terms of these specifications.

**1.2.5** Approved - In these specifications the word "approved" shall refer to the approval of the Engineer or his designated representative.

**1.2.6** As Directed - In these specifications the words "as directed" shall refer to the directions to the Contractor from the Owner or his designated representative.

### **2.0 GENERAL CONDITIONS**

**2.1** The Contractor shall furnish all labor, material and equipment and perform all work and services except those set out and furnished by the



Owner, necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, grading as shown on the plans and as described therein.

This work shall consist of all mobilization clearing and grading, grubbing, stripping, removal of existing material unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the observation of the Owner or his designated representative.

- 2.2** Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the Contractor believes to be a changed condition should not be disturbed so that the owner can investigate the condition.

- 2.3** The construction shall be performed under the direction of an experienced engineer who is familiar with the design plan.



## **II - DRILLED PIER INSTALLATION**

### **1.0 DRILLING PROCEDURE**

- 1.1** Drilled piers will be installed with large caisson drill rigs capable of torque and crowd forces sufficient to install drilled piers at the project site given the in-situ soil conditions.
- 1.2** The drill rig kelly bar and auger will be carefully and accurately placed over the centerline of the drilled pier. The Contractor is responsible for providing necessary surveying to verify drilled pier location before, during, and after the drilled pier installation.
- 1.3** The augers are advanced downwards as they are rotated such that drilling of the soil mass is efficiently accomplished. Depending on the subsurface conditions, and the requirements for the given project, a temporary steel casing should be installed at this time to preclude caving of the soil and/or broken rock mass being penetrated.

### **2.0 CASING INSTALLATION**

- 2.1** The casing will be checked for centerline accuracy and plumbness by the Contractor's survey crew. During casing installation, the Contractor's survey crew will verify alignment with instruments. If plumbness and alignment are not within tolerance as determined by the Contractor's survey crew, the casing will be extracted and re-aligned as necessary.
- 2.2** The drill rig will remove soil and bedrock material from within the casing to the drilled pier design tip elevation. A steel casing, or "Sonotube" shall be inserted into the borehole to preclude cave-ins and/or instability in the borehole.

- 2.3 The bearing surface within the drilled pier will be inspected by a registered Professional Engineer prior to being approved for structural concreting.

### **3.0 INSTALLATION OF THE REBAR CAGE**

- 3.1 An epoxy coated spiral reinforcing steel cage will be installed while in the drilled pier borehole.
- 3.2 To assist in assuring that the reinforcing steel cage does not settle during concrete pumping, a mat of reinforcing steel bars will be installed across the bottom of the reinforcing steel cage perpendicular to the vertical axis of the cage. The exact number of bars will be determined and installed by the Structural Engineer. The number of rebar boots used on the bottom of the cage will also be determined by the Structural Engineer.
- 3.3 The reinforcing steel cage will be lowered into the drilled pier borehole, while drilled pier spacers are placed at intervals as required by the Structural Engineer. The reinforcing steel cage will be checked for alignment by the Contractors survey crew.
- 3.4 The crane will remain attached to the reinforcing steel cage while the concrete pump outlet pipe is lowered to just above the bottom of the drilled pier. The concrete pump pipe sections will be welded together to assure that do not separate during pumping.

### **4.0 CONCRETING OF THE DRILLED PIER**

- 4.1 Concrete pumping may commence once the bearing surface has been approved in accordance with Clause 2.3
- 4.2 A three inch trash pump will be used to pump slurry and/or water from within the casing and from above the newly pumped concrete.



- 4.3** The concrete pump outlet pipe will maintain at least ten (10) feet of embedment into the fresh concrete. The concrete level in the casing will be monitored.
- 4.4** The casing will be completely extracted with the crane and/or vibratory hammer. Caisson clamps on the vibratory hammer (if applicable) will be adjusted to the proper dimension to withdrawal the casing.
- 4.5** The concrete will be terminated at the top of drilled pier elevation and screeded flat.
- 4.6** The upper reinforcing steel dowel cage will be lowered into the concrete to the embedment elevation. If necessary, the concrete will be vibrated to assist in placement. Alignment will be verified by the Contractors survey crew and the cage will be sufficiently braced.



### **III - ENGINEERED FILL BENEATH STRUCTURES CLEARING AND GRADING SPECIFICATIONS**

#### **1.0 GENERAL CONDITIONS**

The Contractor shall furnish all labor, materials, and equipment, and perform all work and services necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction and grading as shown on the plans and as described therein.

This work shall consist of all clearing and grading, removal of existing structures unless otherwise stated, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the lines, grades, slopes, and specifications.

This work is to be accomplished under the constant and continuous supervision of the Owner or his designated representative.

In these specifications the terms "approved" and "as directed" shall refer to directions to the Contractor from the Owner or his designated representative.

#### **2.0 SUBSURFACE CONDITIONS**

Prior to bidding the work, the Contractor shall examine, investigate and inspect the construction site as to the nature and location of the work, and the general and local conditions at the construction site, including without limitation, the character of surface or subsurface conditions and obstacles to be encountered on and around the construction site; and shall make such additional investigation as he may deem necessary for the planning and proper execution of the work. Borings and/or soil investigations shall have been made. Results of these borings and studies will be made available by the Owner to the Contractor upon his request, but the Owner is not responsible for any interpretations or conclusions with respect thereto made by the Contractor on the basis of such information, and the Owner further has no responsibility for the accuracy of the borings and the soil investigations.

If conditions other than those indicated are discovered by the Contractor, the Owner should be notified immediately. The material which the contractor believes to be a





changed condition should not be disturbed so that the Owner can investigate the condition.

### **3.0 SITE PREPARATION**

Within the specified areas, all trees, brush, stumps, logs, tree roots, and structures scheduled for demolition shall be removed and disposed of.

All cut and fill areas shall be properly stripped. Topsoil will be removed to its full depth and stockpiled for use in finish grading. Any rubbish, organic and other objectionable soils, and other deleterious material shall be disposed of off the site, or as directed by the Owner or his designated representative if on site disposal is provided. In no case shall such objectionable material be allowed in or under the fill unless specifically authorized in writing.

Prior to the addition of fill, the original ground shall be compacted to job specifications as outlined below. Special notice shall be given to the proposed fill area at this time. If wet spots, spongy conditions, or groundwater seepage is found, corrective measures must be taken before the placement of fill.

### **4.0 FORMATION OF FILL AREAS**

Fills shall be formed of satisfactory materials placed in successive horizontal layers of not more than eight (8) inches in loose depth for the full width of the cross-section. The depth of lift may be increased if the Contractor can demonstrate the ability to compact a larger lift. If compaction is accomplished using hand-tamping equipment, lifts will be limited to 4-inch loose lifts. Engineered fill placed below the structure bearing elevation shall be compacted to at least 95% of the maximum dry unit weight with a moisture content within 2% of the optimum moisture content as determined by the modified Proctor test.

All material entering the fill shall be free of organic matter such as leaves, grass, roots, and other objectionable material.

The operations on earth work shall be suspended at any time when satisfactory results cannot be obtained because of rain, freezing weather, or other unsatisfactory conditions. The Contractor shall keep the work areas graded to provide the drainage at all times.





The fill material shall be of the proper moisture content before compaction efforts are started. Wetting or drying of the material and manipulation to secure a uniform moisture content throughout the layer shall be required. Should the material be too wet to permit proper compaction or rolling, all work thus affected shall be delayed until the material has dried to the required moisture content. The moisture content of the fill material should be no more than two (2) percentage points higher or lower than optimum unless otherwise authorized. Sprinkling shall be done with equipment that will satisfactorily distribute the water over the disced area. Any areas inaccessible to a roller shall be consolidated and compacted by mechanical tampers. The equipment shall be operated in such a manner that hardpan, cemented gravel, clay or other chunky soil material will be broken up into small particles and become incorporated with the other material in the layer.

In the construction of filled areas, starting layers shall be placed in the deepest portion of the fill, and as placement progresses, additional layers shall be constructed in horizontal planes. Original slopes shall be continuously, vertically benched to provide horizontal fill planes. The size of the benches shall be formed so that the base of the bench is horizontal and the back of the bench is vertical. As many benches as are necessary to bring the site to final grade shall be constructed. Filling operations shall begin on the lowest bench, with the fill being placed in horizontal eight (8) inch thick loose lifts unless otherwise authorized. The filling shall progress in this manner until the entire first bench has been filled, before any fill is placed on the succeeding benches. Proper drainage shall be maintained at all times during benching and filling of the benches, to insure that all water is drained away from the fill area.

Frozen material shall not be placed in the fill nor shall the fill be placed upon frozen material.

The Contractor shall be responsible for the stability of all fills made under the contract, and shall replace any portion, which in the opinion of the Owner or his designated representative, has become displaced due to carelessness or negligence on the part of the Contractor. Fill damaged by inclement weather shall be repaired at the Contractor's expense.

## **5.0 SLOPE RATIO AND STORM WATER RUN-OFF**

Slopes shall not be greater than 2 (horizontal) to 1 (vertical) in both cut and fill, or as illustrated on the construction drawings. Excavations shall be constructed in accordance with all Federal, State and local codes relative to slope geometry.

## **6.0 GRADING**

The Contractor shall furnish, operate, and maintain such equipment as is necessary to construct uniform layers, and control smoothness of grade for maximum compaction and drainage.

## **7.0 COMPACTING**

The compaction equipment shall be approved equipment of such design, weight, and quantity to obtain the required density in accordance with these specifications.

## **8.0 TESTING AND INSPECTION SERVICES**

Testing and inspection services will be provided by the Owner.





#### **IV GUIDELINES FOR EXCAVATIONS AND TRENCHES**

The following represents some general guidelines relative to the design and construction of excavations and trenches. It must be emphasized that these guidelines are not intended to represent a "safety plan," but rather are presented herein to provide general guidance with regard to the design characteristics and safety measures for excavations and trenches.

**1. Check with the following utilities prior to breaking ground:**

- Sewer
- Telephone
- Fuel
- Electric
- Water
- Gas
- Cable

When utility companies or owners do not respond to your request within 48 hours, the contractor may only then proceed provided the contractor does so with caution by using detection equipment or other acceptable means to locate utility installations.

Once the excavation is open, the contractor should protect and support the exposed underground utilities or remove installations to safeguard workers and prevent damage to exposed utilities.

**2. Access and egress ramps must be designed by a "competent person" and structural ramps used for equipment must be designed by a "competent person" with qualified knowledge in structural design. In addition:**

- Ramps must be secured to prevent displacement;
- Ramps used in lieu of steps must have cleats to prevent slipping; and
- Trenching excavations four feet or greater in depth must have a stairway, ladder, ramps or other safe means to egress with lateral travel no more than 25 feet.

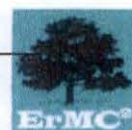
**3. Workers must be provided with reflector garments, such as warning orange or red vests, when exposed to vehicular traffic.**



4. Contractors must not allow workers to work under or near equipment when there is danger of falling debris, spillage or equipment-related injuries.
5. Mobile equipment, operating adjacent to an open excavation or approaching the edge of an excavation, must have one of the following when the operator's view is obstructed:
  - Warning System
  - Mechanical Signals
  - Barricades
  - Stop Logs
  - Hand Signals
6. The contractor must check the atmosphere for hazardous gases and oxygen deficiencies when excavating four feet or greater around landfills, or when hazardous substances are stored nearby, and when the contractor expects there could be any exposure to the workers.
7. When hazardous atmospheric conditions exist, or when conditions could change, the contractor must make emergency rescue equipment readily available including breathing apparatus, safety harnesses with life lines and a basket stretcher.
8. When workers enter bell-bottom pier holes or other deep and confined excavations, the worker must wear (at all times while performing work in the confined space) a separate life line attached to a harness. The line must be attended by someone above while work is being performed. The worker must check for hazardous atmospheric conditions prior to entry.
9. The contractor must ensure that water does not accumulate in open excavations and must inspect the excavation prior to allowing workers to re-enter after heavy rains.
10. Adjacent structures (buildings, walls, etc.) must be supported or secured to prevent worker exposure to unsafe conditions and damage to existing structures.



11. A registered professional engineer must approve operations when a contractor underpins existing structures to ensure worker safety and prevent damage to existing structures.
12. Workers must not be exposed to loose soil and rock or materials in and around excavations. Materials, such as removed soil and rock, must not be stored closer than two feet from the edge of the excavation.
13. Daily inspections of the excavation, the adjacent areas and protective systems must be made by a "competent person" for evidence of possible cave-ins, indications of failure of protective systems, hazardous atmospheres or other hazardous conditions. The "competent person" must stop work immediately and remove workers from the excavation when conditions change and pose a threat to their safety.
14. Workers must not be exposed to fall hazards associated with excavations. Protective walkways or bridges with standard guard rails must be provided.
15. All wells, pits, shafts etc. must be barricaded or covered. After completion of work, all wells, pits, shafts etc. must be backfilled.





## **V - GENERAL CONCRETE SPECIFICATIONS**

### **1.0 GENERAL**

It is the intent of this specification to secure, for every part of the work, concrete of homogenous structure which, when hardened, will have the required strength and resistance to weathering. To this end, the limiting values of concrete and the requirements hereinafter specified must be met. Standard tests of the cement, aggregates, concrete and reinforcement will be made by the Owner as it sees fit. The Contractor shall furnish the material for all required samples plus such labor as required to obtain samples. The Contractor shall provide to authorized representatives of the Owner, convenient access to all parts of the work of all concreting operations for the purpose of sampling and inspection.

### **2.0 SCOPE**

Contractor shall furnish all materials, labor, services, transportation, tools, equipment, and related items required to complete work indicated on the drawings and/or specified.

Unless otherwise noted or as modified by more stringent requirements specified herein, all plain and reinforced concrete work shall be performed in full compliance with applicable requirements of the Building Code Requirements for Reinforced Concrete ACI 318.

Contractor shall obtain Owner's approval of all subgrades, footing bottoms, forms, and reinforcement just prior to placing concrete.

Contractor shall coordinate the work specified in this section with that specified in other sections so that all anchors, pipes and other embedded items are properly installed before concrete is placed.

Contractor shall clean all exposed concrete surfaces and obtain approval of Owner for method of cleaning.

### **3.0 MATERIALS**

All materials shall be of the respective quality specified herein, delivered, stored, and handles as to prevent inclusion of foreign matter and damage by



dampness or breakage. Packaged material shall be stored in original container until ready for use. Materials showing evidence of dampness or other damage may be rejected.

- A. Fine and Coarse Aggregates: Coarse and fine aggregates shall conform to ASTM Specification C33. The maximum size of aggregate shall not be larger than one-fifth (1/5) of the narrowest dimensions between forms, or larger than three fourths (3/4) of the minimum clear spacing between reinforcement.
1. Fine Aggregate: Sand shall be composed essentially of clean, hard, strong, durable grains free of structurally weak grains, organic matter, loam, clay, silt, salt, mica or other fine materials that may effect bonding of the cement paste.
  2. Coarse Aggregate: Cement concrete shall consist of crushed rock or screened gravel and shall be composed essentially of clean, hard, strong and impermeable particles, resistant to wear and frost and free from deleterious amounts of organic matter, loam, clay, salts, mica, and soft, thin, elongated, laminated or disintegrated stone, and shall be inert to water and cement.
- B. Portland Cement: Portland cement shall conform to ASTM Specification C150. Type I or Type II Portland Cement shall be used provided that they are not intermixed during any one batch. Type II Portland Cement shall not be used unless indicated on the plans.
- C. Water: Water for mixing and curing shall be clean, fresh, and free from deleterious materials.
- D. Metal Reinforcement: Rebar shall be Grade 60 and with deformations conforming to ASTH Specification A305. Welded wire mesh shall conform to W4 x W4 size and be of Grade 60 steel.
- E. Admixtures: Except as herein noted, admixtures shall not be used.
1. Under adverse weather conditions only retarding or accelerating agents containing no chloride may be used.
  2. Air-Entraining Agent shall be used for all concrete will give an entrained air range of not less than 4 percent but no greater than 8 percent in the finished product. Under no circumstances shall the air-entraining be interground with cement.
  3. Approval in writing shall be required from Owner prior to the use of any admixture.





#### **4.0 FORM**

Forms shall be constructed with proper shoring and cross-bracing, safeguarding the total structure and specifically lateral stability and sufficiently strong to stand vibrations of concrete and to carry, without appreciable deflection or displacement, all dead and live loads to which they may be subjected.

#### **5.0 INSERTS, ETC.**

Anchors, bolts, dowels, conduit, waterstops, vent pipes and other similar built-in or concreted-in items shall be properly located, accurately positioned and secured. The Contractor shall cooperate in placing of such items with other contractors who require a fastening device for their work and he shall maintain them in proper location during the progress of his work.

#### **6.0 REINFORCEMENT**

Reinforcement at the time concrete is placed shall be free from rust, scale or other coatings that will destroy or reduce the bond.

Reinforcement shall be accurately placed and securely tied at intersections and shall be securely held in position during the placing of concrete by pacers, chairs, or other approved supports.

The reinforcement of foundations, footings and other principal structural members in which the concrete is deposited against the ground shall not have less than three (3) inches of concrete between it and the ground contact surface. If concrete surfaces after removal of the forms are to be exposed to the weather or to be in contact with the ground or rock, reinforcement shall be protected with not less than two (2) inches of concrete,

#### **7.0 CONCRETE**

Concrete for the various parts of the work shall be of 4000 pounds per square inch compressive strength with a minimum 28-day cure. Contractor is responsible to provide a mix of not less than 6 bags of cement per yard of concrete and not more than 7 gallons of water per bag of cement, producing a minimum slump of 2-1/2 inches and a maximum slump of 4-1/2 inches. Concrete that exceeds the above range of maximum or minimum slump





requirements may be rejected by the Owner. All concrete shall be air-entrained. Contractors are required to furnish the name or names of the company(s) that will be providing the mix. The Owner reserves the right to disapprove any concrete supplier that has been known to supply an undesirable material to the Owner on previous occasions.

## **8.0 DEPOSITING CONCRETE**

4.1. Preparation for Placing Concrete: Before depositing concrete, the Contractor shall:

1. Remove from space to be occupied by concrete all debris, including snow, ice, and water unless otherwise permitted by Owner.
2. Provide diversion, satisfactory to Owner, of any flow of water to an excavation so as to avoid washing the freshly deposited concrete.
3. Coat the forms prior to placing of reinforcing steel as required in form work.
4. Secure firmly in correct position, all reinforcement and other items to be encased and remove therefrom all coating including ice and frost.

B. Transportation of Concrete from Batch Plant: The concrete shall be delivered to the site of the work and discharge shall be completed within 90 minutes after addition of the cement and water to the aggregates. Each batch of concrete delivered at the job site shall be accompanied by a time slip issued at the batching plant, bearing the time of charging of the mixer drum with the cement and aggregates.

C. Transporting of Concrete from Mixer to Place of Final Deposit: Transportation shall be done as rapidly as practical by means which shall prevent the separation or loss of the ingredients. If chutes are used, they shall be at a slope not flatter than one vertical to two horizontal. Buggies or carts shall be equipped with pneumatic rubber tires or surfaces of runways shall be sufficiently smooth or both so as not to cause separation or segregation of concrete ingredients. Concrete shall not be allowed to drop freely more than 4 feet. Where greater drops are



required, canvas "elephant trunks" or galvanized iron chutes equipped with suitable hopper heads shall be employed and a sufficient number placed to insure that the concrete may be effectively compacted into horizontal layers not exceeding 12 inches in thickness with minimum lateral movements.

D. Depositing of Concrete: Depositing of concrete shall:

1. Proceed continuously after once starting until reaching the end of a section of construction joint location shown on the drawings, or as approved by the Owner. The operations shall be conducted so that no concrete is deposited on concrete sufficiently hardened to cause formation of seams, and planes of weakness.
2. Be as near as practical to its final position in the forms.
3. Proceed so as to maintain constantly a top surface which is approximately level.
4. Be placed before initial set has occurred, and in no event after it has contained its water content for more than 90 minutes.
5. Be thoroughly worked and compacted by means of suitable tools to provide impermeability, durability and strength and shall be thoroughly worked around reinforcements and embedded items and into corners of forms and so as to be free from voids, pockets or honeycombing. Particular care shall be taken to provide impermeability.

E. Vibration Equipment: Vibration equipment shall be of the appropriate type and shall, at all times, be adequate in number of units and power of each unit to properly consolidate all concrete.

F. Monolithic Pours: Proper delivery of concrete shall be the Contractor's responsibility in order to make a mono-lithic pour without delays and changes of cold joints.

## 9.0 CURING

All concrete work shall be protected from injurious action by the sun, rain, flowing water, frost and other injury and shall be covered with plastic after application of curing compound for three (3) days on pours located above ground.





Contractor shall not remove any formwork for a minimum period of 24 hours after a concrete pour without written approval of the Owner.

#### **10.0 CONCRETE FINISHES**

Finishes of all exposed concrete shall be free of defects which impair its durability or adversely affect its appearance. All such surfaces when stripped, shall be uniform in appearance and any surfaces displaying any deviations from adjacent uniform surfaces shall be rejected and subject to removal.

Finished work shall be level and plumb, true to lines, and dimensions. Finished plane surfaces shall be smooth, and as nearly perfect as practical; however deviations from a true plane shall not exceed 1/8 inch when measured from a 6-foot straight edge placed against the surface to any point on the surface and under the straight edge.

All exposed surfaces shall have defects corrected, protrusions removed, and holes filled.



## APPENDIX A BORING DATA AND SEISMIC INFORMATION





Environmental Resources Management Consulting Company, LLC  
230 Swartz Drive  
Hazard, KY 41701

[illegible]

[illegible]









# Design Maps Summary Report

## User-Specified Input

Report Title Benham Tower Site

Wed December 16, 2015 21:50:04 UTC

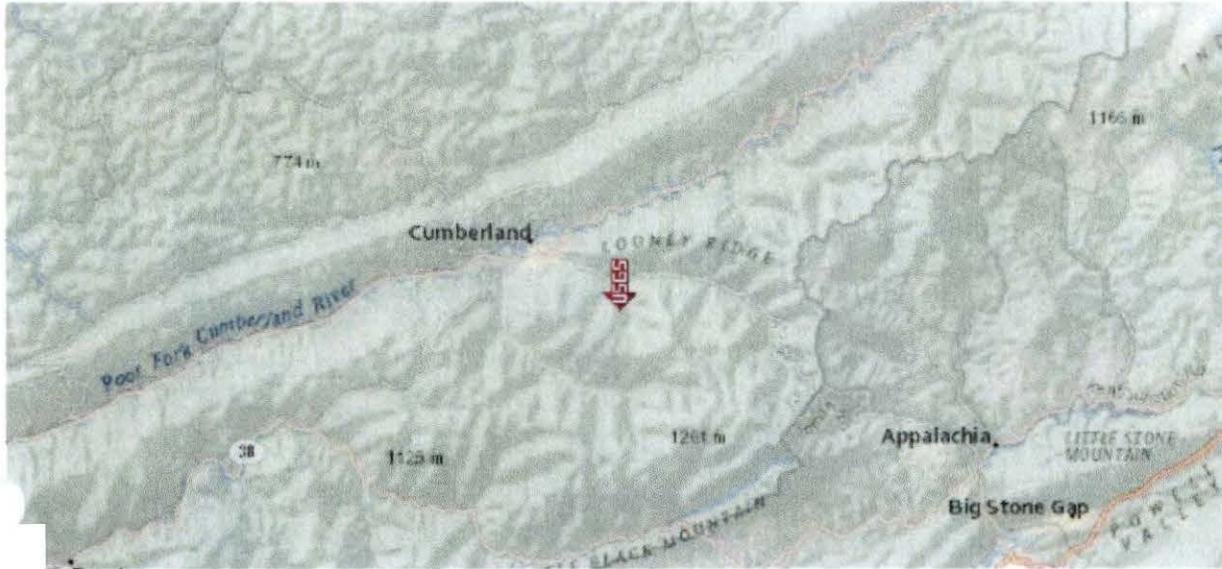
Building Code Reference Document 2006/2009 International Building Code

(which utilizes USGS hazard data available in 2002)

Site Coordinates 36.9625°N, 82.94954°W

Site Soil Classification Site Class E – "Soft Clay Soil"

Occupancy Category IV



## USGS-Provided Output

$S_S = 0.325 \text{ g}$

$S_{MS} = 0.734 \text{ g}$

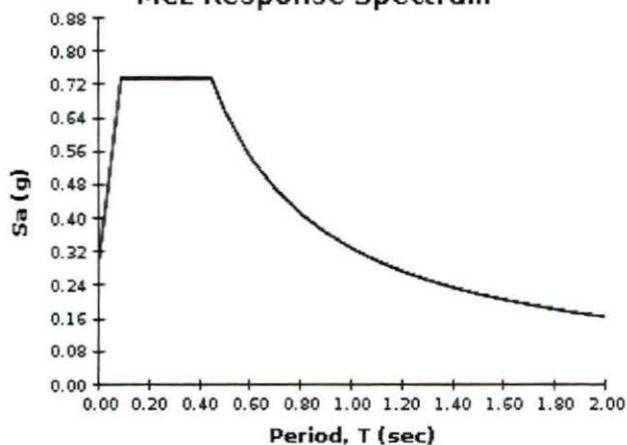
$S_{DS} = 0.489 \text{ g}$

$S_1 = 0.094 \text{ g}$

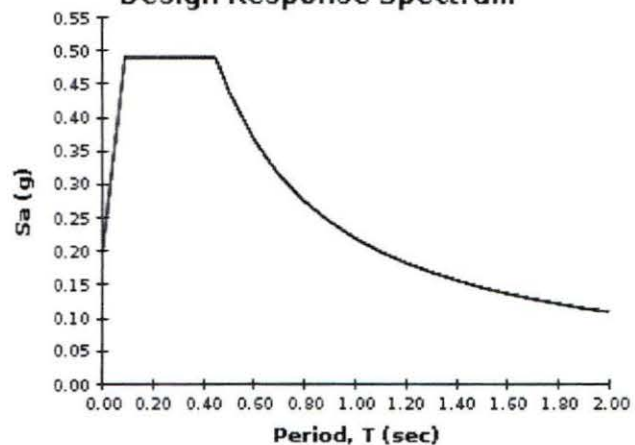
$S_{M1} = 0.329 \text{ g}$

$S_{D1} = 0.219 \text{ g}$

**MCE Response Spectrum**



**Design Response Spectrum**



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# Design Maps Summary Report

## User-Specified Input

Report Title Benham Tower Site Class C

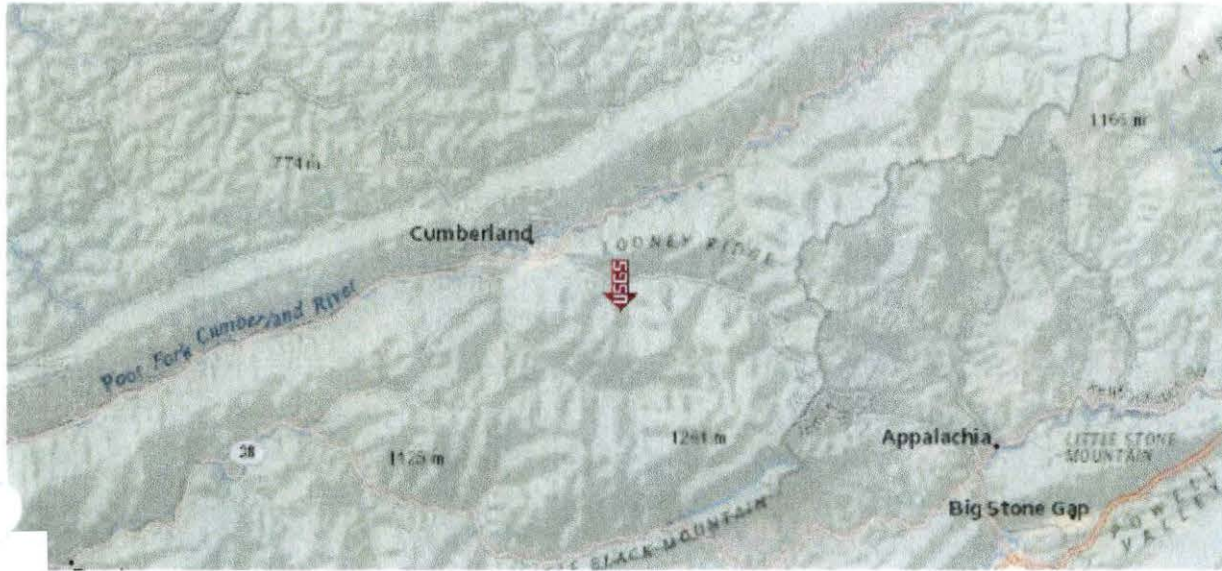
Thu December 17, 2015 19:10:55 UTC

Building Code Reference Document 2006/2009 International Building Code  
(which utilizes USGS hazard data available in 2002)

Site Coordinates 36.9625°N, 82.94954°W

Site Soil Classification Site Class C – "Very Dense Soil and Soft Rock"

Occupancy Category IV



## USGS-Provided Output

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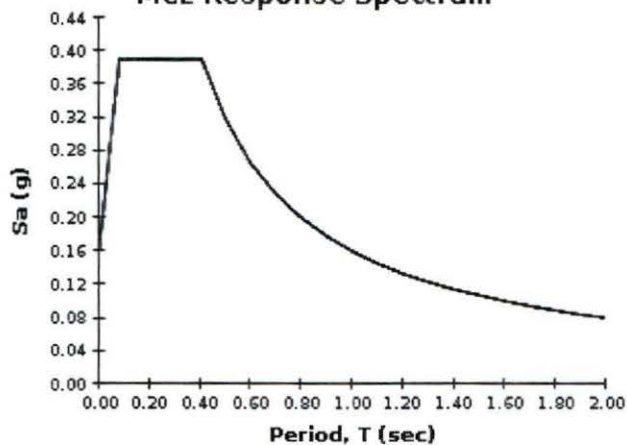
$$S_{DS} = 0.260 \text{ g}$$

$$S_1 = 0.094 \text{ g}$$

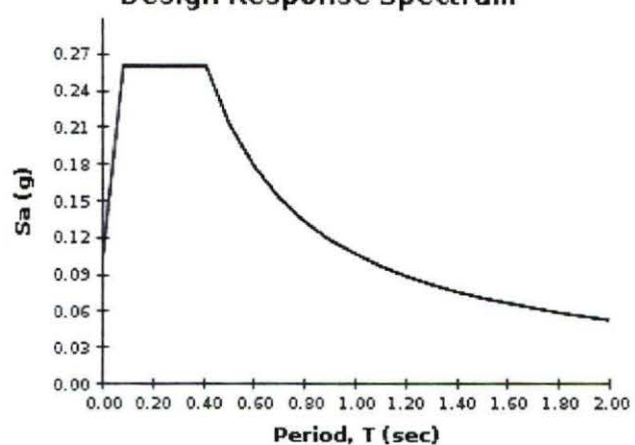
$$S_{M1} = 0.160 \text{ g}$$

$$S_{D1} = 0.107 \text{ g}$$

**MCE Response Spectrum**



**Design Response Spectrum**



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## APPENDIX B    MAPS



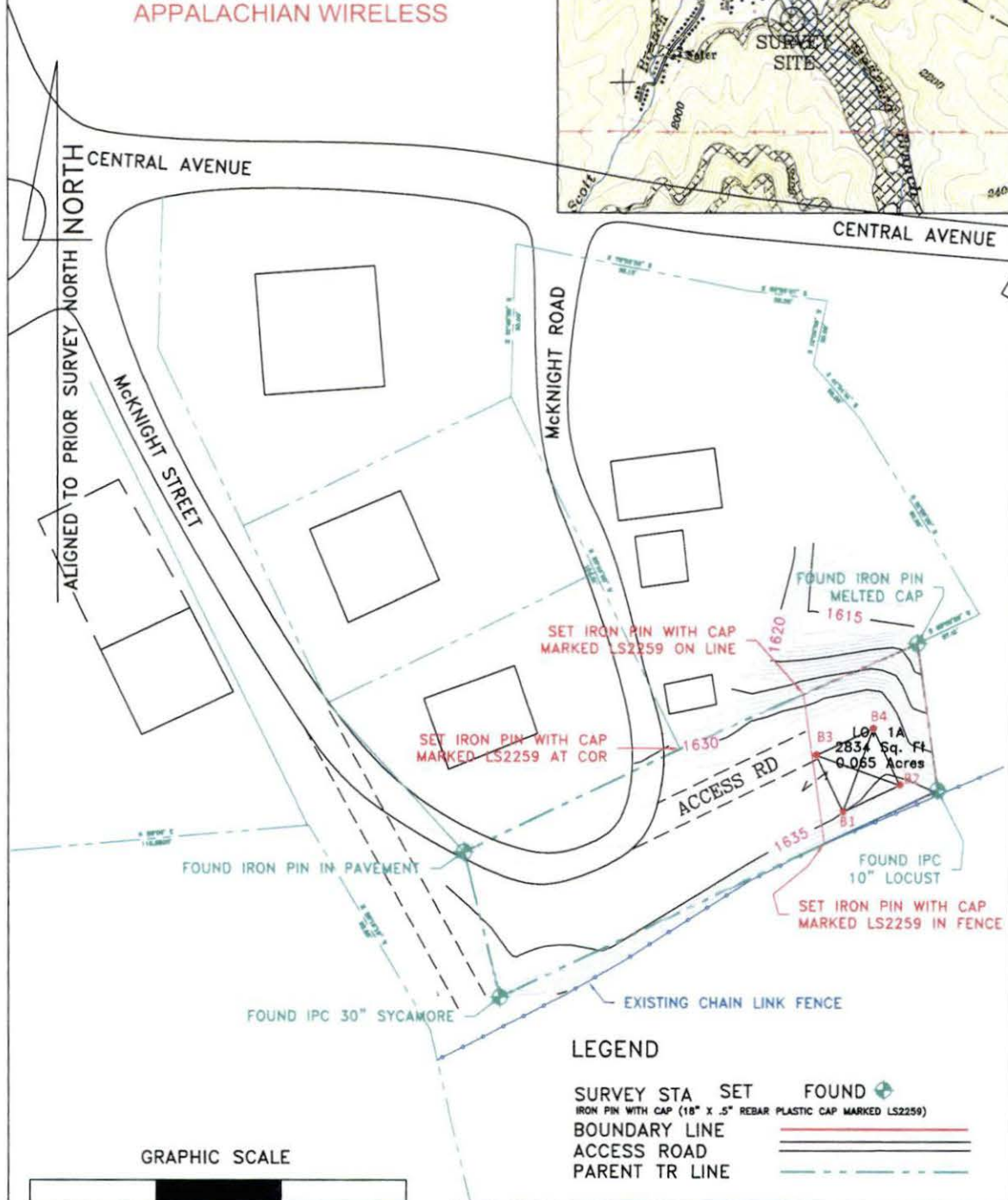
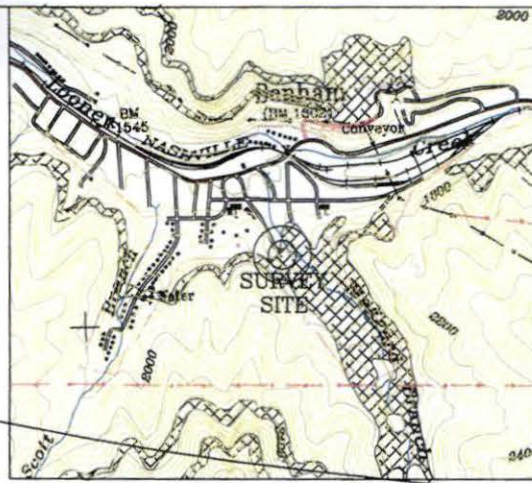
# APPALACHIAN WIRELESS

101 TECHNOLOGY TRAIL

IVEL, KY. 41642

PROPOSED TOWER SITE  
BENHAM IN HARLAN COUNTY

DRAWING PROVIDED BY  
APPALACHIAN WIRELESS



## LEGEND

SURVEY STA SET FOUND  
IRON PIN WITH CAP (18" X .5" REBAR PLASTIC CAP MARKED LS2259)  
BOUNDARY LINE  
ACCESS ROAD  
PARENT TR LINE

## GRAPHIC SCALE



URBAN CLASS SURVEY  
I HEREBY CERTIFY THAT THIS PLAT DEPICTS A SURVEY, MADE  
BY ME, BY THE METHOD OF RANDOM TRAVERSE. THE  
BEARINGS SHOWN HEREON HAVE NOT BEEN ADJUSTED FOR  
CLOSURE. THIS SURVEY AND PLAT MEETS OR EXCEEDS  
THE MINIMUM STANDARDS OF GOVERNING AUTHORITIES.  
THE UNADJUSTED ERROR OF CLOSURE WAS 1 IN 10920

NAME \_\_\_\_\_ PLS# \_\_\_\_\_ DATE \_\_\_\_\_

## PROPERTY SURVEY

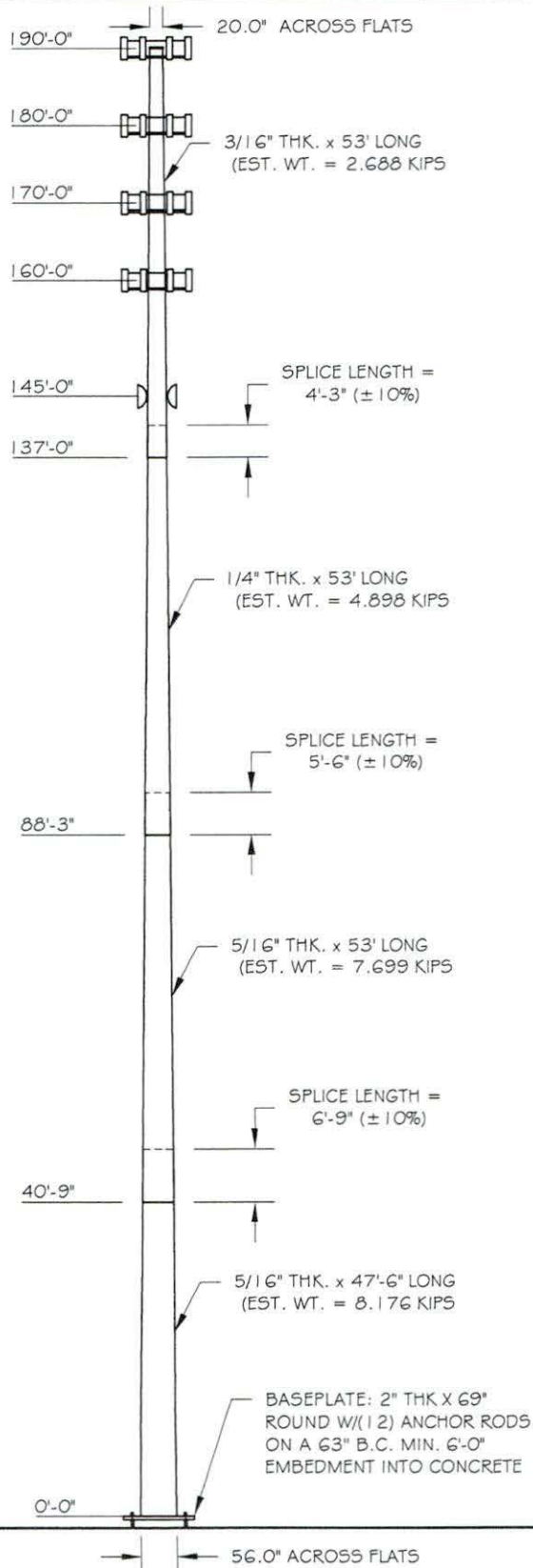
DRAWN BY JWC	SURVEY DATE 09/08/2013	SUB DIVISION BENHAM UNITED METHODIST CHURCH McKNIGHT STREET BENHAM, KY 40807 DEED BOOK 335 PAGE 254
CHECKED BY JWC	DRAWING DATE 09/08/2013	
SCALE 1" = 50'	SHEET 1 OF 1	SURVEYED BY JAMES W. CAUDILL LS2259 2999 PERKINS/MADDEN ROAD AMBURGEY, KY 41773 PHONE 806-642-3217



# TransAmerican Power Products, Inc.

2427 Kelly Lane  
Houston, Texas 77066

PH: 281-444-8277 / FX: 281-444-7270



Page 1 of 2	Job Number: 23516-012
Eng: MFP	Customer Ref: TP-14015
	Date: 1/26/2016
Structure: 190'-FT MONOPOLE	
Site: BENHAM	
Location: HARLAN CO., KY / 36°57'45", -82°56'58"	
Owner: WORLD TOWER	
Revision No.: Revision Date:	

## DESIGN

Building Code: 2013 KENTUCKY BUILDING CODE			
Design Standard: ANSI/TIA-222-G-2			
Wind Speed Load Cases: 3-SEC. GUSTED WIND SPEED			
Load Case #1: 90 MPH Design Wind Speed			
Load Case #2: 30 MPH Wind with 0.5" Ice Accumulation			
Load Case #3 60 MPH Service Wind Speed			
Structure Class	Exposure Cat.	Topography Cat.	Crest Height
II	B	I	

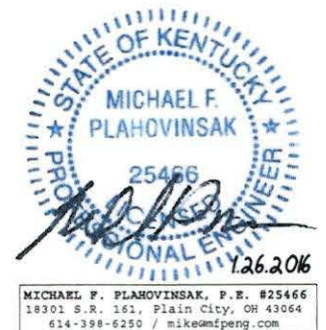
## EQUIPMENT LIST

Elev.	Description
190	(9) WPA-800102-4CF + (3) BXA-70063/6CF + (3) RRU
190	12-FT PLATFORM WITH HANDRAIL
180	(9) WPA-800102-4CF + (3) BXA-70063/6CF + (3) RRU
180	12-FT PLATFORM WITH HANDRAIL
170	(9) WPA-800102-4CF + (3) BXA-70063/6CF + (3) RRU
170	12-FT PLATFORM WITH HANDRAIL
160	(9) WPA-800102-4CF + (3) BXA-70063/6CF + (3) RRU
160	12-FT PLATFORM WITH HANDRAIL
145	(2) 4-FT MICROWAVE DISHES
145	DUAL MICROWAVE MOUNT

ANTENNA FEED LINES ROUTED ON THE INSIDE OF THE POLE

## STRUCTURE PROPERTIES

Cross-Section: 18-SIDED			Taper: 0.19737 in/ft		
Shaft Steel: ASTM A572 GR 65			Baseplate Steel: ASTM A572 GR 60		
Anchor Rods: 2.25 in. A615 GR. 75 X 7'-0" LONG					
Sect.	Length (ft)	Thickness (in)	Splice (ft)	Top Dia. (in)	Bot Dia. (in)
1	53.00	0.1875	4.25	20.00	30.46
2	53.00	0.2500	5.50	29.25	39.71
3	53.00	0.3125	6.75	38.12	48.58
4	47.50	0.3125	0.00	46.63	56.00



## BASE REACTIONS FOR FOUNDATION DESIGN

Moment: 3589 ft-kip  
Shear: 25 kip  
Axial: 55 kip





Page 2 of 2	Job Number: 23516-012
Eng: MFP	Customer Ref: TP-14015
	Date: 1/26/2016
Structure:	190-FT MONOPOLE
Site:	BENHAM
Location:	HARLAN CO., KY / 36°57'45", -82°56'58"
Owner:	WORLD TOWER
Revision No.:	Revision Date:

FOUNDATION NOTES:

1. ALL FOUNDATION CONCRETE SHALL USE TYPE II CEMENT AND ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS. CONCRETE SHALL HAVE A MAXIMUM WATER/CEMENT RATIO OF 0.46 AND SHALL BE AIR ENTRAINED 6% ( $\pm 1.5\%$ ). ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH ACI 318, "THE BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE", LATEST EDITION.

2. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615 VERTICAL BARS SHALL BE GRADE 60, AND TIES OR STIRRUPS SHALL BE A MINIMUM OF GRADE 40. THE PLACEMENT OF ALL REINFORCEMENT SHALL CONFORM TO ACI 315, "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES", LATEST EDITION.

3. CAISSON FOUNDATION INSTALLATION SHALL BE IN ACCORDANCE WITH ACI 336, "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF DRILLED PIERS", LATEST EDITION.

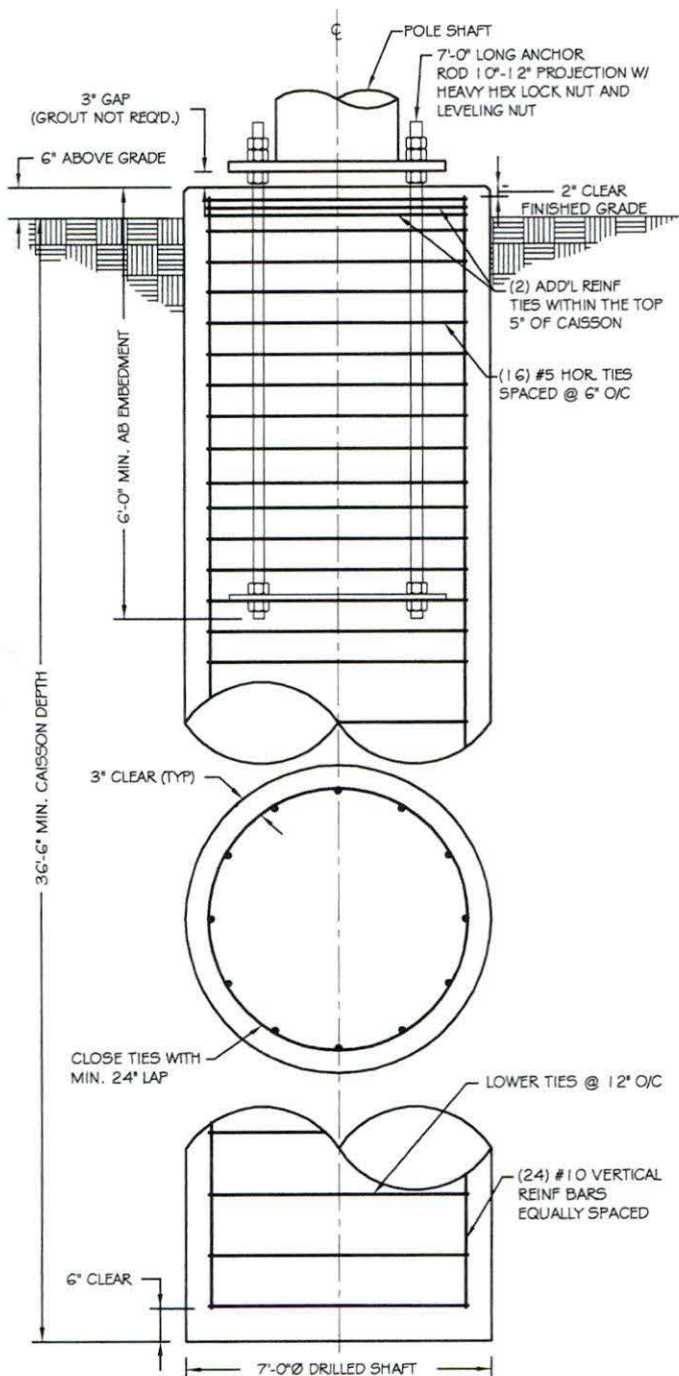
4. THE CONTRACTOR SHALL DETERMINE THE MEANS AND METHODS TO SUPPORT THE EXCAVATION DURING CONSTRUCTION. THE CONTRACTOR SHALL READ THE GEOTECHNICAL REPORT AND SHALL CONSULT THE GEOTECHNICAL ENGINEER AS NECESSARY PRIOR TO CONSTRUCTION.

5. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL REPORT BY:  
ENGINEER: ENVIRONMENTAL RESOURCES  
REPORT NO.: N/A (DATED 12/15/15)

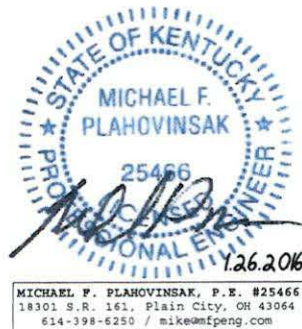
6. ESTIMATED CONCRETE VOLUME = 53 CUBIC YARDS.

7. THE FOUNDATION HAS BEEN DESIGNED TO RESIST THE FOLLOWING FACTORED LOADS:

MOMENT: 3589 FT\*KIPS  
SHEAR: 25 KIPS  
AXIAL: 55 KIPS



## CAISSON FOUNDATION



<b>tnxTower</b>  <b>Michael F. Plahovinsak, P.E.</b> 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	Job	190-ft Monopole - MFP #23516-012	Page	1 of 7
	Project	Benham	Date	19:02:52 01/26/16
	Client	TAPP (TP-14015)	Designed by	Mike

### Tower Input Data

This tower is designed using the TIA-222-G standard.

The following design criteria apply:

Tower is located in Harlan County, Kentucky.

Basic wind speed of 90 mph.

Structure Class II.

Exposure Category B.

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.

### 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	190.00-137.00	53.00	4.25	18	20.0000	30.4600	0.1875	0.7500	A572-65 (65 ksi)
L2	137.00-88.25	53.00	5.50	18	29.2462	39.7100	0.2500	1.0000	A572-65 (65 ksi)
L3	88.25-40.75	53.00	6.75	18	38.1241	48.5800	0.3125	1.2500	A572-65 (65 ksi)
L4	40.75-0.00	47.50		18	46.6234	56.0000	0.3125	1.2500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	20.3085	11.7909	584.7409	7.0334	10.1600	57.5532	1170.2512	5.8966	3.1900	17.013
	30.9299	18.0159	2085.8857	10.7467	15.4737	134.8022	4174.5161	9.0097	5.0310	26.832
L2	30.5494	23.0085	2444.0428	10.2937	14.8571	164.5035	4891.3016	11.5064	4.7073	18.829
	40.3226	31.3115	6159.6442	14.0083	20.1727	305.3459	12327.3933	15.6587	6.5490	26.196
L3	39.8140	37.5044	6774.4000	13.4231	19.3671	349.7898	13557.7139	18.7558	6.1598	19.712
	49.3294	47.8753	14091.5514	17.1350	24.6786	571.0019	28201.6449	23.9422	8.0001	25.6
L4	48.6956	45.9346	12446.3740	16.4404	23.6847	525.5035	24909.1253	22.9717	7.6557	24.498
	56.8639	55.2350	21640.5133	19.7691	28.4480	760.7042	43309.5018	27.6228	9.3060	29.779

<b>tnxTower</b>  <b>Michael F. Plahovinsak, P.E.</b> 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	Job	190-ft Monopole - MFP #23516-012	Page	2 of 7
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### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		$C_A A_A$ ft <sup>2</sup> /ft	Weight plf
1 5/8"	C	No	Inside Pole	190.00 - 0.00	18	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
1 5/8"	C	No	Inside Pole	180.00 - 0.00	18	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
1 5/8"	C	No	Inside Pole	170.00 - 0.00	18	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
1 5/8"	C	No	Inside Pole	160.00 - 0.00	18	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92
1 5/8"	C	No	Inside Pole	145.00 - 0.00	2	No Ice	0.00	0.92
						1/2" Ice	0.00	0.92

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		$C_A A_A$ Front ft <sup>2</sup>	$C_A A_A$ Side ft <sup>2</sup>	Weight K
(3) Antel WPA-800102-4CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	A	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	B	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	C	From Face	3.00 0.00 0.00	0.0000	190.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
12' Platform w/ Handrail	C	None		0.0000	190.00	No Ice 1/2" Ice	24.00 26.00	24.00 26.00	1.80 2.60
**									
(3) Antel WPA-800102-4CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09



<b>tnxTower</b>  <b>Michael F. Plahovinsak, P.E.</b> 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	<b>Job</b>	190-ft Monopole - MFP #23516-012	<b>Page</b>	3 of 7
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	<b>Client</b>	TAPP (TP-14015)	<b>Designed by</b>	Mike

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
RRU	A	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	B	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	C	From Face	3.00 0.00 0.00	0.0000	180.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
12' Platform w/ Handrail	C	None		0.0000	180.00	No Ice 1/2" Ice	24.00 26.00	24.00 26.00	1.80 2.60
**									
(3) Antel WPA-800102-4CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	A	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	B	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	C	From Face	3.00 0.00 0.00	0.0000	170.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
12' Platform w/ Handrail	C	None		0.0000	170.00	No Ice 1/2" Ice	24.00 26.00	24.00 26.00	1.80 2.60
**									
(3) Antel WPA-800102-4CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06

<b>inxTower</b>  <b>Michael F. Plahovinsak, P.E.</b> 18301 State Route 161 Plain City, OH 43064 Phone: 614-398-6250 FAX: mike@mfpeng.com	<b>Job</b>	190-ft Monopole - MFP #23516-012	<b>Page</b>	4 of 7
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	<b>Client</b>	TAPP (TP-14015)	<b>Designed by</b>	Mike

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C <sub>A</sub> A <sub>A</sub> Front ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Side ft <sup>2</sup>	Weight K
Antel BXA-70063/6CF w/ mount pipe	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	A	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	B	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
(3) Antel WPA-800102-4CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	3.70 4.07	3.66 4.21	0.03 0.06
Antel BXA-70063/6CF w/ mount pipe	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	7.75 8.29	5.18 6.11	0.04 0.09
RRU	C	From Face	3.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice	1.50 2.00	1.50 2.00	0.05 0.07
12' Platform w/ Handrail	C	None		0.0000	160.00	No Ice 1/2" Ice	24.00 26.00	24.00 26.00	1.80 2.60

### Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft <sup>2</sup>	Weight K
4 ft standard	A	Paraboloid w/o Radome	From Face	1.00 0.00 0.00	0.0000		145.00	4.00	No Ice 1/2" Ice	12.57 13.10
4 ft standard	B	Paraboloid w/o Radome	From Face	1.00 0.00 0.00	0.0000		145.00	4.00	No Ice 1/2" Ice	12.57 13.10

### 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 90 deg - No Ice
5	0.9 Dead+1.6 Wind 90 deg - No Ice
6	1.2 Dead+1.6 Wind 180 deg - No Ice
7	0.9 Dead+1.6 Wind 180 deg - No Ice
8	1.2 Dead+1.0 Ice+1.0 Temp

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Comb. No.	Description
9	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
10	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
11	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
12	Dead+Wind 0 deg - Service
13	Dead+Wind 90 deg - Service
14	Dead+Wind 180 deg - Service

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	190 - 137	Pole	Max Tension	7	0.00	0.00	0.00
			Max. Compression	8	-32.23	0.00	0.64
			Max. Mx	4	-14.89	-530.82	-2.10
			Max. My	6	-14.91	0.00	-530.18
			Max. Vy	4	17.35	-530.82	-2.10
			Max. Vx	6	17.29	0.00	-530.18
			Max. Torque	5			0.49
L2	137 - 88.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-44.03	0.00	0.64
			Max. Mx	4	-24.80	-1429.84	-20.91
			Max. My	6	-24.81	0.00	-1426.02
			Max. Vy	4	20.43	-1429.84	-20.91
			Max. Vx	6	20.36	0.00	-1426.02
			Max. Torque	5			0.49
L3	88.25 - 40.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-59.45	0.00	0.64
			Max. Mx	4	-37.92	-2441.23	-39.07
			Max. My	6	-37.93	0.00	-2434.34
			Max. Vy	4	23.16	-2441.23	-39.07
			Max. Vx	6	23.09	0.00	-2434.34
			Max. Torque	5			0.49
L4	40.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	8	-77.78	0.00	0.64
			Max. Mx	4	-53.79	-3588.77	-56.95
			Max. My	6	-53.79	0.00	-3578.85
			Max. Vy	4	24.99	-3588.77	-56.95
			Max. Vx	6	24.93	0.00	-3578.85
			Max. Torque	5			0.49

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 137	50.123	13	2.4346	0.0000
L2	141.25 - 88.25	26.925	13	1.9444	0.0000
L3	93.75 - 40.75	11.261	13	1.1615	0.0000
L4	47.5 - 0	2.864	13	0.5521	0.0000



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### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	(3) Antel WPA-800102-4CF w/ mount pipe	13	50.123	2.4346	0.0007	30767
180.00	(3) Antel WPA-800102-4CF w/ mount pipe	13	45.068	2.3528	0.0007	15383
170.00	(3) Antel WPA-800102-4CF w/ mount pipe	13	40.090	2.2661	0.0008	7691
160.00	(3) Antel WPA-800102-4CF w/ mount pipe	13	35.270	2.1694	0.0008	5126
145.00	4 ft standard	13	28.503	1.9951	0.0008	3417

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	190 - 137	204.394	4	9.9581	0.0010
L2	141.25 - 88.25	109.899	4	7.9531	0.0000
L3	93.75 - 40.75	45.976	4	4.7482	0.0000
L4	47.5 - 0	11.687	4	2.2545	0.0000

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
190.00	(3) Antel WPA-800102-4CF w/ mount pipe	4	204.394	9.9581	0.0010	7912
180.00	(3) Antel WPA-800102-4CF w/ mount pipe	4	183.808	9.6237	0.0013	3954
170.00	(3) Antel WPA-800102-4CF w/ mount pipe	4	163.539	9.2690	0.0016	1973
160.00	(3) Antel WPA-800102-4CF w/ mount pipe	4	143.904	8.8738	0.0018	1311
145.00	4 ft standard	4	116.332	8.1607	0.0021	869

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	Kl/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio P <sub>u</sub> / φP <sub>n</sub>
L1	190 - 137 (1)	TP30.46x20x0.1875	53.00	0.00	0.0	17.5167	-14.89	1115.66	0.013
L2	137 - 88.25 (2)	TP39.71x29.2462x0.25	53.00	0.00	0.0	30.4499	-24.80	1959.15	0.013
L3	88.25 - 40.75 (3)	TP48.58x38.1241x0.3125	53.00	0.00	0.0	46.5545	-37.92	3023.96	0.013
L4	40.75 - 0 (4)	TP56x46.6234x0.3125	47.50	0.00	0.0	55.2350	-53.79	3299.62	0.016



<b>Michael F. Plahovinsak, P.E.</b> 18301 State Route 161 W Plain City, OH 43064 Phone: 614-398-6250 email: mike@mfpeng.com	Job	190-ft monopole - MFP #23516-012	Page	BP-G
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## Anchor Rod and Base Plate Calculation

### ANSI/TIA-222-G-2

<b>Factored Base Reactions:</b>	<b>Pole Shape:</b>	<b>Anchor Rods:</b>	<b>Base Plate:</b>
Moment: 3589 ft-kips	18-Sided	(12) 2.25 in. A615 GR. 75	2 in. x 69 in. Round
Shear: 25 kips	<b>Pole Dia. (<math>D_f</math>):</b>	Anchor Rods Evenly Spaced	$f_y = 60$ ksi
Axial: 54 kips	56.00 in	On a 63 in Bolt Circle	

### Anchor Rod Calculation According to TIA-222-G section 4.9.9

$\phi =$	0.80 TIA 4.9.9
$I_{bolts} =$	5953.50 in <sup>2</sup> Momet of Inertia
$P_u =$	228 kips Tension Force
$V_u =$	2 kips Shear Force
$R_{nt} =$	325.00 kips Nominal Tensile Strength
$\eta =$	0.50 for detail type (d)

The following Iteration Equation Shall Be Satisfied:

$$\left( \frac{P_u + \frac{V_u}{\eta}}{\phi R_{nt}} \right) \leq 1.0$$

$$0.892 \leq 1$$

### Base Plate Calculation According to TIA-222-G

$\phi =$	0.90 TIA 4.7
$M_{PL} =$	551.9 in-kip Plate Moment
$L =$	14.7 in Section Length
$Z =$	14.7 Plastic Section Modulus
$M_P =$	879.6 in-kip Plastic Moment
$\phi M_n =$	791.7 in-kip Factored Resistance

Calculated Moment vs Factored Resistance

$$551.89 \text{ in-kip} \leq 792 \text{ in-kip}$$

Anchor Rods Are Adequate	89.2% <input checked="" type="checkbox"/>
Base Plate is Adequate	69.7% <input checked="" type="checkbox"/>



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## Caisson Calculation

According to ANSI/TIA-222-G-2

- Foundation overturning resistance calculated with PLS Caisson, for Brom's method for rigid piles. Soil layers modeled after recommendations from the geotechnical report.
- Cohesion strength for the upper 21 ft has been reduced by 50%
- In lieu of a soil resistance factor  $f_s = 0.75$  (TIA-9.4.1) an additional safety factor against soil failure of 1.33 has been applied.
- Foundation is designed with a minimum safety factor resisting overturning of 2.0
- Foundation has been designed with factored loads per TIA-222-G.
- Geotechnical report indicates groundwater was not encountered within the depth of the foundation.

*** PIER PROPERTIES		CONCRETE STRENGTH (ksi) = 4.00		STEEL STRENGTH (ksi) = 60.00				
		DIAMETER (ft) = 7.000		DISTANCE FROM TOP OF PIER TO GROUND LEVEL (ft) = 0.50				
*** SOIL PROPERTIES	LAYER	TYPE	THICKNESS (ft)	DEPTH AT TOP OF LAYER (ft)	DENSITY (pcf)	CU (psf)	KP	PHI (degrees)
	1	S	4.00	0.00	0.0		1.000	-0.00
	2	S	31.00	4.00	100.0		1.420	9.99
	3	C	10.00	35.00	130.0	6000.0		
*** DESIGN (FACTORED) LOADS AT TOP OF PIER		MOMENT (ft-k) = 3589.0		VERTICAL (k) = 55.0		SHEAR (k) = 25.0		
		ADDITIONAL SAFETY FACTOR AGAINST SOIL FAILURE = 1.33						
*** CALCULATED PIER LENGTH (ft) = 31.500								
*** CHECK OF SOILS PROPERTIES AND ULTIMATE RESISTING FORCES ALONG PIER								
TYPE	TOP OF LAYER BELOW TOP OF PIER (ft)	THICKNESS (ft)	DENSITY (pcf)	CU (psf)	KP	FORCE (k)	ARM (ft)	
S	0.50	4.00	0.0		1.000	0.00	3.17	
S	4.50	19.38	100.0		1.420	560.19	17.42	
S	23.88	7.62	100.0		1.420	-526.75	27.90	
*** SHEAR AND MOMENTS ALONG PIER								
		WITH THE ADDITIONAL SAFETY FACTOR			WITHOUT ADDITIONAL SAFETY FACTOR			
DISTANCE BELOW TOP OF PIER (ft)		SHEAR (k)	MOMENT (ft-k)		SHEAR (k)	MOMENT (ft-k)		
0.00		33.4	4936.5		25.1	3702.4		
3.15		33.4	5041.8		25.1	3781.5		
6.30		28.6	5144.3		21.5	3858.3		
9.45		-3.1	5192.3		-2.3	3894.3		
12.60		-64.4	5093.8		-48.3	3820.4		
15.75		-155.3	4755.6		-116.4	3566.8		
18.90		-275.7	4084.6		-206.8	3063.5		
22.05		-425.8	2987.5		-319.3	2240.7		
25.20		-448.1	1473.5		-336.1	1105.2		
28.35		-238.8	383.9		-179.1	287.9		
31.50		-0.0	0.0		-0.0	0.0		
*** TOTAL REINFORCEMENT PCT = 0.44		REINFORCEMENT AREA (in^2) = 24.38						
*** USABLE AXIAL CAP. (k) = 55.0		USABLE MOMENT CAP. (ft-k) = 3894.8						

### For Design:

7-ft Diameter caisson x 37-ft long (36.5-ft Embedded with 0.5-ft above grade)  
Concrete strength = 4000 PSI @ 28 days. Estimated Concrete Volume = 53 CY3.  
(24) #10 Vertical Rebar. Steel Cross-Section = 30.48 in<sup>2</sup>



**Federal Aviation  
Administration**

FAA Advisory Circular 70/7460-1L, Obstruction Marking Lighting was published on 12/4/2015, and is effective as of that date. The document may be viewed at

[http://www.faa.gov  
/regulations\\_policies  
/advisory\\_circulars/index.cfm  
/go/document.information  
/documentID/1028657](http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1028657)

## **Notice of Proposed Construction or Alteration - Off Airport**

Project Name: EAST -000353775-16

Sponsor: East Kentucky Network, LLC

## Details for Case : Benham

[Show Project Summary](#)

## Case Status

ASN: 2016-ASO-762-OE

Status: Accepted

Date Accepted: 01/14/2016

Date Determined:

Letters: None

Documents: 01/14/2016

Public Comments: None

Project C  
None

## Construction / Alteration Information

Notice Of: Construction

Duration: Permanent

**if Temporary :** Months: Days:

Work Schedule - Start: 02/15/2016

Work Schedule - End: 02/20/2016

*\*For temporary cranes-Does the permanent structure require separate notice to the FAA?  
To find out, use the Notice Criteria Tool. If separate notice is required, please ensure it is filed.  
If it is not filed, please state the reason in the Description of Proposal.*

State Filing: Filed with State

## Structure Summary

Structure Type: Tower

Structure Name: Benham

FDC NOTAM:

NOTAM Number:

FCC Number:

Prior ASN:

## Structure Details

Latitude: 36° 57' 44.96" N

Longitude: 82° 56' 58.33" W

Horizontal Datum: NAD83

Site Elevation (SE): 1634 (nearest foot)

Structure Height (AGL): 190 (nearest foot)

Current Height (AGL): (nearest foot)

*\* For notice of alteration or existing provide the current  
AGL height of the existing structure.*

*Include details in the Description of Proposal*

Minimum Operating Height (AGL): (nearest foot)

*\* For aeronautical study of a crane or construction equipment  
the maximum height should be listed above as the  
Structure Height (AGL). Additionally, provide the minimum  
operating height to avoid delays if impacts are identified that  
require negotiation to a reduced height. If the Structure Height  
and minimum operating height are the same enter the same  
value in both fields.*

Nacelle Height (AGL): (nearest foot)

*\* For Wind Turbines 500ft AGL or greater*

Requested Marking/Lighting: None

## Common Frequency Bands

Low Freq	High Freq
698	806
806	824
824	849
851	866
869	894
896	901
901	902
930	931
931	932
932	932.5
935	940
940	941
1850	1910
1930	1990
2305	2310
2345	2360

## Specific Frequencies



**Other :**

**Recommended Marking/Lighting:**

**Current Marking/Lighting:**

N/A Proposed Structure

**Other :**

**Nearest City:**

Benham

**Nearest State:**

Kentucky

**Description of Location:**

Off of McKnight Rd, Benham  
(Harlan), KY

***On the Project Summary page upload any certified survey.***

**Description of Proposal:**

A new 180' tower with  
top-mounted antennas (overall  
height of 190' AGL)

[← Previous](#)

[Back to  
Search  
Result](#)

[Next](#)



## KENTUCKY AIRPORT ZONING COMMISSION

## APPLICATION FOR PERMIT TO CONSTRUCT OR ALTER A STRUCTURE

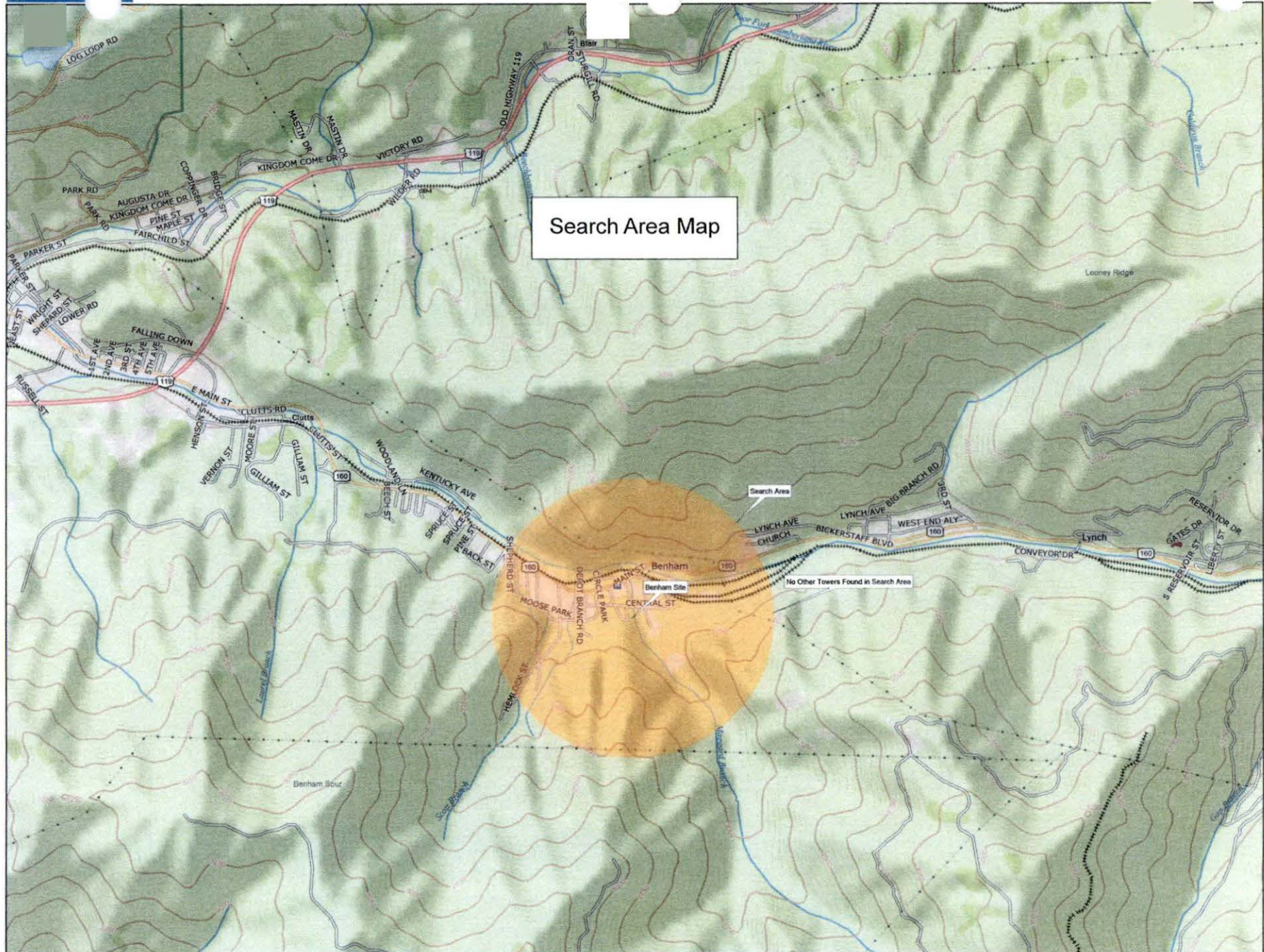
<b>APPLICANT (name)</b> East Kentucky Network, LLC c/o LNGS		<b>PHONE</b> 703-584-8667	<b>FAX</b> 703-584-8692	<b>KY AERONAUTICAL STUDY #</b>	
<b>ADDRESS (street)</b> 8300 Greensboro Dr, #1200		<b>CITY</b> McLean		<b>STATE</b> VA	<b>ZIP</b> 22102
<b>APPLICANT'S REPRESENTATIVE (name)</b> Ali Kuzehkanani		<b>PHONE</b> 703-584-8667	<b>FAX</b> 703-584-8692		
<b>ADDRESS (street)</b> 8300 Greensboro Dr, #1200		<b>CITY</b> McLean		<b>STATE</b> VA	<b>ZIP</b> 22102
<b>APPLICATION FOR</b> <input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Alteration <input type="checkbox"/> Existing				<b>WORK SCHEDULE</b>	
<b>DURATION</b> <input type="checkbox"/> Permanent <input type="checkbox"/> Temporary (months days )				Start 02/15/16 End 02/20/16	
<b>TYPE</b> <input type="checkbox"/> Crane <input type="checkbox"/> Building <input checked="" type="checkbox"/> Antenna Tower <input type="checkbox"/> Power Line <input type="checkbox"/> Water Tank <input type="checkbox"/> Landfill <input type="checkbox"/> Other		<b>MARKING/PAINTING/LIGHTING PREFERRED</b> <input type="checkbox"/> Red Lights & Paint <input type="checkbox"/> White- medium intensity <input type="checkbox"/> White- high intensity <input type="checkbox"/> Dual- red & medium intensity white <input type="checkbox"/> Dual- red & high intensity white <input checked="" type="checkbox"/> Other None			
<b>LATITUDE</b> 36°57'44.96"		<b>LONGITUDE</b> 82°56'58.33"		<b>DATUM</b> <input checked="" type="checkbox"/> NAD83 <input type="checkbox"/> NAD27 <input type="checkbox"/> Other	
<b>NEAREST KENTUCKY</b> City Benham County Harlan		<b>NEAREST KENTUCKY PUBLIC USE OR MILITARY AIRPORT</b> Lonesome Pine Airport			
<b>TE ELEVATION (AMSL, feet)</b> 1634		<b>TOTAL STRUCTURE HEIGHT (AGL, feet)</b> 190		<b>CURRENT (FAA aeronautical study #)</b>	
<b>RALL HEIGHT (site elevation plus total structure height, feet)</b> ---				<b>PREVIOUS (FAA aeronautical study #)</b>	
<b>DISTANCE (from nearest Kentucky public use or Military airport to structure)</b> 23.2 miles				<b>PREVIOUS (KY aeronautical study #)</b>	
<b>DIRECTION (from nearest Kentucky public use or Military airport to structure)</b> East					
<b>DESCRIPTION OF LOCATION</b> (Attach USGS 7.5 minute quadrangle map or an airport layout drawing with the precise site marked and any certified survey.) Off of McKnight Rad, Benham (Harlan), KY					
<b>DESCRIPTION OF PROPOSAL</b> A new 180' tower with top-mounted antennas (overall height of 190' AGL)					
<b>FAA Form 7460-1</b> (Has the "Notice of Construction or Alteration" been filed with the Federal Aviation Administration?) <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes, when? 01/14/16					
<b>CERTIFICATION</b> (I hereby certify that all the above entries, made by me, are true, complete, and correct to the best of my knowledge and belief.)					
<b>PENALTIES</b> (Persons failing to comply with KRS 183.861 to 183.990 and 602 KAR 050 are liable for fines and/or imprisonment as set forth in KRS 183.990(3). Noncompliance with FAA regulations may result in further penalties.)					
<b>NAME</b> i Kuzehkanani		<b>TITLE</b> Dir of Engineering		<b>SIGNATURE</b> <i>Ali Kuzehkanani</i>	<b>DATE</b> 01/14/16
<b>MISSION ACTION</b>		<input type="checkbox"/> Chairperson, KAZC <input type="checkbox"/> Administrator, KAZC			
<input type="checkbox"/> Approved <input type="checkbox"/> Disapproved		<b>SIGNATURE</b>		<b>DATE</b>	

## Driving Directions for Benham

From the Harlan County Courthouse located at the intersection of First Street and Central Street. Take Central Street for 1/10 of a mile to the junction of Central Street and 421, and then turn right onto 421. Go 22 miles then exit to the right onto 160. Go 1/10 of a mile; turn left at the light traveling 1.6 miles. Turn right onto Tool House Lane, then go to the end and turn right then left. Go approximately 500 feet and the site will be on your left (signs will be posted here).

Prepared By:  
Daryl Bartley  
Appalachian Wireless  
(606) 791-0310

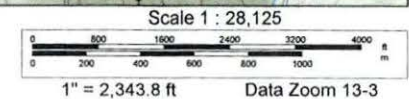




Data use subject to license.

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www.delorme.com





## LEASE AGREEMENT

THIS LEASE AGREEMENT is made and entered into on the 1<sup>st</sup> day of November, 2013, by and between Benham Community United Methodist Church, of Central Avenue, Benham, KY 40807, **LESSORS**, and **East Kentucky Network, LLC, d/b/a Appalachian Wireless**, of 101 Technology Trail, Ivel, Kentucky 41642, **LESSEE**:

WITNESSETH:

That for and in consideration of the rents and other considerations hereinafter set out and subject to the terms and conditions therefore, Lessor(s) do hereby lease, let and demise unto Lessee, its successors and assigns, to have and to hold for the term hereinafter set out and subject to the Lessee's right to surrender or terminate this Lease and provided hereinafter, the following described premises (Leased Premises), which term shall include all real property, rights and privileges herein granted:

BEING the same property described by metes and bounds in the description attached hereto and made a part hereof as Exhibit "A", and as shown on the plat dated September 8, 2013, prepared by James W. Caudill, Licensed Professional Land Surveyor, and attached hereto and made a part hereof as Exhibit "B".

The Lessor grants unto Lessee full and complete right of ingress, egress and regress over roads located upon this property controlled by Lessor to and from the Leased Premises, and the nonexclusive right to use any existing road located on this property. In the event the Lessee desires to relocate all or any portion of an existing roadway or to construct another access road to the Leased Premises, the location of such roadway shall be mutually agreed upon by Lessor and Lessee. Lessor further grants to the Lessee a right of way and easement to construct and maintain and operate telephone and power transmission lines over Lessors remaining property to the Leased Premises for service of the tower and related facilities only, said lines to be located where feasible along the access road to the Leased Premises, with Lessor having input as to

location of said power transmission lines in the event Lessee changes the location of its access road. Lessee shall have the right to trim or remove trees, limbs or underbrush which interferes with its access road or power/telephone lines wherever such road and lines are located or may damage tower if they fall. Lessee shall maintain the existing road with gravel and needed repairs.

This Lease is made on the following terms and conditions:

1. **TERM OF LEASE.** The term of this lease shall be for a period of five (5) years from the effective date with an allowance of an additional six (6) automatic renewals of five (5) year terms unless Lessee gives Lessor written notice at least sixty (60) days prior to expiration of then said Term that Lessee does not wish to renew.

2. **CANCELLATION.** Lessee shall have the right to terminate this Lease and abandon (subject to reclamation and removal of all structures erected thereon by Lessee) the Premises at any time under its sole discretion, upon six (6) month written notice to Lessor of its intention to do so. In the event that Leased Premises fail the process for approval as an acceptable cellular tower site by the Federal Communications Commission or any tests or requirements as required for such approval (the "FCC Process") or approval by the Public Service Commission of Kentucky (the "PSC"), or any other regulatory approval required, then in its sole discretion Lessee may terminate this Lease Agreement upon thirty (30) days written notice to Lessor of such intention. In the event of termination by Lessee, the Lessor shall have no obligation to refund all or any portion of the Leasehold rental payment that has been paid through the date of termination. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days thereafter to remove all structures it has erected upon the Leased Premises, and to reclaim the premises. Payment shall continue until said structures are removed.

3. **RENTAL.** As rental for the Leased Premises, Lessee shall pay Lessor \$350.00 per month with an increase of 5% added to the rental payment every five years. Please see table below for scheduled rent payments.



<u>YEARS</u>	<u>AMOUNT</u>
1-5	\$350.00
6-10	367.50
11-15	385.88
16-20	405.17
21-25	425.43
26-30	446.70
31-35	469.04

4. **USE OF PREMISES.** Lessee shall have the exclusive rights and privileges of the use of the Leased Premises for the purpose of constructing a tower, buildings, and other related facilities, including, but not limited to telephone lines, coaxial lines, power lines and the installation of any and all other equipment deemed necessary by Lessee to receive and transmit any and all electronic signals in the rural service area now or hereafter to be served by the facility. The parties hereto recognize that technology in the communications field is advancing at a rapid rate and that this site may be used for any other purpose now in the development stage or which may later be developed in the communications industry to carry out the objectives of Lessee, that being to transmit and receive signals and communications by wire, fiber optics, radio and satellite. Lessee shall not use the Leased Premises for purposes other than maintenance or use as a site for communications by the use of methods now or hereafter known.

Lessee agrees to maintain the Leased Premises in a neat and orderly manner.

5. **INDEMNITY.** Lessee agrees to indemnify and save harmless the Lessor from any liability by virtue of Lessee's activities upon the Leased Premises or in the exercise of any rights and privileges granted herein, specifically including but not limited to any claim, loss, fine, penalty and costs (including reasonable attorney's fees) arising out of any violation of any environmental laws or regulations. This provision shall survive the termination of the lease. Lessee shall maintain and keep in full force and effect public liability and property damage insurance in an amount of at least One Million Dollars (\$1,000,000.00). Lessor shall not be held liable for personal injury or property damage on the Leased Premises whether or not associated with Lessee.

6. **TAXES.** Lessee shall pay all personal property taxes assessed on or any portion of such taxes attributable to the equipment used by Lessee on the Premises. Lessor shall pay when due all real property taxes and all other fees and assessments attributable to the Premises. Lessee shall reimburse the Lessor as additional compensation for any increase in real estate taxes levied against the Lessor (or its successors or assigns) which are directly attributable to or arise as a result of the improvements constructed by the Lessee, its successors or assigns. Payment will be issued after Lessee receives written proof from Lessor that the increase in real estate taxes levied is due to improvements constructed by the Lessee.

7. **MISCELLANEOUS PROVISIONS.** All notices, demands, or other writings in this Lease Agreement provided to be given, made or sent, or which may be given or made or sent, to either party hereto to the other, shall be deemed to have been fully given or made or sent when made in writing and deposited in the United States Mail, certified and postage prepaid, to Lessor and Lessee at the addresses stated in the caption of this Lease Agreement. Such addresses may be changed by written notice given by such party as above provided.

8. **SUCCESSORS AND ASSIGNS.** This Lease Agreement shall be binding upon the parties hereto, their heirs, executors, administrators and assigns.

WITNESS OUR HANDS, the day and year aforesaid.

**LESSORS:**



**Mitchell Osborne, Church Trustee**



**Michael Epling, Church Trustee**



**Robert Falls, Church Trustee**

  
Marcus Ely, Church Trustee

  
Ron Johnson, Church Trustee

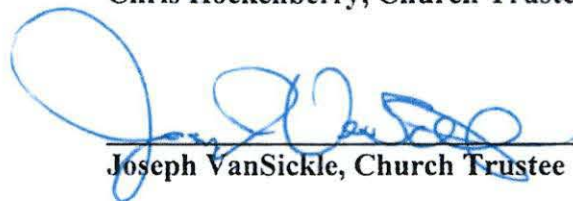
  
Nancy Moneyhun, Church Trustee

  
Peggy Duncan, Church Trustee

  
Cindy Humphrey, Church Trustee

  
Joyce Ely, Church Trustee

  
Chris Hockenberry, Church Trustee

  
Joseph VanSickle, Church Trustee



STATE OF KENTUCKY

COUNTY OF Floyd

The foregoing Lease Agreement was this 1<sup>st</sup> day of November, 2013,  
produced and acknowledged before me by **Mitchell Osborne, Michael Epling, Robert Falls,**  
**Marcus Ely, Nancy Moneyhun, Peggy Duncum, Cindy Humphrey, Joyce Ely, Chris**  
**Hockenberry and Joseph VanSickle, Trustees of Benham United Methodist Church,**  
Lessor.

Lynn Haney  
NOTARY PUBLIC

COMMISSION EXPIRES: 7-14-15

STATE OF Virginia

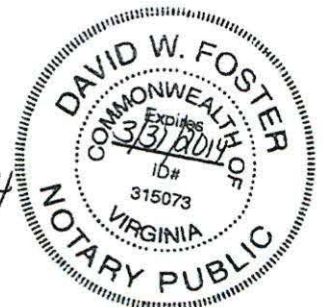
COUNTY OF Roanoke

The foregoing Lease Agreement was this 29<sup>th</sup> day of October, 2013,  
produced and acknowledged before me by **Ron Johnson, Trustee of Benham United**  
**Methodist Church,** Lessor.

David Foster  
NOTARY PUBLIC

COMMISSION EXPIRES: March 31, 2014

LESSEE:



EAST KENTUCKY NETWORK, LLC  
d/b/a APPALACHIAN WIRELESS

W A Gillum  
W. A. Gillum, General Manager

STATE OF KENTUCKY  
COUNTY OF FLOYD

The foregoing Lease Agreement was this 31 day of October, 2013,  
produced and acknowledged before me by **East Kentucky Network, LLC, dba Appalachian  
Wireless** by **W. A. Gillum**, its **General Manager**, Lessee.

Lynn Haney  
NOTARY PUBLIC  
COMMISSION EXPIRES: 7-14-15

**LOT DESCRIPTION**

Property of  
Benham United Methodist Church  
P.O. Box 128  
Benham, KY 40807

Maggard Br. Of Looney Creek in Harlan County  
Near end of McKnight Street  
September 8, 2013

A portion of the property lying within the tract of land located on Maggard Branch of Looney Creek in Harlan County Kentucky, in the City of Behnam. Being a part of the same land conveyed by deed from Ark Land Company to the Benham United Methodist Church by Deed dated July 18<sup>th</sup>, 1998 and recorded in Deed Book 335 Page 254 of the Harlan county Court Clerk.

Unless stated otherwise, any monument referred to herein as "set iron pin with cap" is a set 1/2" diameter rebar, at least eighteen (18") in length, with a plastic cap stamped "LS-2259". All bearings stated herein are referred to a prior survey of the property. This survey preformed by James W. Caudill, LS2259, on September 8, 2013.

**Lot 1A**

Beginning on a found iron pin with melted cap from original survey, being the 3<sup>rd</sup> corner of the original survey, and near Maggard Branch on the corner between Ernest & Jamie Marsh (book 334 page 327) and Ark Land Company (book 272 page 773); thence running with the dividing line between Ark Land Company and Benham United Methodist Church South 07 deg 56 min 46 sec East, 58.90 feet to a found iron pin with cap at base of 10" locust tree, being the forth corner of the original survey, thence continuing with the line of Ark Land Company South 64 deg 49 min 49 sec West, 49.92 feet to a set iron pin with cap marked ls2259 on the 4<sup>th</sup> line of the original survey; thence leaving the Ark Land company line and running across the lot severing the property of Benham United Methodist Church North 08 deg 02 min 52 sec West, 59.88 feet to a set iron pin with cap marked ls2259 on the 2<sup>nd</sup> line of the original survey and a point on the line of Ernest & Jamie Marsh; thence running with the line of Ernest & Jamie Marsh North 65 deg 56 min 20 sec East, 49.74 feet to the beginning. Containing a calculated area of 2834sq ft or 0.065 acres.

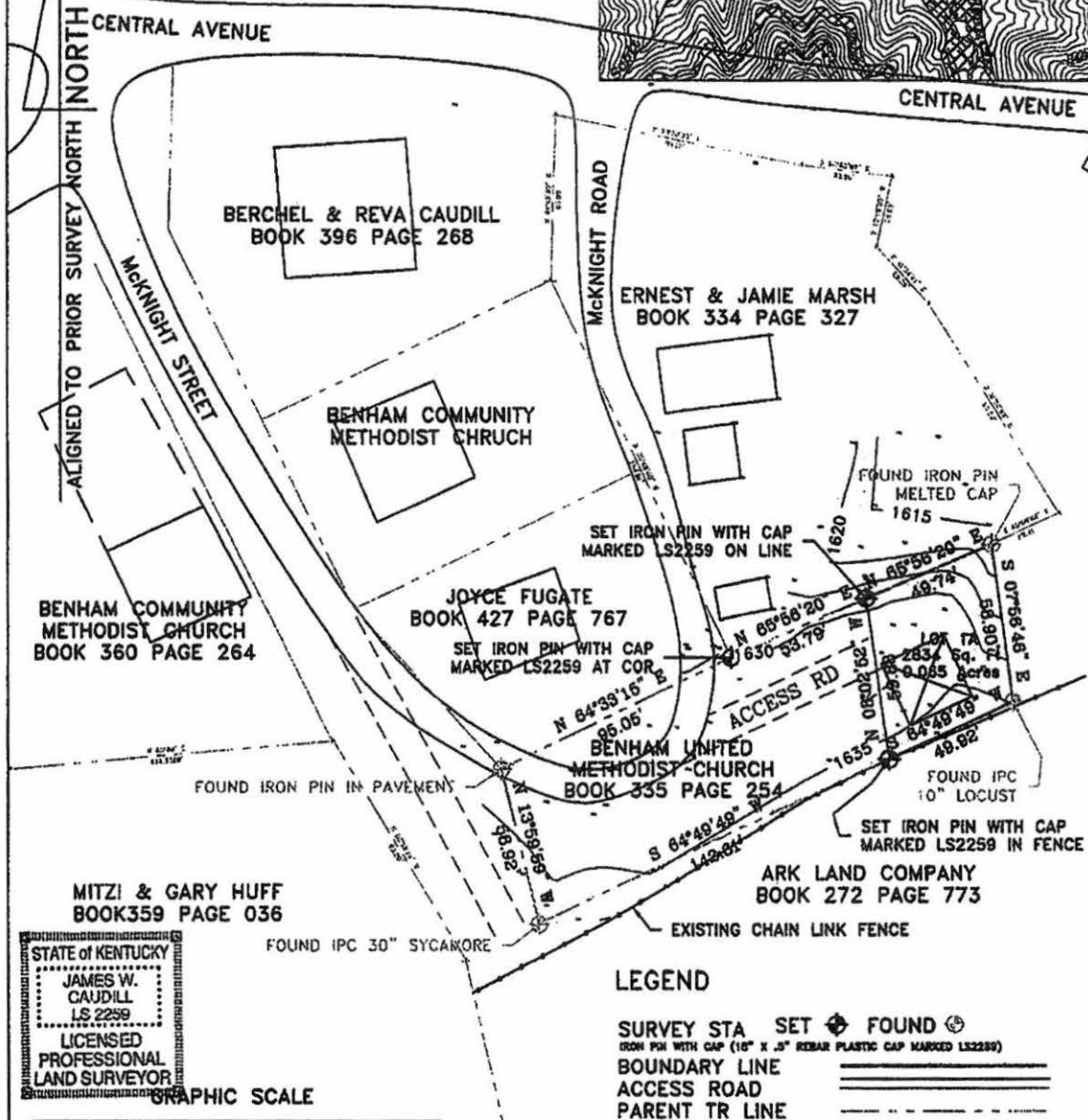
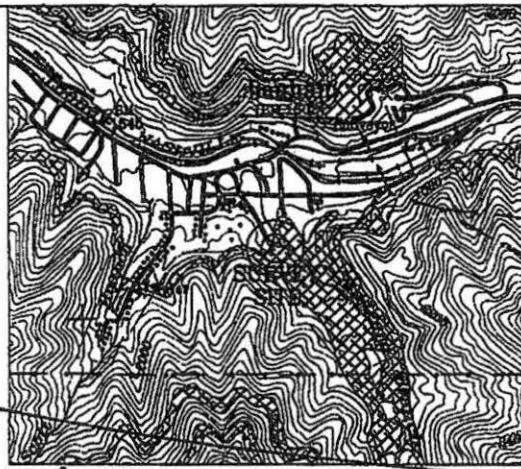
This survey was performed on September 8, 2013 by James W. Caudill, a Kentucky Licensed Professional Land Surveyor No. 2259.



*James W. Caudill*  
James W. Caudill, PLS #2259



**APPALACHIAN WIRELESS**  
101 TECHNOLOGY TRAIL  
IVEL, KY. 41642  
PROPOSED TOWER SITE  
BENHAM IN HARLAN COUNTY



STATE OF KENTUCKY  
JAMES W. CAUDILL  
LS 2259  
LICENSED  
PROFESSIONAL  
LAND SURVEYOR

URBAN CLASS SURVEY  
I HEREBY CERTIFY THAT THIS PLAT DEPICTS A SURVEY, MADE  
BY ME, BY THE METHOD OF RANDOM TRAVERSE. THE  
BEARINGS SHOWN HEREON HAVE NOT BEEN ADJUSTED FOR  
CLOSURE. THIS SURVEY AND PLAT MEETS OR EXCEEDS  
THE MINIMUM STANDARDS OF GOVERNING AUTHORITIES.  
THE UNADJUSTED ERROR OF CLOSURE WAS 1 IN 10920

*James W. Caudill* 2259 9-8-13  
NAME PLS# DATE

**PROPERTY SURVEY**

DRAWN BY JWC	SURVEY DATE 09/08/2013	SUB DIVISION BENHAM UNITED METHODIST CHURCH McKNIGHT STREET BENHAM, KY 40807 DEED BOOK 335 PAGE 254
CHECKED BY JWC	DRAWING DATE 09/08/2013	
SCALE 1" = 50'	SHEET 1 OF 1	SURVEYED BY JAMES W. CAUDILL LS2259 2599 PERKINS/HAAGEN ROAD ANDERSCY, KY 41773 PHONE 606-642-3277



LINE	BEARING	DISTANCE
L1	N 04°17'55" W	33.79'
L2	N 00°07'40" E	43.35'
L3	N 03°17'38" E	54.59'
L4	N 12°51'00" E	31.91'
L5	N 24°34'34" E	54.12'
L6	N 27°05'20" E	42.76'
L7	N 27°43'41" E	29.03'
L8	N 83°21'55" W	31.48'
L9	N 64°31'41" W	49.49'
L10	N 61°57'52" W	39.69'
L11	N 57°41'27" W	29.94'
L12	N 52°04'55" W	52.78'
L13	N 39°21'02" W	35.12'
L14	S 63°46'18" W	49.92'

APPALACHIAN WIRELESS  
 101 TECHNOLOGY TRAIL  
 IVEL, KY. 41642  
 PROPOSED TOWER SITE  
 BENHAM IN HARLAN COUNTY

ERNEST & JAMIE MARSH  
 BOOK 334 PAGE 327

ARK LAND COMPANY  
 BOOK 272 PAGE 773

JOYCE FUGATE  
 BOOK 427 PAGE 767

STORAGE BUILDING

McKNIGHT ROAD

BENHAM UNITED  
 METHODIST CHURCH  
 BOOK 335 PAGE 254

LEGEND

- CONCRETE PAD
- TOWER
- BOUNDARY LINE
- STREET
- POWERLINE

PROPOSED ACCESS ROAD

PROPOSED MONOPOLE 190'  
 LAT:36°57'44.9657"  
 LON:82°56'58.3310"  
 N:3522203.28  
 E:5739380.48  
 EL:1634

EQUIPMENT BUILDING

GENERATOR PAD

FOUNDATION 7' DIA

TOP POLE DIA 20"

BOT POLE DIA 56"

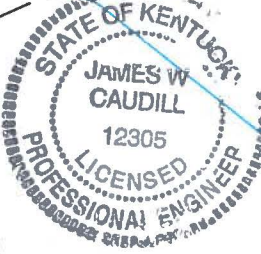
ARK LAND COMPANY  
 BOOK 272 PAGE 773



LEGEND

- CONCRETE PAD
- BOUNDARY LINE
- ACCESS ROAD
- POWERLINE

NOTE: SEE FOUNDATION DRAWINGS FOR DETAILS



I HEREBY CERTIFY THAT THIS DOCUMENT  
 WAS PREPARED BY ME OR UNDER MY DIRECTION.

*James W. Caudill*  
 JAMES W. CAUDILL

12305 PE# 1-10-16 DATE

-THE PROPOSED TOWER HAS BEEN LOCATED USING  
 DUAL FREQUENCY GPS UNIT PROCESSED BY "OPUS"  
 -STATE PLANE COORDINATES NAD 83 KY SINGLE ZONE  
 N 3522203.28 E 5730380.48, GRND EL 1634' FT MSL  
 FOUNDATION EL 1634' TOP OF TOWER EL 1824'  
 -PRECISION: HORIZONTAL=0.30' VERTICAL=0.50'  
 -THIS SURVEY MEETS OBSTACLE ACCURACY CODE 2C.  
 -PROPERTY LINE INFORMATION TAKEN FROM DEEDS  
 AND VERIFIED IN THE FIELD.

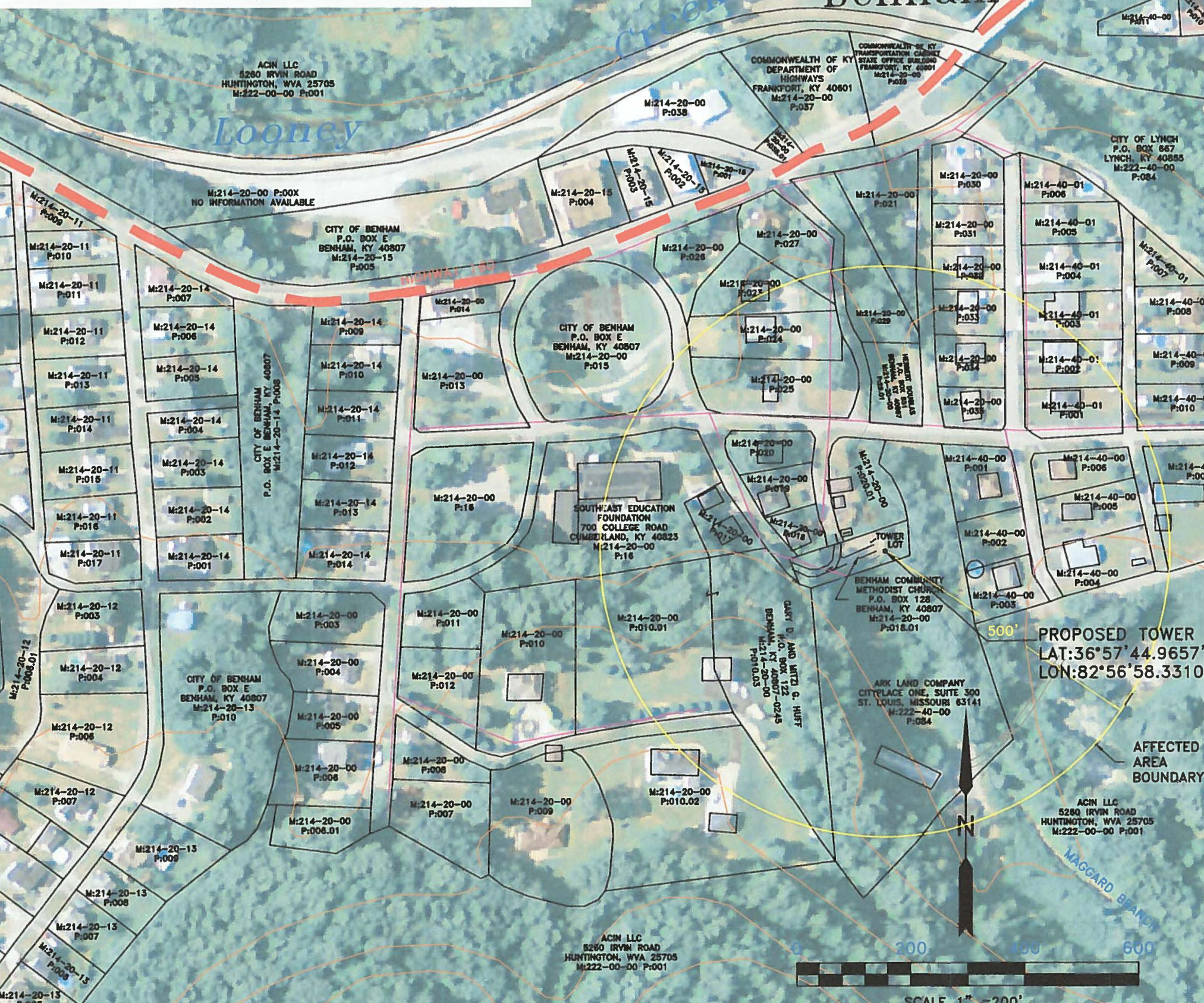
PROPOSED SITE PLAN AND STRUCTURE LOCATION  
 PROPOSED BENHAM TOWER

<b>DRAWN</b> JWC	<b>DATE</b> 01/10/16	BENHAM TOWER CITY OF BENHAM TRACT OFF HIGHWAY 160 IN HARLAN COUNTY
<b>APPROVED</b>	<b>DATE</b>	
<b>SCALE</b> 1" = 10'	<b>SHEET</b> 2 OF 3	<b>PROJECT NO.</b> BENHAM/BENHAMPLAN10



BENHAM 7.5' QUADRANGLE

Benham



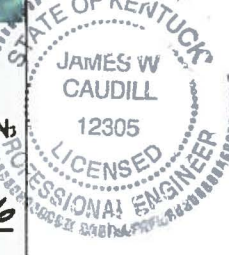
- PVA PROPERTY OWNERS MAP #S 214-20-00, 214-20-11, 214-20-12, 214-20-13, 214-20-14, 214-20-15, 214-40-00, 214-40-01
- M:214-20-00 P:003 RUTH BUCHANAN C/O ELLEN NAPIER 8433 WOODEND TRAIL KNOXVILLE, TN 37919
  - M:214-20-00 P:004 CHAD MORGAN P.O. BOX 131 BENHAM, KY 40807
  - M:214-20-00 P:005 MICHAEL W. BLAIR P.O. BOX 513 BENHAM, KY 40807
  - M:214-20-00 P:006 ROBERT N. AND JUDY SAYLOR P.O. BOX 27 BENHAM, KY 40807
  - M:214-20-00 P:006.01 ROBERT N. AND JUDY SAYLOR P.O. BOX 27 BENHAM, KY 40807
  - M:214-20-00 P:007 DANIEL AND ANN H. MIDGIFT 282 OAK STREET BENHAM, KY 40807
  - M:214-20-00 P:008 TIM W. AND MARSHA HUGHES 280 OAK STREET BENHAM, KY 40807
  - M:214-20-00 P:009 PAUL AND ROBERTA PRATT P.O. BOX 416 BENHAM, KY 40807
  - M:214-20-00 P:010 GARY D. AND MITZI G. HUFF P.O. BOX 122 BENHAM, KY 40807
  - M:214-20-00 P:010.01 GARY D. AND MITZI G. HUFF P.O. BOX 122 BENHAM, KY 40807
  - M:214-20-00 P:010.02 PAM AND WESLEY SHEFFIELD P.O. BOX 524 BENHAM, KY 40807
  - M:214-20-00 P:010.03 GARY D. AND MITZI G. HUFF P.O. BOX 122 BENHAM, KY 40807
  - M:214-20-00 P:011 GARY D. AND MITZI G. HUFF P.O. BOX 122 BENHAM, KY 40807
  - M:214-20-00 P:012 REVA EARLY HARPER 258 OAK STREET BENHAM, KY 40807
  - M:214-20-00 P:013 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-00 P:014 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-00 P:015 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-00 P:016 SOUTHEAST EDUCATION FOUNDATION 700 COLLEGE ROAD CUMBERLAND, KY 40823
  - M:214-20-00 P:017 BENHAM COMMUNITY METHODIST CHURCH P.O. BOX 128 BENHAM, KY 40807
  - M:214-20-00 P:018 JOYCE FUGATE P.O. BOX 155 ST. PAUL, VA 24283
  - M:214-20-00 P:019 BENHAM COMMUNITY METHODIST CHURCH P.O. BOX 128 BENHAM, KY 40807
  - M:214-20-00 P:020 BERCHEL AND REVA H. CAUDILL P.O. BOX 308 DUNGANNON, VA 24245
  - M:214-20-00 P:020.01 ERNEST AND JAMIE MARSH P.O. BOX 361 BENHAM, KY 40807
  - M:214-20-00 P:021 ROY SILVER AND ELAINE CONRAD P.O. BOX G BENHAM, KY 40807
  - M:214-20-00 P:023 ANGELO J. SPARACIA 7 BRUSH HOLLOW ROAD HOLBROOK, KY 11741
  - M:214-20-00 P:024 JAMES EDWARD AND MARY JANE SNEED 242 MCKNIGHT STREET BENHAM, KY 40807
  - M:214-20-00 P:025 HERBERT DOUGLAS P.O. BOX 551 BENHAM, KY 40807
  - M:214-20-00 P:026 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-00 P:027 SHIRLEY D. AND JIMMY HENSLEY P.O. BOX 303 BENHAM, KY 40807
  - M:214-20-00 P:028 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-00 P:029.01 HERBERT DOUGLAS P.O. BOX 551 BENHAM, KY 40807
  - M:214-20-00 P:030 GEORGE SR. AND ANDREA MASSEY P.O. BOX 404 LYNCH, KY 40855
  - M:214-20-00 P:031 DANIEL AND MELISSA GUILLEN 107 HIGHWAY 3404 PADRIDGE, KY 40862
  - M:214-20-00 P:032 CLYDE L. AND NANCY MONEYHUN P.O. BOX 54 BENHAM, KY 40807
  - M:214-20-00 P:033 BILLIE JEAN FRANKS AND PEGGY LOUIS DUNCUM P.O. BOX 403 BENHAM, KY 40807
  - M:214-20-00 P:034 TRISTAN M. CURRY 181 MAGGARD STREET BENHAM, KY 40807
  - M:214-20-00 P:035 REBECCA LEWIS C/O MICHAEL LEWIS P.O. BOX 404 BENHAM, KY 40807
  - M:214-20-00 P:038.01 COMMONWEALTH OF KENTUCKY TRANSPORTATION CABINET, DEPARTMENT OF HIGHWAYS FRANKFORT, KY 40601
  - M:214-20-11 P:009 DAVID S. MORRIS 264 HEMLOCK STREET BENHAM, KY 40807
  - M:214-20-11 P:010 THERESA AND VALERIE OSBORNE 7177 EAST HIGHWAY 221 BLEDSOE, KY 40810
  - M:214-20-11 P:011 SAUNDRA HOWARD P.O. BOX 116 BENHAM, KY 40807
  - M:214-20-11 P:012 TERRY AND CAROLYN SHEFFIELD P.O. BOX 476 BENHAM, KY 40807
  - M:214-20-11 P:013 ROBERT RONALD AND PEARL W. COPE P.O. BOX 472 BENHAM, KY 40807
  - M:214-20-11 P:014 JERRY W. AND LINDA M. HALCOMB P.O. BOX 481 BENHAM, KY 40807
  - M:214-20-11 P:015 DOUGLAS PAUL AND MICHELLE L. OSBORNE P.O. BOX 144 BENHAM, KY 40807
  - M:214-20-11 P:016 WANDA C. HUMPHREY P.O. BOX 193 BENHAM, KY 40807
  - M:214-20-11 P:017 WANDA C. HUMPHREY P.O. BOX 193 BENHAM, KY 40807
  - M:214-20-12 P:003 PATRICIA MCKECHNIE P.O. BOX 481 BENHAM, KY 40807
  - M:214-20-12 P:004 DAVID T. AND VALERIE KIDWELL P.O. BOX 124 BENHAM, KY 40807
  - M:214-20-12 P:008 WOODROW AND BARBARA FIELDS P.O. BOX 192 BENHAM, KY 40807
  - M:214-20-12 P:008.01 WOODROW AND BARBARA FIELDS P.O. BOX 192 BENHAM, KY 40807
  - M:214-20-12 P:007 WOODROW AND BARBARA HELEN FIELDS P.O. BOX 192 BENHAM, KY 40807
  - M:214-20-13 P:005 JOSHUA WAYNE BRASHEARS C/O BANK OF HARLAN P.O. BOX 919 HARLAN, KY 40831
  - M:214-20-13 P:006 THOMAS M. AND SANDRA SOLTESS 292 HEMLOCK STREET BENHAM, KY 40807
  - M:214-20-13 P:007 SHIRLEY PETTYPIECE P.O. BOX 341 BENHAM, KY 40807
  - M:214-20-13 P:008 AARON CREECH AND LOIS INEZ P.O. BOX 196 BENHAM, KY 40807
  - M:214-20-13 P:009 JAMES DAVID AND LYNN JONES P.O. BOX 434 BENHAM, KY 40807
  - M:214-20-13 P:010 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-14 P:001 DANIEL W. BOGOS P.O. BOX 42 BENHAM, KY 40807
  - M:214-20-14 P:002 JACK AND RUBY HATFIELD P.O. BOX 348 BENHAM, KY 40807
  - M:214-20-14 P:003 TRAVIS AND JACQUELINE BLAIR P.O. BOX 123 BENHAM, KY 40807
  - M:214-20-14 P:004 RODERICK D. AND PAMELA RALEIGH P.O. BOX 321 BENHAM, KY 40807
  - M:214-20-14 P:005 MARCUS AND JOYCE ELY P.O. BOX 514 BENHAM, KY 40807
  - M:214-20-14 P:006 JERRY AND PAM CORNETT 1210 LYNN STREET CUMBERLAND, KY 40823
  - M:214-20-14 P:007 HUMPHREY D. III AND MARTHA SHOEMAKER P.O. BOX 512 BENHAM, KY 40807
  - M:214-20-14 P:008 FLOYD AND CAROLYN SHORT P.O. BOX 71 BENHAM, KY 40807
  - M:214-20-14 P:010 SHIRLEY BROUGHTON C/O SHIRLEY ROBINSON P.O. BOX 252 BENHAM, KY 40807
  - M:214-20-14 P:011 PAUL AND CARMEN A. GRAHAM C/O MYRA GRAHAM ENGLE 3332 MONTAVESTA ROAD LEXINGTON, KY 40502
  - M:214-20-14 P:012 BERTHA ESTEP P.O. BOX 67 BENHAM, KY 40807
  - M:214-20-14 P:013 MIDLORE KENNEDY C/O SOCIAL SECURITY ADMINISTRATION 1ST FL. REAR 6011 W IRVING PK RD. CHICAGO, IL 60634
  - M:214-20-14 P:014 PAUL AND LINDA ESTEP P.O. BOX 158 BENHAM, KY 40807
  - M:214-20-15 P:001 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-15 P:002 BENHAM MASONIC LODGE C/O GARY HENSLEY P.O. BOX 44 BENHAM, KY 40807
  - M:214-20-15 P:003 CITY OF BENHAM P.O. BOX E BENHAM, KY 40807
  - M:214-20-15 P:004 COMMONWEALTH OF KENTUCKY, KY COMM. AND TECH. COLLEGE SYS., 300 N MAIN ST VERSAILLES, KY 40383
  - M:214-40-00 P:001 ODYSSEY INC. P.O. BOX 886 LOUISA, KY 41234
  - M:214-40-00 P:002 MICHAEL HATFIELD P.O. BOX 232 BENHAM, KY 40807
  - M:214-40-00 P:003 MICHAEL HATFIELD P.O. BOX 232 BENHAM, KY 40807
  - M:214-40-00 P:004 JUNE SCHOOVER P.O. BOX 322 BENHAM, KY 40807
  - M:214-40-00 P:005 BLAIR BULLOCK 209 BEALE STREET CUMBERLAND, KY 40823
  - M:214-40-00 P:006 JACK MARTIN P.O. BOX 291 BENHAM, KY 40807
  - M:214-40-00 P:007 REVELATION ENERGY LLC 1051 MAIN STREET MILTON, WV 25541
  - M:214-40-00 P:010 ARCHIE SR. AND RUTH WILLIAMS C/O JOE WILLIAMS P.O. BOX 183 BENHAM, KY 40807
  - M:214-40-00 P:011 STEVEN B. GRIFFEY 1180 LAFAYETTE BOULEVARD WINCHESTER, KY 40391-8749
  - M:214-40-01 P:001 CECIL B. AND MISSY BOWMAN 182 MAGGARD STREET BENHAM, KY 40807
  - M:214-40-01 P:002 ROGER AND HILDA FAYE RALEIGH P.O. BOX 211 BENHAM, KY 40807
  - M:214-40-01 P:003 GARY LEE AND DAWNE FIELDS P.O. BOX 63 BENHAM, KY 40807
  - M:214-40-01 P:004 CLYDE M. AND RUBY HALCOMB ESTATE C/O DAVID AND IMOGENE HALCOMB P.O. BOX 374 BENHAM, KY 40807
  - M:214-40-01 P:005 CLYDE G. AND MARY W. CLARK ESTATE 174 MAGGARD STREET BENHAM, KY 40807
  - M:214-40-01 P:006 KENNETH AND SHIELA DUNCUM P.O. BOX 471 BENHAM, KY 40807
  - M:214-40-01 P:007 SHEILA HUBBARD P.O. BOX 15 BENHAM, KY 40807
  - M:214-40-01 P:008 TEDDY AND JANICE CHARLES P.O. BOX 373 BENHAM, KY 40807
  - M:214-40-01 P:009 JOHNNY WAYNE AND NANCY BLAIR 164 CREECH STREET BENHAM, KY 40807
  - M:214-40-01 P:010 NONA CRESS AND JERRY ANN SHOULTER 4585 WARD ROAD MORROW, OH 45152-9709

**LEGEND**

- POWER LINE
- PROPERTY LINE
- ACCESS ROAD
- CREEK
- CEMETERY
- TOWER

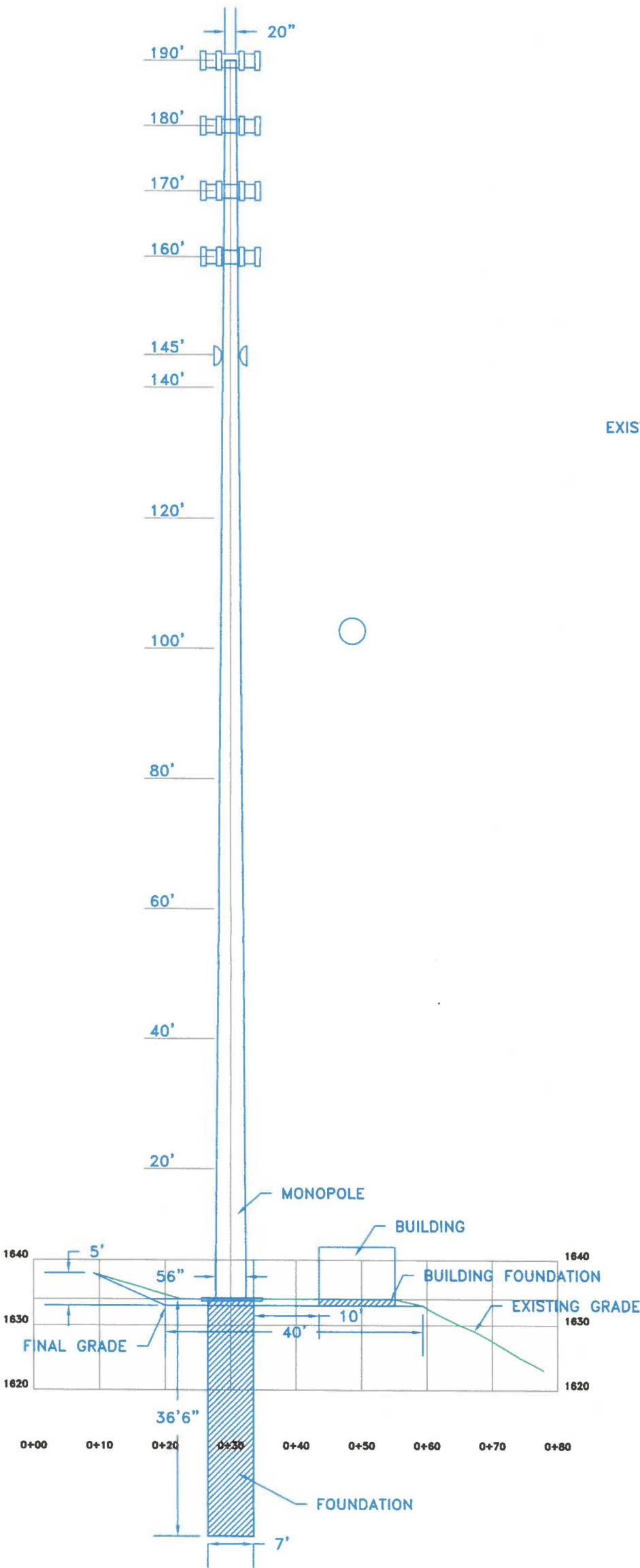
**APPALACHIAN WIRELESS**  
101 TECHNOLOGY TRAIL  
IVEL, KY. 41642  
PROPOSED TOWER SITE  
BENHAM, HARLAN CO OF KY

**J W CAUDILL ENGINEERING**  
9383 HWY 15 STE.C ISOM, KY 41824  
ENGINEER'S CERTIFICATE: I HEREBY CERTIFY THAT THE INFORMATION SHOWN REFLECTS THE INFORMATION OBTAINED AND PROVIDED BY THE HARLAN COUNTY PROPERTY VALUATION ADMINISTRATION OFFICE IN HARLAN.  
*James W. Caudill* 12305  
JAMES W. CAUDILL P.E.# 1-10-16  
DATE

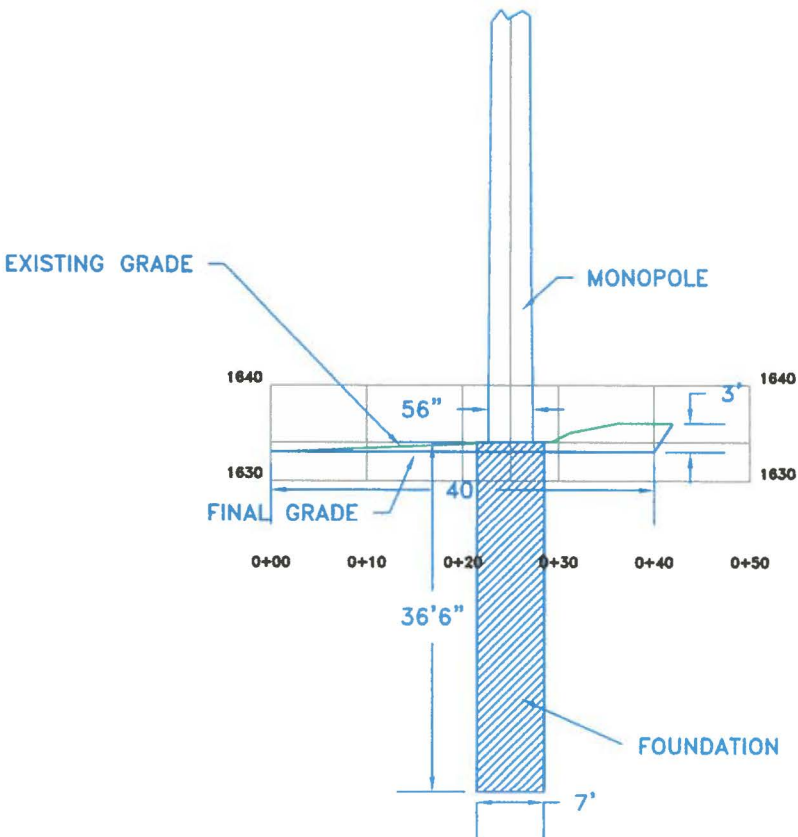


MAP SHOWING STRUCTURES & LAND OWNERS WITHIN 500 FT OF THE PROPOSED TOWER		
<b>DRAWN</b> JWC	<b>DATE</b> 01/10/16	BENHAM TOWER CITY OF BENHAM TRACT OFF HIGHWAY 160 IN HARLAN COUNTY KY
<b>APPROVED</b>	<b>DATE</b>	
<b>SCALE</b> 1" = 200'	<b>SHEET</b> 1 OF 3	<b>PROJECT NO.</b> BENHAM/BENHAMPVA200





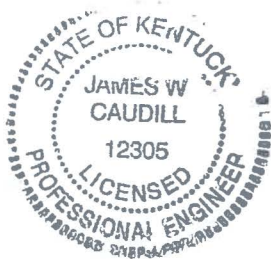
SITE PROFILE



SITE CROSS SECTION

NOTE: SEE FOUNDATION DRAWINGS FOR DETAILS

1" = 20'  
01/10/16  
GRAPHIC SCALE



THIS IS A VERTICAL PROFILE SKETCH OF THE TOWER INDICATING THE PROPOSED ANTENNA AND DISH ELEVATIONS. NO DESIGN CRITERIA WAS CONSIDERED IN THE PREPARATION OF THIS DRAWING.

*James W. Caudill 12305*  
JAMES W. CAUDILL P.E. 1-10-16  
DATE

PROPOSED SITE PLAN AND STRUCTURE LOCATION PROPOSED BENHAM TOWER		
<b>DRAWN</b> JWC	<b>DATE</b> 01/10/16	BENHAM TOWER CITY OF BENHAM TRACT OFF HIGHWAY 160 IN HARLAN COUNTY
<b>APPROVED</b>	<b>DATE</b>	
<b>SCALE</b> 1" = 20'	<b>SHEET</b> 3 OF 3	<b>PROJECT NO.</b> BENHAM/BENHAMPROFILE