

**GUYED TOWER  
FOUNDATION MAPPING AND GEOTECHNICAL ANALYSIS**



**SITE NAME AND  
NUMBER**

**PREPARED FOR:**

**CLIENT LOGO**

**PREPARED BY:**

Wes Culver  
Design Engineer  
Structural Components, LLC  
SC Job # 090168

**DATE:**

July 6th, 2009



## REQUIRED SCOPE OF WORK

**1617 Pearl St., Unit A      Boulder, CO 80302      PH: 800 584-8839**

CLIENT:	CLIENT NAME	DATE AT SITE:	7/2/2009
SITE (ID):	SITE NAME	TOWER TYPE / HT:	150' Guyed Tower
ADDRESS:	SITE ADDRESS	WEATHER:	85 °F, Sunny, Wind 5-10 MPH E
LEAD:	Wes Culver		

### EXISTING TOWER INFORMATION

Data	Existing Information	File/Date	Discrepancy	Scope of Work
Tower Mast Information	PREVIOUS INFO		Yes	Guy wires are all 7/16", not 3/8" as listed in previous Structural Analysis.
Antenna Information	PREVIOUS INFO		N/A	No antenna mapping required.
Foundation Information	No existing information supplied		N/A	Full foundation mapping.
Soils Information	No existing information supplied		N/A	Geotech information gathered during excavation, to be evaluated by professional geotech company
Site Constraints	PREVIOUS INFO		N/A	No compound mapping required.
Reinforcement Constraints	No existing information supplied		N/A	No obstruction mapping required.
Maintenance Issues	No existing information supplied		N/A	Maintenance issues seen from ground noted.

### EXISTING TOWER INFORMATION

Mapping Cut Sheets	Required Yes/No	Completed By	# Pages	Notes
PreConstruction Summary	No	N/A	0	
TIA Maintenance Issues	Yes	WC	1	
Compound Sketch	No	N/A	0	
Tower Mast Geometry & Member Sizes	No	N/A	0	
Tower Base Details	No	N/A	0	
Tower Section Details	No	N/A	0	
Leg Splice Details	No	N/A	0	
Gusset Details	No	N/A	0	
Guy Attachment Details	No	N/A	0	
Torque Arm Details	No	N/A	0	
Guy Anchor & Guy Wire Details	Yes	WC	1	
Antenna & Coax Details	No	N/A	0	
Obstructions	No	N/A	0	
Tower Base Foundation Details	Yes	WC	1	
Guy Anchor Block Details	Yes	WC	1	
Guy Anchor Caisson Details	No	N/A	0	
Geophysical Mapping & Soil Samples	Yes	WC	1	
Guy Tensions and Mast Alignment	No	N/A	0	

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LEAD:	<u>Wes Culver</u>		

Issue: Guy wires not grounded above anchor heads.  
 Recommendations: Install ground wires vertical from guy wires to prevent lightning from passing through anchor heads.



Issue: Turnbuckles not locked with proper figure 8 method for all anchors.  
 Recommendations: Re-install locks with proper Figure 8 configuration.



Issue: Level III rust on anchor rods above concrete encasement.  
 Recommendations: Remove rust with wire brush or similar and then cold-galvanize affected areas with min. (2) coats of 95% Zinch Rich Paint. Should also extend concrete encasement to prevent future rusting.



Issue: Old guy wires and other debris around site.  
 Recommendations: Clean up old guy wires and debris.

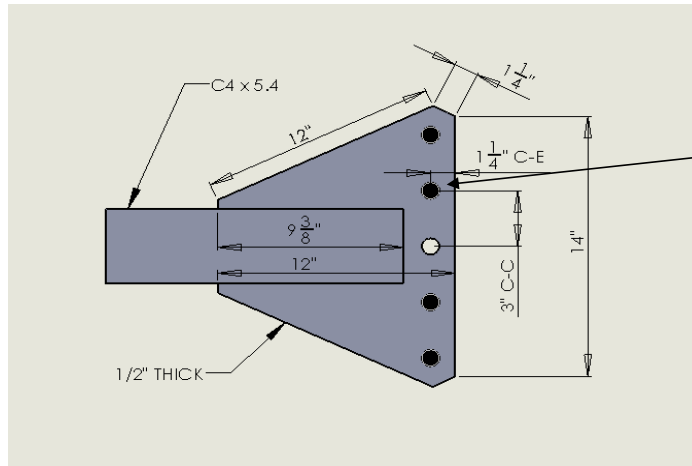


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CIRCLE ANCHOR: {A} {B} {C} {INNER} MIDDLE OUTER  
 ANCHOR LOCATIONS TAKEN WITH: TRANSIT {LASER} TAPE MEASURE

**ANCHOR HEAD DETAIL**



**Anchor A** Radius 118.9' Height 3' Up Az. 20 Deg  
**Anchor B** Radius 118.2' Height 2' Up Az. 140 Deg  
**Anchor C** Radius 118.0' Height 3' Down Az. 260 Deg

Hole #	To Elev.	Hole Diameter	Hole Tear-out	Guy Size	Turnbuckle Size	Grounding / Condition
5	136'	7/8"	13/16"	7/16" x 7 EHS	3/4" x 12	No grounding on guy wire
4	136'	7/8"	13/16"	7/16" x 7 EHS	3/4" x 12	No grounding on guy wire
3	N/A	7/8"	13/16"	N/A	N/A	N/A
2	68'	7/8"	13/16"	7/16" x 7 EHS	3/4" x 12	No grounding on guy wire
1	68'	7/8"	13/16"	7/16" x 7 EHS	3/4" x 12	No grounding on guy wire

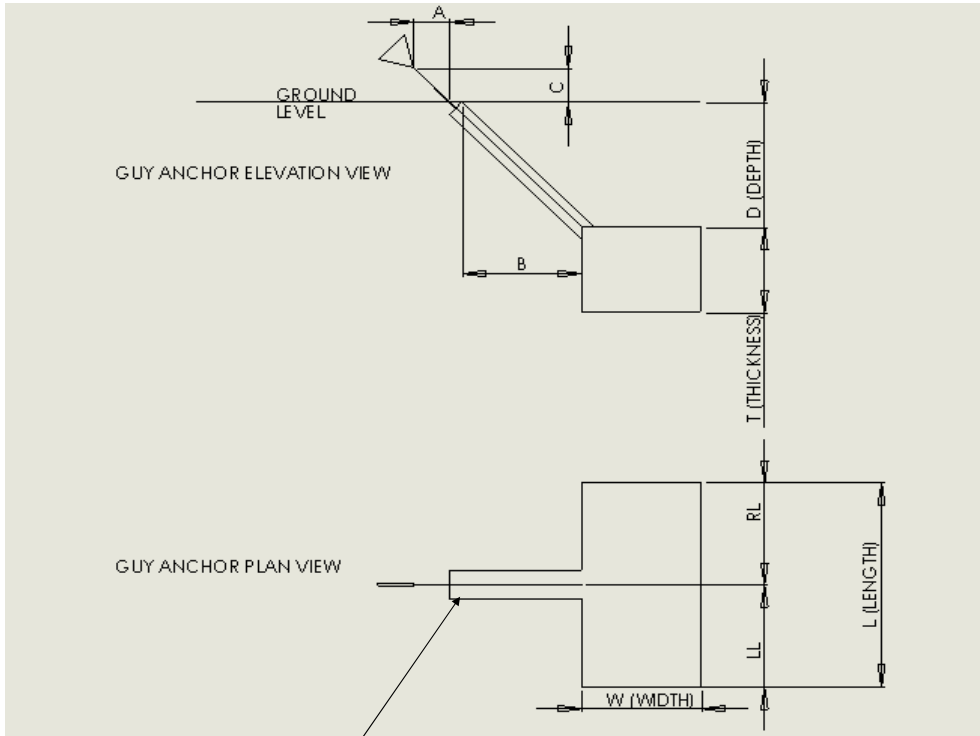
**GUY ANCHOR BLOCK DETAILS**

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ANCHOR LOCATIONS TAKEN WITH: TRANSIT {LASER} TAPE MEASURE  
 TYPE OF ANCHOR BLOCK INSTALLATION: {FREE POURED} CAST IN PLACE

**GUY ANCHOR DETAIL SKETCH**



NOTE: ANCHOR RODS ARE COVERED IN APPROXIMATELY 30" WIDE x 6" THICK FREE-POURED CONCRETE ENCASUREMENT.

MAPPED USING: PET {PROBE} {SHOVEL} {BACKHOE} REBAR LOCATE {VISUAL} OTHER

GUY ANCHORS DIMENSIONS ARE AVERAGE AS FOUNDATION SHAPE IS VERY ROUGH DUE TO FREE POUR.

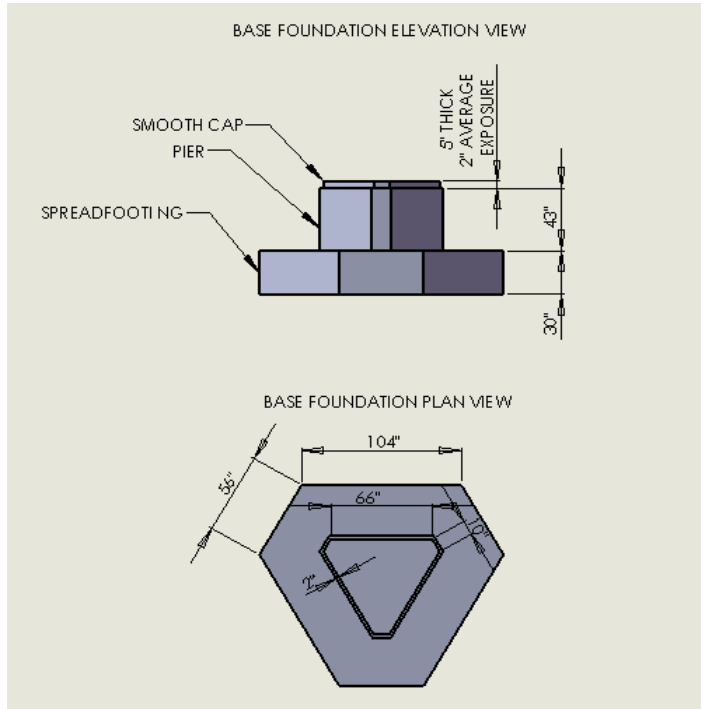
Location	Anchor	Radius	Height	Azimuth	A (distance)	B (distance)	W (width)	LL (left length)	RL (right length)	L (length)	C (height)	D (depth)	T (thickness)
INNER	A	118.9'	3'	20	12"	44**	36**	36"	36"	72"	12"	48"	36"
	B	118.2'	2'	140	12"	44**	36**	30"	33"	63"	12"	48"	36"
	C	118.0'	-3'	260	12"	44**	44**	30"	30"	60"	12"	44"	30"

NOTE: \* VALUES WERE VERIFIED BY PROBING, NOT EXCAVATION TO AVOID DAMAGING FENCES.

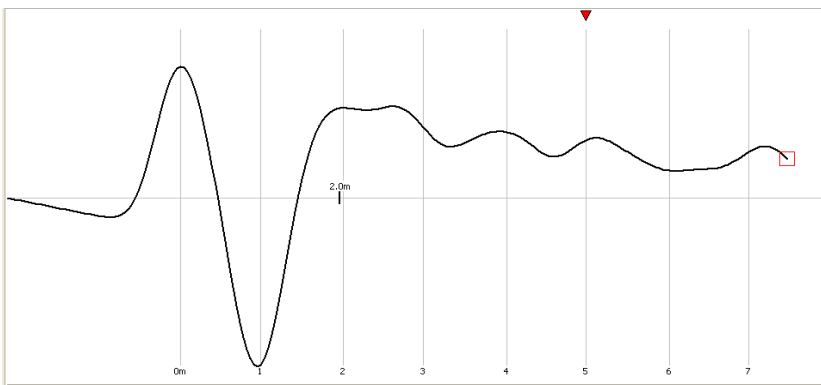
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**BASE FOUNDATION MAPPING**



NOTE: DIMENSIONS OF SPREADFOOTING ARE AVERAGE, FOUNDATION IS VERY ROUGH SHAPE DUE TO FREE-POUR.



DEPTH TO TOP OF SPREADFOOTING WAS DETERMINED USING PROBE AND TOTAL DEPTH WAS FOUND USING PILE ECHO TESTING (PET). FOR MORE INFORMATION VISIT [WWW.PILETEST.COM](http://WWW.PILETEST.COM).

MAPPED USING: { PET } { PROBE } SHOVEL { BACKHOE } REBAR LOCATE { VISUAL } OTHER



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 LEAD: Andy Aakhus-Witt 1/0/1900

VZW Site Identification Sign



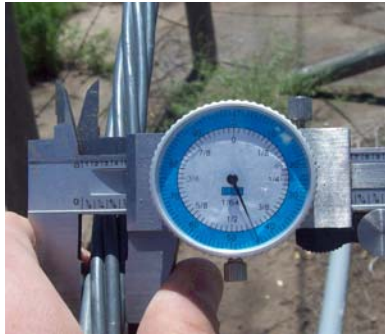
Anchor block exposure



5" Tall formed cap at base



All guy wires 7/16" x 7 EHS



Determining dimensions of base spreadfooting by using probe



Determining block thickness



Concrete encasement around anchor rods



Determining length of anchor block



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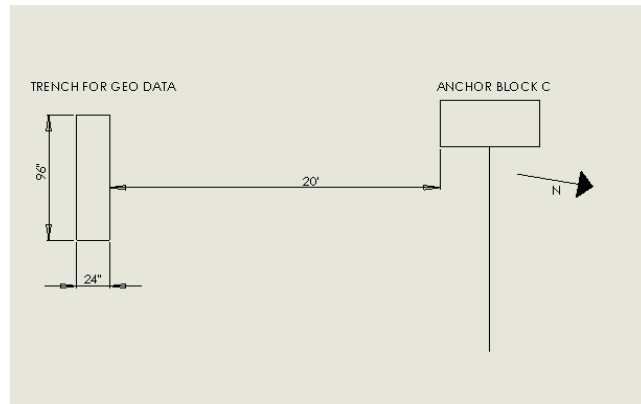
**DYNAMIC PENETROMETER**
**LOCATION: NEAR ANCHOR C**

SECTION DEPTH (FT)	BLOW COUNT (#)	PEN. DEPTH (IN)
1	6	1.75
2.5	15	1.75
3.5	15	1.5
5	15	1.5
6	N/A	N/A
7	N/A	N/A

**Site Issues:**

Geo data was taken near Anchor C and then determined to have the same properties at the other anchor locations and at the base of the tower. At 6' and 7', the dynamic penetrometer bounced off of the rock. From 6' to 7' the solid rock was chipped away, by 7' the ground was solid rock and could not be broken with a backhoe.

SKETCH ALL DIG LOCATIONS & LABEL LOCATIONS A, B, C...  
 ONE PAGE PER DIG LOCATION & SOIL SAMPLING



Note: Additional Geotech Report forthcoming from Yeh and Associates, Inc.

SHEAR VAIN & POCKET PENETROMETER LOCATION:	DEPTH (in)	PENETROMETER 3+ READINGS	SHEAR VAIN SIZE: 3+ READINGS	SOIL SAMPLE #
Dark sandy, loam	0' to 1'	1, 0.5, 0.5	1, 2, 2	C 0 - 1
Soft sand, many softball sized rocks present in soil	1' to 3'	Too soft for reading	Too soft for reading	C 1 - 2
Soil solidifies at 3' into sandstone that can be broken apart by shovel or backhoe. When broken, very similar to soil from 1' to 3'.	3' to 5'	Too hard for reading	Too hard for reading	C 3 - 6
Soil changes at 6' to much more solid sandstone that can only be broken up by backhoe. Cannot be	6' - 7'	Too deep for reading	Too deep for reading	C 6+ (Rock)