EMPIRE telecom

January 28, 2015

Melanie A. Bachman
Executive Director
Connecticut Siting Council
10 Franklin Street
New Britain, CT 06051

Regarding:	Notice of Exempt Modification – Addition of 3 radio heads previously approved
Property Address:	5 Perryridge Road, Greenwich, CT (the "Property")
Applicant:	AT&T Mobility ("AT&T")

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 164 foot Monopole ("tower") location on the Property. AT&T's facility consists of nine (9) wireless telecommunications antenna at 134 feet. The is controlled by Greenwich Hospital. The Council approved the previous application on May 31st 2011 reference number EM-CING-057-110506. This application (attached) granted AT&T the use of 6 radio heads at this location. The approval expired one year from the issue date. During that time AT&T made the changes to the site per the approval but only installed three (3) of the six (6) radio heads that they received approval. AT&T would now like to install the additional three(3) radio heads that were originally approved under EM-CING-057-110506.

Please accept this application as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72 (b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the First Selectman, and the Director of Planning and Zoning for the Town of Greenwich. A copy of this letter is also being sent to Greenwich Hospital, the owner of the structure that AT&T is located.

The planned modifications to AT&T's facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T's additional, previously approved 3 radio heads will be installed at 134 foot level of the 164 foot monopole.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

EMPIRE telecom

standard. An RF emissions calculation (attached) for AT&T's modified facility was provided in the application which led to the May 31st 2011 Decision.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Centek Engineering dated April 14, 2011).

For the foregoing reasons AT&T respectfully requests that the proposed addition of 3 radio heads previously approved be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

David P. Cooper
Director of Site Acquisition
Empire Telecom

CC: Peter Tesei, First Selectman, Town of Greenwich
Katie DeLuca, Director, Planning and Zoning, Town of Greenwich
Greenwich Hospital

16 Esquire Road, Billerica, MA 01862 Mobile 617-639-4908 Email: Dcooper@empiretelecomm.com

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

CT2102

May 31, 2011

Douglas L. Culp, Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-057-110506** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 5 Perryridge Road, Greenwich, Connecticut.

Dear Mr. Culp:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Not less than 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated May 6, 2011. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Linda Roberts
Executive Director

LR/CDM/laf

c: The Honorable Peter J. Tesei, First Selectman, Town of Greenwich
Diane Fox, Planning & Zoning Director, Town of Greenwich
Greenwich Hospital

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

May 10, 2011

The Honorable Peter J. Tesei
First Selectman
Town of Greenwich
Town Hall
101 Field Point Road
P. O. Box 2540
Greenwich, CT 06836-2540

RE: **EM-CING-057-110506** - New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 5 Perryridge Road, Greenwich, Connecticut.

Dear First Selectman Tesei:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by May 24, 2011.

Thank you for your cooperation and consideration.

Very truly yours,

Linda Roberts

Linda Roberts
Executive Director

LR/jbw

Enclosure: Notice of Intent

c: Diane Fox, Planning & Zoning Director, Town of Greenwich

CSC
CONNECTICUT SITING COUNCIL

EM-CING-057-110506

at&t
Your world. Delivered.

cingular
raising the bar

· Wireless PCS, LLC
; Drive
onnecticut 06067-3900
Phone: ( ) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

ORIGINAL

HAND DELIVERED

May 6, 2011

RECEIVED
MAY - 6 2011
CONNECTICUT
SITING COUNCIL

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

Re: New Cingular Wireless PCS, LLC notice of intent to modify an existing telecommunications facility located at 5 Perryridge Road Greenwich, CT (owner Greenwich Hospital)

Dear Ms. Roberts:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the chief elected official of the municipality in which the affected cell site is located.

UMTS technology offers services to mobile computer and phone users anywhere in the world. Based on the Global System for Mobile ("GSM") communication standard, UMTS is the planned worldwide standard for mobile users. UMTS, fully implemented, gives computer and phone users high-speed access to the Internet as they travel. They have the same capabilities even when they roam, through both terrestrial wireless and satellite transmissions.

LTE is a new high-performance air interface for cellular mobile communications. It is the last step toward the 4th generation (4G) of radio technologies, designed to increase the capacity and speed of mobile telephone networks.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in AT&T's operations at the site. Also included is documentation of the

structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modifications as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected.

2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound other than some enlarged equipment pads as may be noted in the attachments.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more.

4. Radio frequency power density may increase due to use of one or more GSM channel for UMTS transmissions. Moreover, LTE will utilize additional radio frequencies newly-licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons, New Cingular Wireless respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (860) 463-5511 with questions concerning this matter. Thank you for your consideration.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Attachments

NEW CINGULAR WIRELESS PCS, LLC
Equipment Modification

5 Perryridge Ridge Greenwich, CT
Site Number 2102
Exempt Mod 08/08

Tower Owner/Manager: Greenwich Hospital

Equipment configuration: Monopole

Current and/or approved: Six PowerWave antennas @ 134 ft
Six PowerWave TMA's and Diplexers @ 134 ft
Twelve runs 1 5/8 inch coax to 134 ft
Equipment Shelter

Planned Modifications: Retain existing PowerWave Antenna's and TMA's at 134 ft
Retain all Coax Cabling
Install three PowerWave P65-16 antennas or equivalent @ 134 ft
Install six remote radio heads and surge arrestor @ 134 ft
Install one new cabinet and surge suppressor equipment in shelter

Power Density:

Worst-case calculations for existing wireless operations at the site, using standard parameters for other carriers, indicate a radio frequency electromagnetic radiation power density, measured at ground level beside the Tower, of approximately 47.7% of the standard adopted by the FCC. As depicted in the second table below, the total radio frequency electromagnetic radiation power density following proposed modifications would be approximately 49.7 % of the standard.

Existing

Other Users							23.70
AT&T UMTS	134	1900 Band	2	500	0.0200	1.0000	2.00
AT&T UMTS	134	800 Band	1	500	0.0100	0.5867	1.71
AT&T GSM	134	800Band	15	296	0.0889	0.5867	15.15
AT&T GSM	134	1900 Band	6	427	0.0513	1.0000	5.13
Total							**47.7%**

* Data for other users are from Siting Council records - Dave Martin – from Sprint Actual reading at site.

Proposed

Company	Centerline Ht (feet)	Frequency (MHz)	Number of Channels	Power Per Channel (Watts)	Power Density (mW/cm^2)	Standard Limits (mW/cm^2)	Percent of Limit
Other Users							23.70
AT&T UMTS	134	800 Band	1	500	0.0100	0.5867	1.71
AT&T UMTS	134	1900 Band	2	500	0.0200	1.0000	2.00
AT&T GSM	134	1900 Band	6	427	0.0513	1.0000	5.13
AT&T GSM	134	880 - 894	15	296	0.0889	0.5867	15.15
AT&T LTE	134	740 - 746	1	500	0.0100	0.4933	2.03
Total							**49.7%**

* Data for other users are from Siting Council records - Dave Martin – from Sprint Actual reading at site.

Structural information:

The attached structural analysis demonstrates that the monopole and foundation have adequate structural capacity to accommodate the proposed modifications. (CENTEK dated 4-14-11).

PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY MODIFICATIONS
SITE ADDRESS:	5 PERRYRIDGE ROAD GREENWICH, CT 06830
LATITUDE:	41.034168° N 41° 2' 3"
LONGITUDE:	-73.630856° W -73° 37' 51.08"
JURISDICTION:	NATIONAL, STATE & LOCAL CODES OR ORDINANCES
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
NOC#	866-915-5600

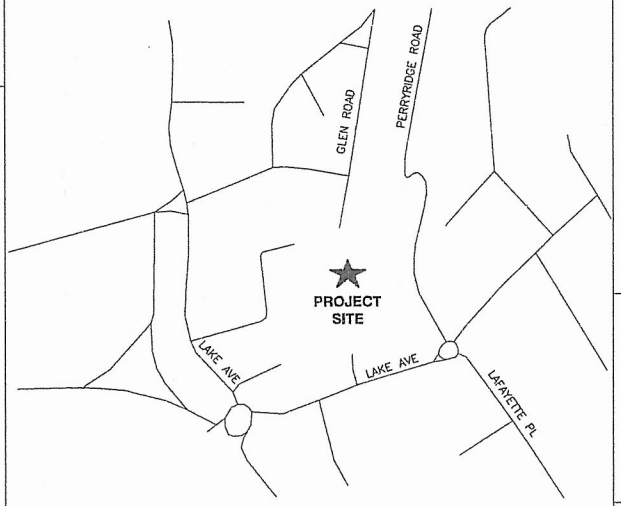
at&t

SITE NUMBER: CT2102
SITE NAME: GREENWICH HOSPITAL

DRAWING INDEX

VICINITY MAP

HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD. 0.3 MILES. TURN LEFT AT CAPITAL BLVD. 0.3 MILES. TURN LEFT AT WEST ST. 0.3 MILES. TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN. 9.6 MILES. TAKE EXIT 17 FOR CT-15 S/W CROSS PKWY. 0.4 MILES. MERGE ONTO CT-15 S 29.8 MI 7. TAKE EXIT 52 FOR STATE ROUTE 108 S/STATE ROUTE 8 S TOWARD BRIDGEPORT. 0.7 MILES. FOLLOW SIGNS FOR CT-8 S/BRIDGEPORT AND MERGE ONTO CT-8 S/STATE ROUTE 8 S. 5.3 MILES. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR I-95 S/N.Y. CITY AND MERGE ONTO I-95 S. 23.4 MILES. TAKE EXIT 5 FOR US-1 TOWARD RIVERSIDE/OLD GREENWICH. 0.1 MILES. TURN LEFT AT US-1 S/E PUTNAM AVE. 2.5 MILES. TURN RIGHT AT MAPLE AVE. 0.4 MILES. TAKE THE 1ST LEFT ONTO PATTERSON AVE. 0.2 MILES. CONTINUE ONTO DEER PARK DR. 495 FT. CONTINUE ONTO GLEN RD. 0.4 MILES.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL

BEFORE YOU DIG

CALL TOLL FREE 800-922-4455

UNDERGROUND SERVICE ALERT

STATE OF CONNECTICUT — DANIEL J. HAMM — No 24173 — LICENSED PROFESSIONAL ENGINEER

Hudson Design Group LLC
1400 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2102
SITE NAME: GREENWICH HOSPITAL
5 PERRYRIDGE ROAD
GREENWICH, CT 06830
FAIRFIELD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	03/26/11	CONSTRUCTION REVISED	JG	DC	DPH
1	03/10/11	ISSUED FOR CONSTRUCTION	HC	DC	DPH
0	02/10/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

AT&T

TITLE SHEET (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2102.01	T-1	2

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – SAI
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
BUILDING CODE: 2003 IBC WITH 2005 CT SUPPLEMENT & 2009 CT AMENDMENTS
ELECTRICAL CODE: REFER TO ELECTRICAL DRAWINGS
LIGHTENING CODE: REFER TO ELECTRICAL DRAWINGS

SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

MANUAL OF STEEL CONSTRUCTION, ASD, NINTH EDITION;

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-F, STRUCTURAL STANDARDS FOR STEEL

ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
AWG	AMERICAN WIRE GAUGE	MGB	MASTER GROUND BUS		
BCW	BARE COPPER WIRE	MIN	MINIMUM	TBD	TO BE DETERMINED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW	TBR	TO BE REMOVED
EXISTING	EXISTING	N.T.S.	NOT TO SCALE	TBRR	TO BE REMOVED AND REPLACED
EG	EQUIPMENT GROUND	REF	REFERENCE	TYP	TYPICAL
EGR	EQUIPMENT GROUND RING	REQ'D	REQUIRED		

Hudson Design Group LLC
1400 OSGOOD STREET
BUILDING 20 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-3526

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2102
SITE NAME: GREENWICH HOSPITAL
5 PERRYRIDGE ROAD
GREENWICH, CT 06830
FAIRFIELD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	03/26/11	CONSTRUCTION REVISED	JG	DC	DPH
1	03/10/11	ISSUED FOR CONSTRUCTION	HC	DC	DPH
0	02/10/11	ISSUED FOR REVIEW	JG	DC	DPH

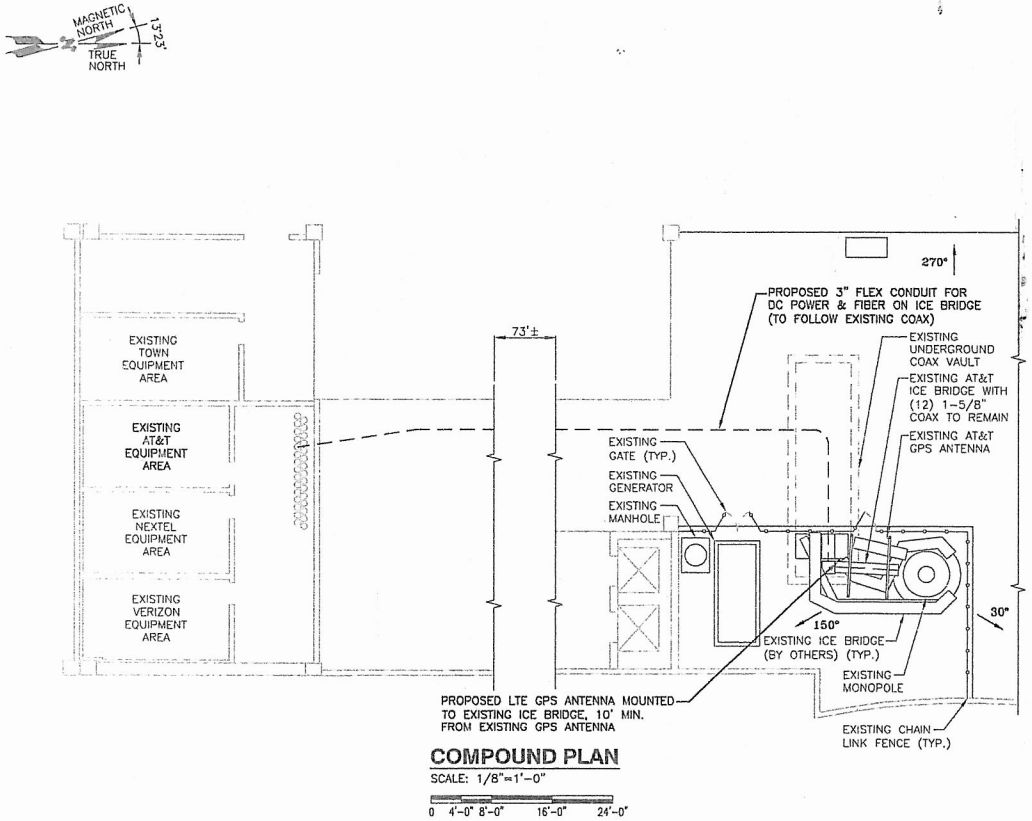
SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

STATE OF CONNECTICUT
DANIEL C. HAMM
No. 21178
LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES (LTE)

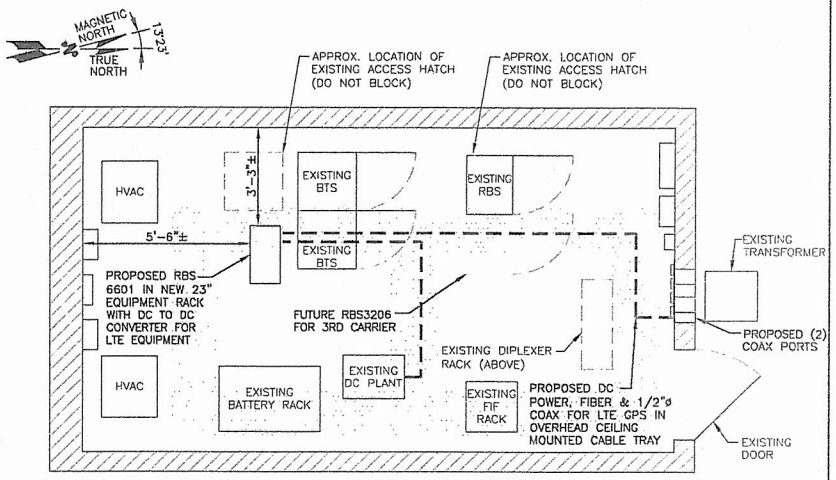
JOB NUMBER	DRAWING NUMBER	REV
2102.01	GN-1	2



COMPOUND PLAN

SCALE: 1/8"=1'-0"

0 4'-0" 8'-0" 16'-0" 24'-0"



EQUIPMENT ROOM PLAN

SCALE: 1/2"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"

Hudson Design Group LLC
1400 OSGOOD STREET
BUILDING 30 NORTH, SUITE 2-101
N. ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

SAI communications
22 KEEWAYDIN DRIVE
SALEM, NH 03079

SITE NUMBER: CT2102
SITE NAME: GREENWICH HOSPITAL
5 PERRYRIDGE ROAD
GREENWICH, CT 06830
FAIRFIELD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

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STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND & EQUIPMENT PLAN (LTE)

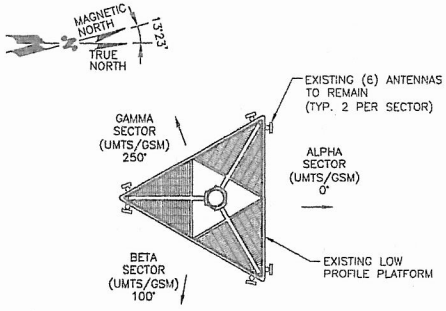
JOB NUMBER	DRAWING NUMBER	REV
2102.01	A-1	2

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING STRUCTURES TO SUPPORT THE PROPOSED EQUIPMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION.

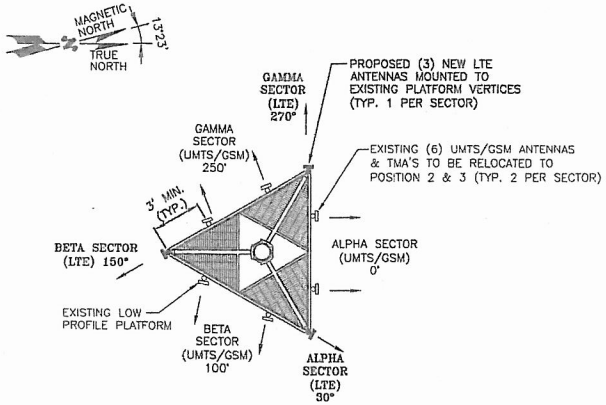
*NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA CONFIGURATION



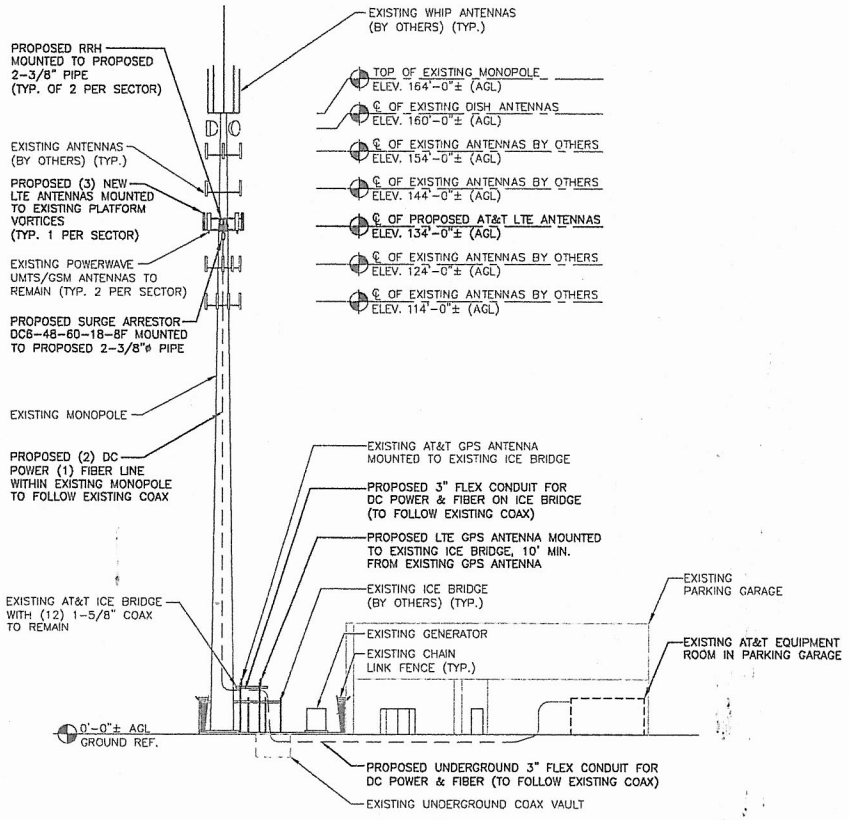
EXISTING GSM/UMTS ANTENNA PLAN

SCALE: N.T.S.



PROPOSED LTE ANTENNA PLAN

SCALE: N.T.S.



WEST ELEVATION

SCALE: 1/16"=1'-0"

0 8'-0" 16'-0" 32'-0" 48'-0"

STATE OF CONNECTICUT DANIEL P. HAMM No. 21178 LICENSED PROFESSIONAL ENGINEER

Daniel P. Hamm

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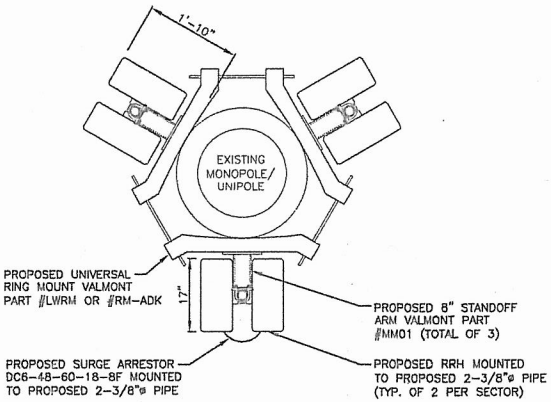
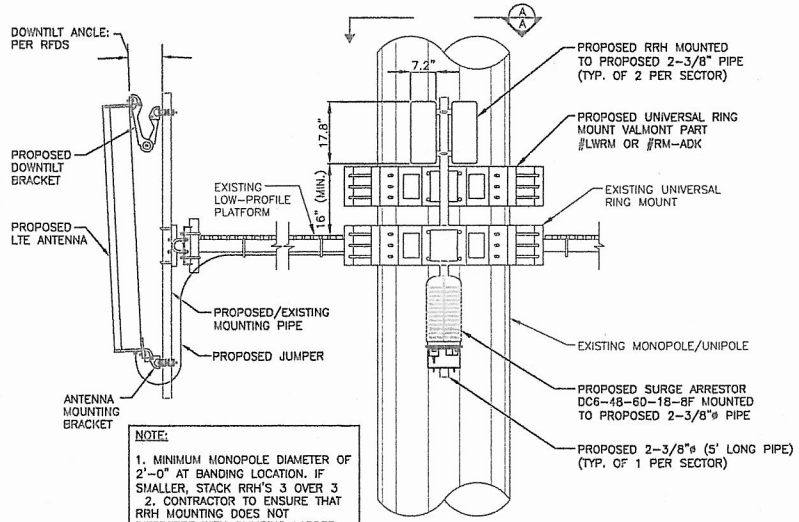
ANTENNA LAYOUT AND ELEVATION (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2102.01	A-2	2



SECTION A-A



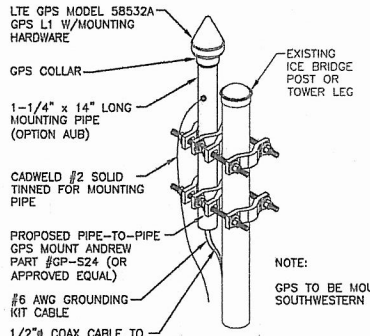
NOTE:

1. MINIMUM MONOPOLE DIAMETER OF 2'-0" AT BANDING LOCATION. IF SMALLER, STACK RRH'S 3 OVER 3
2. CONTRACTOR TO ENSURE THAT RRH MOUNTING DOES NOT INTERFERE WITH CLIMBING LADDER

PART #	VMI PART #	SIZE RANGE
LWRM	801068	12"-45"
RM-ADK	157286	36"-60" ADAPTER KIT

PROPOSED RRH & SURGE ARRESTOR MOUNTING DETAIL

SCALE: N.T.S.



GPS MOUNTED TO ICE BRIDGE

SCALE: N.T.S.

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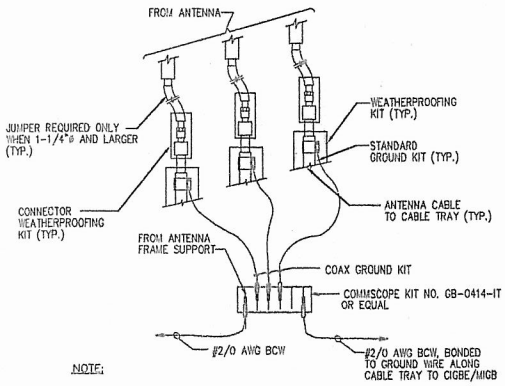
STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2102.01	A-3	2

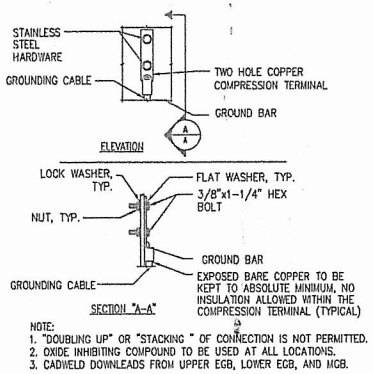


NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

GROUND WIRE TO GROUND BAR CONNECTION DETAIL

1 — N.T.S.

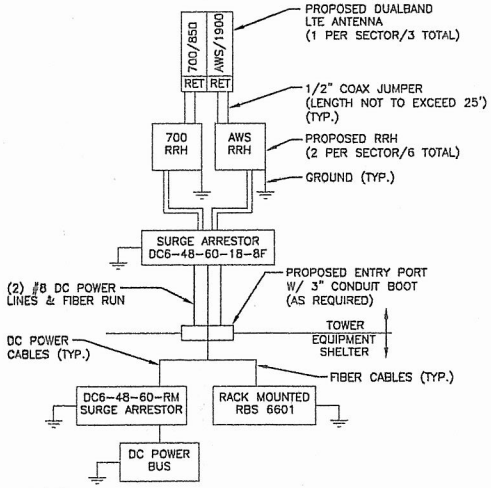


NOTE:

1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

2 — N.T.S.

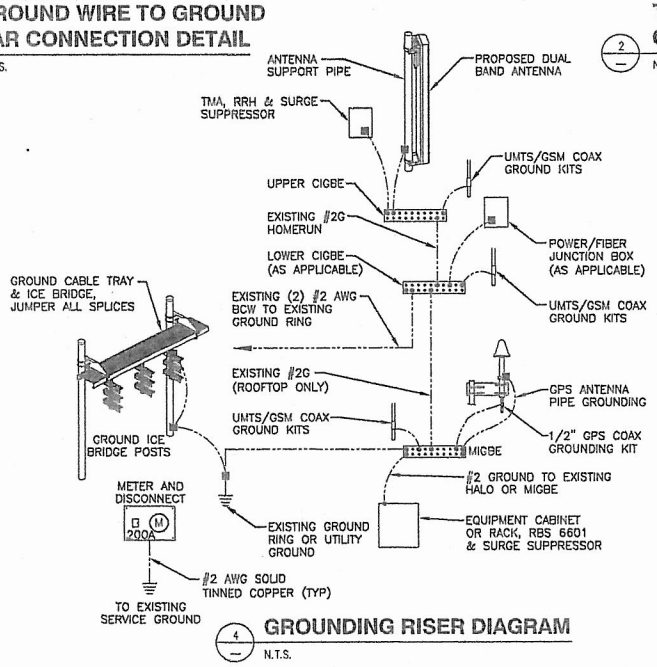


NOTES:

1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS.

PLUMBING DIAGRAM

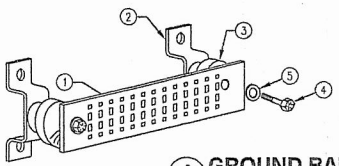
3 — N.T.S.



GROUNDING RISER DIAGRAM

4 — N.T.S.

WIRELESS SOLUTIONS INC.			
NO.	REQ.	PART NO.	DESCRIPTION
1	1	HLGB-0420-IS	SOLID GND. BAR (20"x4"x1/4")
2	2	———	WALL MTG. BRKT.
3	2	———	INSULATORS
4	4	———	5/8"-11x1" H.H.C.S.
5	4	———	5/8 LOCKWASHER



GROUND BAR - DETAIL

5 — N.T.S.

EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
–48V POWER SUPPLY RETURN BAR (#2)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

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N. ANDOVER, MA 01845
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0	02/10/11	ISSUED FOR REVIEW	JG	DC	DPH

SCALE: AS SHOWN | DESIGNED BY: DC | DRAWN BY: JG

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24173 — LICENSED PROFESSIONAL ENGINEER

AT&T

PLUMBING DIAGRAM & DETAILS (LTE)

JOB NUMBER	DRAWING NUMBER	REV
2102.01	G-1	2

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

164-ft Existing EEI Monopole

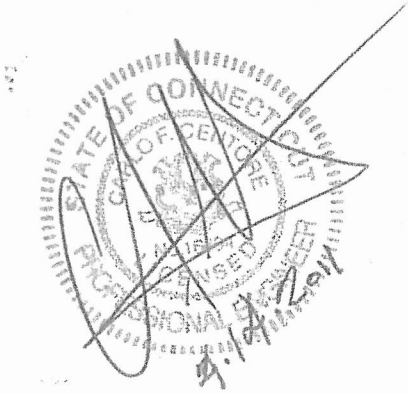
Proposed AT&T Antenna Upgrade

AT&T Site Ref: CT2102:
Greenwich Hospital

5 Perryridge Road
Greenwich, CT

CENTEK Project No. 11009.CO12

Date: April 14, 2011



Prepared for:

AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by AT&T Mobility on the existing monopole (tower) owned and operated by Greenwich Hospital located in Greenwich, Connecticut.

The host tower is a 164-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 11030 dated August 21, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The bottom four (4) vertical tower sections are slip joint connected while the top section is flange connected. The diameter of the pole (flat-flat) is 47.0-in at the top and 76.0-in at the base.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by CHA; job no; 20621-1037-1203, dated December 29, 2009, an AT&T RFDS sheet and visual verification conducted from grade by Centek personal on April 5, 2011.

AT&T Mobility proposes the installation of three (3) panel antennas on an existing low profile platform, together with six (6) Remote Radio Units (RRU's) and one (1) surge arrestor mounted on a proposed universal ring mount. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing tower was designed to support several communication antennas. The existing, proposed and future loads considered in this analysis consist of the following:

- TOWN (EXISTING):
  Antennas: One (1) PD1142-1 Omni-directional whip antenna, one (1) PD620-3 Omni-directional whip antenna, one (1) ALR8 Omni-directional whip antenna three (3) BMR10 Omni-directional whip antennas and one (1) camera mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 164-ft above grade level.
  Coax Cables: Six (6) 1/2" ∅, one (1) 5/8" ∅, three (3) 7/8" ∅ and two (2) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: Two (2) 4 FT Dishes and one (1) 2 Ft Dish mounted on three 4'x4" pipe mounts with a RAD center elevation of 160-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- SPRINT (EXISTING/RESERVED):
  Antennas: Three (3) Decibel 950F65T2E-M (2 existing/1 reserved) panel antennas, six (6) Decibel DB980F90E-M (4 existing/2 reserved) panel antennas and one (1) GPS antenna mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 154-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ and one (1) 1/2 ∅ coax cables running on the inside of the existing tower.

- CLEARWIRE (EXISTING):
  Antennas: Three (3) Argus LLPX310R panel antennas, three (3) Samsung FDD-R6-RRH, two (2) Dragonwave Horizon ODU's and two (2) Dragonwave A-ANT-23-G-2-C dishes mounted on the Sprint 13-ft low profile platform with a RAD center elevation of 154-ft above the existing tower base plate.
  Coax Cables: Two (2) 2" ∅ conduits and two (2) 5/8" ∅ coax cables running on the inside of the existing tower.
- T-MOBILE (EXISTING/RESERVED):
  Antennas: Twelve (12) APX16PV-16PVL-X (6 existing/6reserved) panel antennas and twelve (12) G20057A1 TMAs (6 existing/6 reserved) mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 144-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- AT&T (EXISTING TO REMAIN):
  Antennas: Six (6) Powerwave 7770.00 panel antennas and six (6) LGP21401 tmas mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 134-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower
- VERIZON (EXISTING):
  Antennas: Six (6) Decibel 844G65T6ZAXY panel antennas, three (3) Andrew LNX-6514DS-T4M panel antennas, three (3) RYMSA MG D3-800T0 panel antennas and six (6) RFS FD(R6004/2C-3L Diplexers mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 124-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- NEXTEL (EXISTING):
  Antennas: Twelve (12) Decibel DB846G90A-XY panel antennas mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 114-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables running on the inside of the existing tower.
- **AT&T (PROPOSED):**
  Antennas: Three (3) Powerwave P65-16-XLH-RR panel antennas mounted on a 13-ft low profile platform with a RAD center elevation of 134-ft above the existing tower base plate.
- **AT&T (PROPOSED):**
  Antennas: Six (6) Ericsson RRUS-11 and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
  Coax Cables: One (1) fiber cable and two (2) dc control cables running on the inside of the existing tower.

- UNKNOWN (EXISTING):
  Antennas: Three GPS antennas mounted on three (3) standoffs with a RAD center elevation of 50-ft above grade level.
  Coax Cables: Three (3) 7/8" ∅ coax cables running on the exterior of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.
- Refer to construction drawings prepared by Hudson Design Group dated 3.10.11 for RRU and Surge Arrestor mounting details.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled RISATower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for 85 mph basic wind speed (fastest mile) with no ice and 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice tower structure and its components.

Basic Wind Speed:	Fairfield; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Greenwich; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed criteria controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software RISATower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

Calculated stresses were found to be within allowable limits. In Load Case 1, per RISATower "Section Capacity Table", this tower was found to be at **47.9%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L5)	1.5'-39.88'	47.9%	**PASS**

- The tower deflection (tilt) was found to be within allowable limits.

Deflection (degrees)	Proposed	Allowable [1]	Result
Tilt	1.42	1.9	**PASS**

(1) Allowable tilt taken from original EEI design documents job no. 11030 dated 8/21/02.

Foundation and Anchors

The existing foundation consists of a 9.0 ∅ x 28.0-ft long reinforced concrete cassion. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 11030 dated August 21, 2002. The base of the tower is connected to the foundation by means of (30) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft into the concrete foundation structure.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Base Reactions	Vector	Proposed Load
Base	Shear	**45 kips**
	Axial	**80 kips**
	Moment	**5000 ft-kips**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	56.5%	**PASS**
	Lateral Deflection	0.59 in.[1]	**PASS**

(1) Lateral deflection typically limited to 1.0 in. for monopole tower structures.

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	58.4%	PASS
Flange Plate	Bending	44.5%	PASS
Anchor Bolts	Compression	49.1%	PASS
Base Plate	Bending	38.5%	PASS

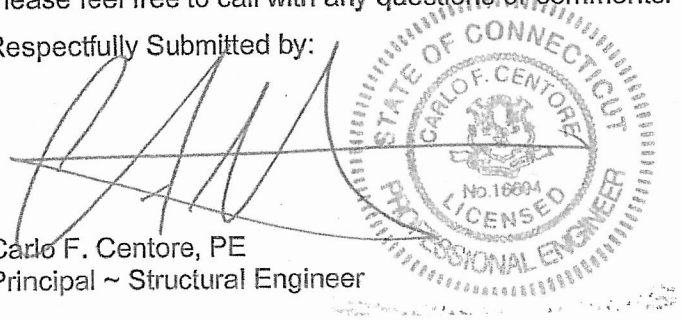
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified AT&T antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Carlo F. Centore, PE
Principal ~ Structural Engineer

Prepared by:

Timothy J. Lynn, EIT
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

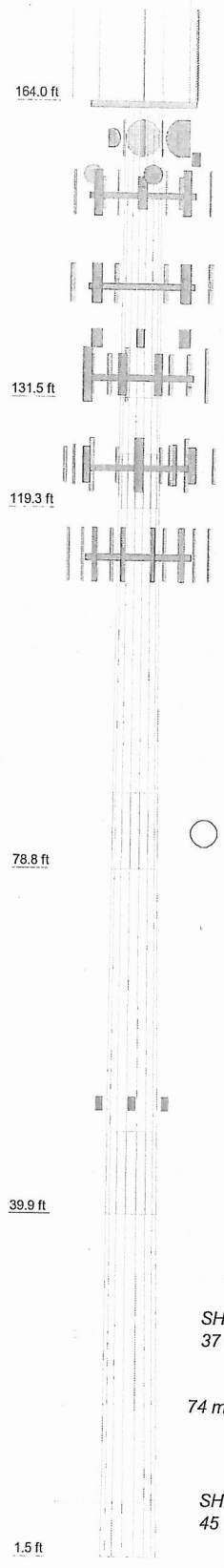
General Description of Structural Analysis Program

RISATower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, RISATower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

RISATower Features:

- RISATower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	1	2	3	4	5
Length (ft)	32.50	12.21	46.50	47.33	47.63
Number of Sides	18	18	18	18	18
Thickness (in)	0.3125	0.3750	0.4375	0.5625	0.5625
Socket Length (ft)		6.00	8.42	9.25	
Top Dia (in)	47.0000	53.4200	54.0585	60.4813	66.7412
Bot Dia (in)	53.4200	56.1500	62.9700	69.6600	76.0000
Grade	A572-65				
Weight (K)	5.5	2.7	12.8	18.5	20.5



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
PD1142-1 (Town Existing)	164
PD620-3 (Town Existing)	164
ALR8 (Town Existing)	164
BMR10 (Town Existing)	164
BMR10 (Town Existing)	164
BMR10 (Town Existing)	164
Camera (Town Existing)	164
Low Profile Platform (Town Existing)	164
4'x4" Pipe Mount (Town Existing)	160
4'x4" Pipe Mount (Town Existing)	160
4'x4" Pipe Mount (Town Existing)	160
4 FT DISH (Town Existing)	160
4 FT DISH (Town Existing)	160
2 FT DISH (Town Existing)	160
Remote Radio Head FD R6 RRH (Clearwire Existing)	154
Remote Radio Head FD R6 RRH (Clearwire Existing)	154
Remote Radio Head FD R6 RRH (Clearwire Existing)	154
Horizon ODU (Clearwire Existing)	154
Horizon ODU (Clearwire Existing)	154
(2) DB980F90E-M (Sprint Existing)	154
DB980F90E-M (Sprint Reserved)	154
(2) DB980F90E-M (Sprint Existing)	154
DB980F90E-M (Sprint Reserved)	154
(2) 950F65T2E-M (Sprint Existing)	154
950F65T2E-M (Sprint Reserved)	154
GPS (Sprint Existing)	154
Low Profile Platform (Sprint Existing)	154
LLPX310R (Clearwire Existing)	154
LLPX310R (Clearwire Existing)	154
LLPX310R (Clearwire Existing)	154
A-Ant-23G-2-C (Clearwire Existing)	154
A-Ant-23G-2-C (Clearwire Existing)	154
(2) APX16PV-16PVL-X (T-Mobile Reserved)	144
(2) G20057A1 TMA (T-Mobile Existing)	144
(2) G20057A1 TMA (T-Mobile Reserved)	144
(2) APX16PV-16PVL-X (T-Mobile Existing)	144
(2) APX16PV-16PVL-X (T-Mobile Reserved)	144
(2) G20057A1 TMA (T-Mobile Existing)	144
(2) G20057A1 TMA (T-Mobile Reserved)	144
Low Profile Platform (T-Mobile Existing)	144
(2) APX16PV-16PVL-X (T-Mobile Existing)	144
(2) APX16PV-16PVL-X (T-Mobile Reserved)	144

TYPE	ELEVATION
(2) G20057A1 TMA (T-Mobile Existing)	144
(2) G20057A1 TMA (T-Mobile Reserved)	144
(2) APX16PV-16PVL-X (T-Mobile Existing)	144
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(2) RRUS-11 (ATI Proposed)	138
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7770.00 (ATI Existing)	134
7770.00 (ATI Existing)	134
P65-16-XLH-RR (ATI Proposed)	134
(2) LGP214nn TMA (ATI Existing)	134
(2) LGP214nn TMA (ATI Existing)	134
(2) LGP214nn TMA (ATI Existing)	134
Low Profile Platform (ATI Existing)	134
7770.00 (ATI Existing)	134
7770.00 (ATI Existing)	134
P65-16-XLH-RR (ATI Proposed)	134
7770.00 (ATI Existing)	134
7770.00 (ATI Existing)	134
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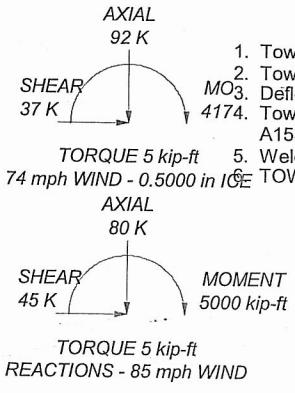
LNX-6514DS-T0M (Verizon Existing)	124
844G65T6ZAXY (Verizon Existing)	124
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
844G65T6ZAXY (Verizon Existing)	124
MG D3-800TX (Verizon Existing)	124
LNX-6514DS-T0M (Verizon Existing)	124
844G65T6ZAXY (Verizon Existing)	124
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Low Profile Platform (Verizon Existing)	124
844G65T6ZAXY (Verizon Existing)	124
MG D3-800TX (Verizon Existing)	124
LNX-6514DS-T0M (Verizon Existing)	124
844G65T6ZAXY (Verizon Existing)	124
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
(4) DB846G90A-XY (Nextel Existing)	114
(4) DB846G90A-XY (Nextel Existing)	114
(4) DB846G90A-XY (Nextel Existing)	114
Low Profile Platform (Nextel Existing)	114
GPS	51.5
GPS	51.5
GPS	51.5

MATERIAL STRENGTH

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



TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
5. Welds are fabricated with ER-70S-6 electrodes.
6. TOWER RATING: 47.9%

Centek Engineering Inc.
63-2 North Branford Road
Branford, CT 06405
Phone: 203.488.0580
FAX: 203.488.8587

Job: 11009.CO12 - CT2102 - Greenwich Hosp			
Project: 164' EEI Monopole - Greenwich, CT			
Client: AT&T Mobility	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 04/14/11	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

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

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	164.00-131.50	32.50	0.00	18	47.0000	53.4200	0.3125	1.2500	A572-65 (65 ksi)
L2	131.50-119.29	12.21	6.00	18	53.4200	56.1500	0.3750	1.5000	A572-65 (65 ksi)
L3	119.29-78.79	46.50	8.42	18	54.0585	62.9700	0.4375	1.7500	A572-65 (65 ksi)
L4	78.79-39.88	47.33	9.25	18	60.4813	69.6600	0.5625	2.2500	A572-65 (65 ksi)
L5	39.88-1.50	47.63		18	66.7412	76.0000	0.5625	2.2500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	47.7251	46.3082	12752.5270	16.5741	23.8760	534.1149	25521.8341	23.1585	7.7220	24.71
	54.2441	52.6760	18769.9004	18.8532	27.1374	691.6627	37564.4987	26.3430	8.8519	28.326
L2	54.2441	63.1368	22444.4518	18.8310	27.1374	827.0684	44918.4365	31.5744	8.7419	23.312
	57.0162	66.3862	26091.2194	19.8001	28.5242	914.7047	52216.7704	33.1994	9.2224	24.593
L3	56.0600	74.4594	27047.4669	19.0354	27.4617	984.9157	54130.5236	37.2368	8.7443	19.987
	63.9414	86.8342	42898.2727	22.1990	31.9888	1341.0421	85852.9920	43.4253	10.3127	23.572
L4	63.0724	106.9776	48524.0652	21.2712	30.7245	1579.3269	97111.9796	53.4990	9.6547	17.164
	70.7346	123.3649	74413.8720	24.5296	35.3873	2102.8424	148925.659 7	61.6942	11.2702	20.036
L5	69.5966	118.1537	65376.3617	23.4934	33.9045	1928.2498	130838.747 4	59.0881	10.7564	19.123
	77.1724	134.6842	96834.1984	26.7803	38.6080	2508.1382	193795.813 7	67.3549	12.3860	22.02

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 164.00-131.50				1	1	1		
L2 131.50-119.29				1	1	1		
L3 119.29-78.79				1	1	1		
L4 78.79-39.88				1	1	1		
L5 39.88-1.50				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2 (Town Existing)	A	No	Inside Pole	164.00 - 4.50	6	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
5/8 (Town Existing)	A	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	0.40
						1/2" Ice	0.00	0.40
7/8 (Town Existing)	A	No	Inside Pole	164.00 - 4.50	3	No Ice	0.00	0.54
						1/2" Ice	0.00	0.54
1 1/4 (Town Existing)	A	No	Inside Pole	164.00 - 4.50	5	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
1 5/8 (Sprint Existing)	B	No	Inside Pole	154.00 - 7.50	6	No Ice	0.00	1.04
						1/2" Ice	0.00	1.04
1/2 (Sprint Existing)	B	No	Inside Pole	154.00 - 7.50	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
2" Rigid Conduit (Clearwire Existing)	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
LDF4.5-50 (5/8 FOAM) (Clearwire Existing)	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
1 5/8	B	No	Inside Pole	144.00 - 4.50	12	No Ice	0.00	1.04

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(T-Mobile Existing)						1/2" Ice	0.00	1.04
1 5/8	A	No	Inside Pole	134.00 - 11.50	12	No Ice	0.00	1.04
(AT&T Existing)						1/2" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	124.00 - 7.50	12	No Ice	0.00	1.04
(Verizon Existing)						1/2" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	114.00 - 4.50	12	No Ice	0.00	1.04
(Nextel Existing)						1/2" Ice	0.00	1.04
RG6-Fiber	A	No	Inside Pole	134.00 - 11.50	1	No Ice	0.00	0.00
(AT&T Propsoed)						1/2" Ice	0.00	0.00
#8 AWG Copper WIre	A	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.00
(AT&T Propsoed)						1/2" Ice	0.00	0.00
7/8	B	No	CaAa (Out Of Face)	51.50 - 4.50	3	No Ice	0.11	0.54
						1/2" Ice	0.21	1.52

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	0.000	0.43
		C	0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.000	0.000	0.000	0.000	0.24
		B	0.000	0.000	0.000	0.000	0.30
		C	0.000	0.000	0.000	0.000	0.06
L3	119.29-78.79	A	0.000	0.000	0.000	0.000	0.78
		B	0.000	0.000	0.000	0.000	1.01
		C	0.000	0.000	0.000	0.000	0.94
L4	78.79-39.88	A	0.000	0.000	0.000	0.000	0.75
		B	0.000	0.000	0.000	3.869	0.99
		C	0.000	0.000	0.000	0.000	0.97
L5	39.88-1.50	A	0.000	0.000	0.000	0.000	0.60
		B	0.000	0.000	0.000	11.782	0.90
		C	0.000	0.000	0.000	0.000	0.85

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	164.00-131.50	A	0.500	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	0.000	0.000	0.43
		C		0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.500	0.000	0.000	0.000	0.000	0.24
		B		0.000	0.000	0.000	0.000	0.30
		C		0.000	0.000	0.000	0.000	0.06
L3	119.29-78.79	A	0.500	0.000	0.000	0.000	0.000	0.78
		B		0.000	0.000	0.000	0.000	1.01
		C		0.000	0.000	0.000	0.000	0.94
L4	78.79-39.88	A	0.500	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	0.000	7.355	1.02
		C		0.000	0.000	0.000	0.000	0.97
L5	39.88-1.50	A	0.500	0.000	0.000	0.000	0.000	0.60
		B		0.000	0.000	0.000	22.395	1.00
		C		0.000	0.000	0.000	0.000	0.85

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	164.00-131.50	0.0000	0.0000	0.0000	0.0000
L2	131.50-119.29	0.0000	0.0000	0.0000	0.0000
L3	119.29-78.79	0.0000	0.0000	0.0000	0.0000
L4	78.79-39.88	0.1320	0.0762	0.2434	0.1405
L5	39.88-1.50	0.3779	0.2182	0.6797	0.3924

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4'x4" Pipe Mount (Town Existing)	A	From Face	0.50	0.00	0.0000	160.00	No Ice	1.32	1.32	0.04
							1/2" Ice	1.58	1.58	0.06
				0.00						
4'x4" Pipe Mount (Town Existing)	B	From Face	0.50	0.00	0.0000	160.00	No Ice	1.32	1.32	0.04
							1/2" Ice	1.58	1.58	0.06
				0.00						
4'x4" Pipe Mount (Town Existing)	C	From Face	0.50	0.00	0.0000	160.00	No Ice	1.32	1.32	0.04
							1/2" Ice	1.58	1.58	0.06
				0.00						
PD1142-1 (Town Existing)	A	From Face	4.00	0.00	0.0000	164.00	No Ice	1.32	1.32	0.01
							1/2" Ice	3.21	3.21	0.02
				5.00						
PD620-3 (Town Existing)	B	From Face	4.00	0.00	0.0000	164.00	No Ice	3.83	3.83	0.05
							1/2" Ice	5.99	5.99	0.08
				10.00						
ALR8 (Town Existing)	C	From Face	4.00	0.00	0.0000	164.00	No Ice	8.10	8.10	0.10
							1/2" Ice	10.80	10.80	0.15
				5.00						
BMR10 (Town Existing)	A	From Face	4.00	-6.00	0.0000	164.00	No Ice	8.64	8.64	0.10
							1/2" Ice	10.80	10.80	0.15
				5.00						
BMR10 (Town Existing)	B	From Face	4.00	-6.00	0.0000	164.00	No Ice	8.64	8.64	0.10
							1/2" Ice	10.80	10.80	0.15
				5.00						
BMR10 (Town Existing)	C	From Face	4.00	-6.00	0.0000	164.00	No Ice	8.64	8.64	0.10
							1/2" Ice	10.80	10.80	0.15
				5.00						
Camera (Town Existing)	C	From Face	4.00	0.00	0.0000	164.00	No Ice	3.00	3.00	0.10
							1/2" Ice	4.00	4.00	0.15
				2.00						
Low Profile Platform (Town Existing)	C	None			0.0000	164.00	No Ice	15.70	15.70	1.30
							1/2" Ice	20.10	20.10	1.76
LLPX310R (Clearwire Existing)	A	From Face	3.00	0.00	0.0000	154.00	No Ice	4.84	1.96	0.03
							1/2" Ice	5.19	2.23	0.05
				0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
LLPX310R	B	From Face	3.00	0.0000	154.00	No Ice	4.84	1.96	0.03
(Clearwire Existing)			0.00			1/2" Ice	5.19	2.23	0.05
			0.00						
LLPX310R	C	From Face	3.00	0.0000	154.00	No Ice	4.84	1.96	0.03
(Clearwire Existing)			0.00			1/2" Ice	5.19	2.23	0.05
			0.00						
Remote Radio Head FD R6	A	From Face	3.00	0.0000	154.00	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00						
Remote Radio Head FD R6	B	From Face	3.00	0.0000	154.00	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00						
Remote Radio Head FD R6	C	From Face	3.00	0.0000	154.00	No Ice	1.80	0.78	0.03
RRH			0.00			1/2" Ice	1.99	0.92	0.04
(Clearwire Existing)			0.00						
Horizon ODU	A	None		0.0000	154.00	No Ice	0.79	0.17	0.00
(Clearwire Existing)						1/2" Ice	0.91	0.25	0.00
Horizon ODU	C	None		0.0000	154.00	No Ice	0.79	0.17	0.00
(Clearwire Existing)						1/2" Ice	0.91	0.25	0.00
(2) DB980F90E-M	A	From Face	4.00	0.0000	154.00	No Ice	3.90	2.29	0.01
(Sprint Existing)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00						
DB980F90E-M	A	From Face	4.00	0.0000	154.00	No Ice	3.90	2.29	0.01
(Sprint Reserved)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00						
(2) DB980F90E-M	B	From Face	4.00	0.0000	154.00	No Ice	3.90	2.29	0.01
(Sprint Existing)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00						
DB980F90E-M	B	From Face	4.00	0.0000	154.00	No Ice	3.90	2.29	0.01
(Sprint Reserved)			0.00			1/2" Ice	4.28	2.65	0.03
			0.00						
(2) 950F65T2E-M	C	From Face	4.00	0.0000	154.00	No Ice	6.42	4.24	0.02
(Sprint Existing)			0.00			1/2" Ice	6.88	4.62	0.06
			0.00						
950F65T2E-M	C	From Face	4.00	0.0000	154.00	No Ice	6.42	4.24	0.02
(Sprint Reserved)			0.00			1/2" Ice	6.88	4.62	0.06
			0.00						
GPS	C	From Face	4.00	0.0000	154.00	No Ice	1.00	1.00	0.01
(Sprint Existing)			-6.00			1/2" Ice	1.50	1.50	0.01
			3.00						
Low Profile Platform	C	None		0.0000	154.00	No Ice	15.70	15.70	1.30
(Sprint Existing)						1/2" Ice	20.10	20.10	1.76
(2) APX16PV-16PVL-X	A	From Face	4.00	0.0000	144.00	No Ice	6.70	2.00	0.04
(T-Mobile Existing)			0.00			1/2" Ice	7.13	2.33	0.07
			0.00						
(2) APX16PV-16PVL-X	A	From Face	4.00	0.0000	144.00	No Ice	6.70	2.00	0.04
(T-Mobile Reserved)			0.00			1/2" Ice	7.13	2.33	0.07
			0.00						
(2) G20057A1 TMA	A	From Face	4.00	0.0000	144.00	No Ice	0.82	0.39	0.01
(T-Mobile Existing)			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
(2) G20057A1 TMA	A	From Face	4.00	0.0000	144.00	No Ice	0.82	0.39	0.01
(T-Mobile Reserved)			0.00			1/2" Ice	0.95	0.49	0.02
			0.00						
(2) APX16PV-16PVL-X	B	From Face	4.00	0.0000	144.00	No Ice	6.70	2.00	0.04
(T-Mobile Existing)			0.00			1/2" Ice	7.13	2.33	0.07
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) APX16PV-16PVL-X (T-Mobile Reserved)	B	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	6.70 7.13	2.00 2.33	0.04 0.07
(2) G20057A1 TMA (T-Mobile Existing)	B	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
(2) G20057A1 TMA (T-Mobile Reserved)	B	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
(2) APX16PV-16PVL-X (T-Mobile Existing)	C	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	6.70 7.13	2.00 2.33	0.04 0.07
(2) APX16PV-16PVL-X (T-Mobile Reserved)	C	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	6.70 7.13	2.00 2.33	0.04 0.07
(2) G20057A1 TMA (T-Mobile Existing)	C	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
(2) G20057A1 TMA (T-Mobile Reserved)	C	From Face	4.00 0.00 0.00	0.0000	144.00	No Ice 1/2" Ice	0.82 0.95	0.39 0.49	0.01 0.02
Low Profile Platform (T-Mobile Existing)	C	None		0.0000	144.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
(2) RRUS-11 (AT&T Proposed)	A	From Face	0.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.17 3.41	1.01 1.20	0.04 0.06
(2) RRUS-11 (AT&T Proposed)	B	From Face	0.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.17 3.41	1.01 1.20	0.04 0.06
(2) RRUS-11 (AT&T Proposed)	C	From Face	0.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	3.17 3.41	1.01 1.20	0.04 0.06
DC6-48-60-18-8F Surge Arrestor (AT&T Proposed)	C	From Face	0.50 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice	1.27 1.46	1.27 1.46	0.02 0.04
Valmont Uni-Tri Bracket (AT&T Proposed)	C	None		0.0000	138.00	No Ice 1/2" Ice	1.75 1.94	1.75 1.94	0.29 0.31
7770.00 (AT&T Existing)	A	From Face	3.00 -2.00 0.00	0.0000	134.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
7770.00 (AT&T Existing)	A	From Face	3.00 2.00 0.00	0.0000	134.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
P65-16-XLH-RR (AT&T Proposed)	A	From Face	3.00 6.00 0.00	0.0000	134.00	No Ice 1/2" Ice	8.40 8.95	4.70 5.15	0.06 0.11
7770.00 (AT&T Existing)	B	From Face	3.00 -2.00 0.00	0.0000	134.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
7770.00 (AT&T Existing)	B	From Face	3.00 2.00 0.00	0.0000	134.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07
P65-16-XLH-RR (AT&T Proposed)	B	From Face	3.00 6.00 0.00	0.0000	134.00	No Ice 1/2" Ice	8.40 8.95	4.70 5.15	0.06 0.11
7770.00 (AT&T Existing)	C	From Face	3.00 2.00	0.0000	134.00	No Ice 1/2" Ice	5.88 6.31	2.93 3.27	0.04 0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
7770.00	C	From Face	3.00	0.0000	134.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-2.00			1/2" Ice	6.31	3.27	0.07
			0.00						
P65-16-XLH-RR	C	From Face	3.00	0.0000	134.00	No Ice	8.40	4.70	0.06
(AT&T Proposed)			6.00			1/2" Ice	8.95	5.15	0.11
			0.00						
(2) LGP214nn TMA	A	From Face	3.00	0.0000	134.00	No Ice	1.29	0.23	0.01
(AT&T Existing)			-2.00			1/2" Ice	1.45	0.31	0.02
			0.00						
(2) LGP214nn TMA	B	From Face	3.00	0.0000	134.00	No Ice	1.29	0.23	0.01
(AT&T Existing)			-2.00			1/2" Ice	1.45	0.31	0.02
			0.00						
(2) LGP214nn TMA	C	From Face	3.00	0.0000	134.00	No Ice	1.29	0.23	0.01
(AT&T Existing)			-2.00			1/2" Ice	1.45	0.31	0.02
			0.00						
Low Profile Platform	C	None		0.0000	134.00	No Ice	15.70	15.70	1.30
(AT&T Existing)						1/2" Ice	20.10	20.10	1.76
844G65T6ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.67	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	5.05	4.10	0.04
			0.00						
MG D3-800TX	A	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
LNX-6514DS-T0M	A	From Face	4.00	0.0000	124.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
844G65T6ZAXY	A	From Face	4.00	0.0000	124.00	No Ice	4.67	3.73	0.01
(Verizon Existing)			6.00			1/2" Ice	5.05	4.10	0.04
			0.00						
(2) FD9R6004/2C-3L	A	From Face	3.00	0.0000	124.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
844G65T6ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.67	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	5.05	4.10	0.04
			0.00						
MG D3-800TX	B	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
LNX-6514DS-T0M	B	From Face	4.00	0.0000	124.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						
844G65T6ZAXY	B	From Face	4.00	0.0000	124.00	No Ice	4.67	3.73	0.01
(Verizon Existing)			6.00			1/2" Ice	5.05	4.10	0.04
			0.00						
(2) FD9R6004/2C-3L	B	From Face	3.00	0.0000	124.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
844G65T6ZAXY	C	From Face	4.00	0.0000	124.00	No Ice	4.67	3.73	0.01
(Verizon Existing)			-6.00			1/2" Ice	5.05	4.10	0.04
			0.00						
MG D3-800TX	C	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
LNX-6514DS-T0M	C	From Face	4.00	0.0000	124.00	No Ice	8.41	5.41	0.04
(Verizon Existing)			0.00			1/2" Ice	8.96	5.86	0.09
			0.00						

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
844G65T6ZAXY (Verizon Existing)	C	From Face	4.00 6.00 0.00	0.0000	124.00	No Ice 1/2" Ice	4.67 5.05	3.73 4.10	0.01 0.04
(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	C	From Face	3.00 0.00 0.00	0.0000	124.00	No Ice 1/2" Ice	0.37 0.45	0.08 0.14	0.00 0.01
Low Profile Platform (Verizon Existing)	C	None		0.0000	124.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
(4) DB846G90A-XY (Nextel Existing)	A	From Face	4.00 0.00 0.00	0.0000	114.00	No Ice 1/2" Ice	4.99 5.44	5.87 6.32	0.02 0.05
(4) DB846G90A-XY (Nextel Existing)	B	From Face	4.00 0.00 0.00	0.0000	114.00	No Ice 1/2" Ice	4.99 5.44	5.87 6.32	0.02 0.05
(4) DB846G90A-XY (Nextel Existing)	C	From Face	4.00 0.00 0.00	0.0000	114.00	No Ice 1/2" Ice	4.99 5.44	5.87 6.32	0.02 0.05
Low Profile Platform (Nextel Existing)	C	None		0.0000	114.00	No Ice 1/2" Ice	15.70 20.10	15.70 20.10	1.30 1.76
GPS	A	From Face	1.50 0.00 0.00	0.0000	51.50	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01
GPS	B	From Face	1.50 0.00 0.00	0.0000	51.50	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01
GPS	C	From Face	1.50 0.00 0.00	0.0000	51.50	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.01

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH (Town Existing)	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	4.00	No Ice 1/2" Ice	12.56 13.09	0.17 0.24
4 FT DISH (Town Existing)	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	4.00	No Ice 1/2" Ice	12.56 13.09	0.17 0.24
2 FT DISH (Town Existing)	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.03 0.04
A-Ant-23G-2-C (Clearwire Existing)	A	Paraboloid w/Radome	From Face	3.10 -2.52 2.00	Worst		154.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05
A-Ant-23G-2-C (Clearwire Existing)	C	Paraboloid w/Radome	From Face	3.80 -1.24 2.00	Worst		154.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05

Tower Pressures - No Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.00-131.50	147.53	1.534	28	135.985	A	0.000	135.985	135.985	100.00	0.000	0.000
					B	0.000	135.985		100.00	0.000	0.000
					C	0.000	135.985		100.00	0.000	0.000
L2 131.50-119.29	125.34	1.464	27	55.744	A	0.000	55.744	55.744	100.00	0.000	0.000
					B	0.000	55.744		100.00	0.000	0.000
					C	0.000	55.744		100.00	0.000	0.000
L3 119.29-78.79	98.89	1.368	25	199.426	A	0.000	199.426	199.426	100.00	0.000	0.000
					B	0.000	199.426		100.00	0.000	0.000
					C	0.000	199.426		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	22	213.639	A	0.000	213.639	213.639	100.00	0.000	0.000
					B	0.000	213.639		100.00	0.000	3.869
					C	0.000	213.639		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	18	231.142	A	0.000	231.142	231.142	100.00	0.000	0.000
					B	0.000	231.142		100.00	0.000	11.782
					C	0.000	231.142		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.00-131.50	147.53	1.534	21	0.5000	138.694	A	0.000	138.694	138.694	100.00	0.000	0.000
						B	0.000	138.694		100.00	0.000	0.000
						C	0.000	138.694		100.00	0.000	0.000
L2 131.50-119.29	125.34	1.464	20	0.5000	56.761	A	0.000	56.761	56.761	100.00	0.000	0.000
						B	0.000	56.761		100.00	0.000	0.000
						C	0.000	56.761		100.00	0.000	0.000
L3 119.29-78.79	98.89	1.368	19	0.5000	202.801	A	0.000	202.801	202.801	100.00	0.000	0.000
						B	0.000	202.801		100.00	0.000	0.000
						C	0.000	202.801		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	16	0.5000	216.881	A	0.000	216.881	216.881	100.00	0.000	0.000
						B	0.000	216.881		100.00	0.000	7.355
						C	0.000	216.881		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	14	0.5000	234.341	A	0.000	234.341	234.341	100.00	0.000	0.000
						B	0.000	234.341		100.00	0.000	22.395
						C	0.000	234.341		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 164.00-131.50	147.53	1.534	10	135.985	A	0.000	135.985	135.985	100.00	0.000	0.000
					B	0.000	135.985		100.00	0.000	0.000
					C	0.000	135.985		100.00	0.000	0.000
L2 131.50-119.29	125.34	1.464	9	55.744	A	0.000	55.744	55.744	100.00	0.000	0.000
					B	0.000	55.744		100.00	0.000	0.000
					C	0.000	55.744		100.00	0.000	0.000
L3 119.29-78.79	98.89	1.368	9	199.426	A	0.000	199.426	199.426	100.00	0.000	0.000
					B	0.000	199.426		100.00	0.000	0.000
					C	0.000	199.426		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	8	213.639	A	0.000	213.639	213.639	100.00	0.000	0.000
					B	0.000	213.639		100.00	0.000	3.869
					C	0.000	213.639		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	6	231.142	A	0.000	231.142	231.142	100.00	0.000	0.000
					B	0.000	231.142		100.00	0.000	11.782
					C	0.000	231.142		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	4.24	130.34	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	1.66	135.82	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-78.79	2.73	12.76	A	1	0.65	1	1	1	199.426	5.53	136.63	C
			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	5.25	134.97	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	5.06	131.96	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	1762.61 kip-ft	21.74		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	4.24	130.34	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	1.66	135.82	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-	2.73	12.76	A	1	0.65	1	1	1	199.426	5.53	136.63	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	5.25	134.97	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	5.06	131.96	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	1762.61 kip-ft	21.74		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	4.24	130.34	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	1.66	135.82	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-78.79	2.73	12.76	A	1	0.65	1	1	1	199.426	5.53	136.63	C
			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	5.25	134.97	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	5.06	131.96	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	1762.61 kip-ft	21.74		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	6.49	A	1	0.65	1	1	1	138.694	3.24	99.70	C
			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			
L2 131.50-119.29	0.60	3.11	A	1	0.65	1	1	1	56.761	1.27	103.72	C
			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3 119.29-78.79	2.73	14.25	A	1	0.65	1	1	1	202.801	4.22	104.21	C
			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4 78.79-	2.74	20.14	A	1	0.65	1	1	1	216.881	4.09	105.20	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
39.88			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.45	22.21	A	1	0.65	1	1	1	234.341	4.10	106.72	C
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	9.21	66.20						OTM	1355.40 kip-ft	16.92		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	6.49	A	1	0.65	1	1	1	138.694	3.24	99.70	C
			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			
L2 131.50-119.29	0.60	3.11	A	1	0.65	1	1	1	56.761	1.27	103.72	C
			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3 119.29-78.79	2.73	14.25	A	1	0.65	1	1	1	202.801	4.22	104.21	C
			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4 78.79-39.88	2.74	20.14	A	1	0.65	1	1	1	216.881	4.09	105.20	C
			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.45	22.21	A	1	0.65	1	1	1	234.341	4.10	106.72	C
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	9.21	66.20						OTM	1355.40 kip-ft	16.92		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	6.49	A	1	0.65	1	1	1	138.694	3.24	99.70	C
			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			
L2 131.50-119.29	0.60	3.11	A	1	0.65	1	1	1	56.761	1.27	103.72	C
			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3 119.29-78.79	2.73	14.25	A	1	0.65	1	1	1	202.801	4.22	104.21	C
			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4 78.79-39.88	2.74	20.14	A	1	0.65	1	1	1	216.881	4.09	105.20	C
			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.45	22.21	A	1	0.65	1	1	1	234.341	4.10	106.72	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	9.21	66.20						OTM	1355.40 kip-ft	16.92		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	1.47	45.10	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	0.57	47.00	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-78.79	2.73	12.76	A	1	0.65	1	1	1	199.426	1.91	47.28	C
			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	1.82	46.70	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	1.75	45.66	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	609.90 kip-ft	7.52		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	1.47	45.10	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	0.57	47.00	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-78.79	2.73	12.76	A	1	0.65	1	1	1	199.426	1.91	47.28	C
			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	1.82	46.70	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	1.75	45.66	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	609.90	7.52		

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
									kip-ft			

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1 164.00-131.50	0.69	5.47	A	1	0.65	1	1	1	135.985	1.47	45.10	C
			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2 131.50-119.29	0.60	2.69	A	1	0.65	1	1	1	55.744	0.57	47.00	C
			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3 119.29-78.79	2.73	12.76	A	1	0.65	1	1	1	199.426	1.91	47.28	C
			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4 78.79-39.88	2.71	18.55	A	1	0.65	1	1	1	213.639	1.82	46.70	C
			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.34	20.49	A	1	0.65	1	1	1	231.142	1.75	45.66	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.07	59.96						OTM	609.90 kip-ft	7.52		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	59.96					
Bracing Weight	0.00					
Total Member Self-Weight	59.96			1.39	-0.70	
Total Weight	80.36			1.39	-0.70	
Wind 0 deg - No Ice		0.00	-44.54	-4928.15	-0.70	1.98
Wind 30 deg - No Ice		22.23	-38.58	-4267.72	-2459.08	4.11
Wind 60 deg - No Ice		38.50	-22.27	-2463.38	-4258.73	5.14
Wind 90 deg - No Ice		44.46	0.00	1.39	-4917.45	4.79
Wind 120 deg - No Ice		38.50	22.27	2466.17	-4258.73	3.16
Wind 150 deg - No Ice		22.23	38.58	4270.51	-2459.08	0.68
Wind 180 deg - No Ice		0.00	44.54	4930.94	-0.70	-1.98
Wind 210 deg - No Ice		-22.23	38.58	4270.51	2457.67	-4.11
Wind 240 deg - No Ice		-38.50	22.27	2466.17	4257.32	-5.14
Wind 270 deg - No Ice		-44.46	0.00	1.39	4916.04	-4.79
Wind 300 deg - No Ice		-38.50	-22.27	-2463.38	4257.32	-3.16
Wind 330 deg - No Ice		-22.23	-38.58	-4267.72	2457.67	-0.68
Member Ice	6.24					
Total Weight Ice	92.26			2.43	-1.23	
Wind 0 deg - Ice		0.00	-36.63	-4099.19	-1.23	1.79

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - Ice		18.28	-31.72	-3549.68	-2046.72	3.66
Wind 60 deg - Ice		31.66	-18.31	-2048.38	-3544.12	4.56
Wind 90 deg - Ice		36.56	0.00	2.43	-4092.21	4.23
Wind 120 deg - Ice		31.66	18.31	2053.24	-3544.12	2.77
Wind 150 deg - Ice		18.28	31.72	3554.54	-2046.72	0.56
Wind 180 deg - Ice		0.00	36.63	4104.06	-1.23	-1.79
Wind 210 deg - Ice		-18.28	31.72	3554.54	2044.26	-3.66
Wind 240 deg - Ice		-31.66	18.31	2053.24	3541.67	-4.56
Wind 270 deg - Ice		-36.56	0.00	2.43	4089.75	-4.23
Wind 300 deg - Ice		-31.66	-18.31	-2048.38	3541.67	-2.77
Wind 330 deg - Ice		-18.28	-31.72	-3549.68	2044.26	-0.56
Total Weight	80.36			1.39	-0.70	
Wind 0 deg - Service		0.00	-15.41	-1704.44	-0.51	0.68
Wind 30 deg - Service		7.69	-13.35	-1475.92	-851.16	1.42
Wind 60 deg - Service		13.32	-7.71	-851.58	-1473.87	1.78
Wind 90 deg - Service		15.38	0.00	1.28	-1701.80	1.66
Wind 120 deg - Service		13.32	7.71	854.14	-1473.87	1.09
Wind 150 deg - Service		7.69	13.35	1478.48	-851.16	0.24
Wind 180 deg - Service		0.00	15.41	1707.01	-0.51	-0.68
Wind 210 deg - Service		-7.69	13.35	1478.48	850.14	-1.42
Wind 240 deg - Service		-13.32	7.71	854.14	1472.86	-1.78
Wind 270 deg - Service		-15.38	0.00	1.28	1700.79	-1.66
Wind 300 deg - Service		-13.32	-7.71	-851.58	1472.86	-1.09
Wind 330 deg - Service		-7.69	-13.35	-1475.92	850.14	-0.24

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service

Comb. No.	Description
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	164 - 131.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.18	-0.68	-2.12
			Max. Mx	5	-13.95	-371.29	-1.20
			Max. My	8	-13.95	-0.48	-373.97
			Max. Vy	5	20.31	-371.29	-1.20
			Max. Vx	8	20.40	-0.48	-373.97
			Max. Torque	4			-4.95
L2	131.5 - 119.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.04	-0.68	-2.12
			Max. Mx	5	-15.60	-500.10	-1.21
			Max. My	8	-15.59	-0.48	-503.31
			Max. Vy	5	21.18	-500.10	-1.21
			Max. Vx	8	21.26	-0.48	-503.31
			Max. Torque	4			-4.95
L3	119.29 - 78.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.32	-0.68	-2.12
			Max. Mx	5	-32.64	-1627.57	-1.27
			Max. My	8	-32.64	-0.51	-1634.04
			Max. Vy	5	33.44	-1627.57	-1.27
			Max. Vx	8	33.53	-0.51	-1634.04
			Max. Torque	4			-4.95
L4	78.79 - 39.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-62.72	-0.78	-2.17
			Max. Mx	5	-52.64	-3002.22	-1.32
			Max. My	8	-52.64	-0.55	-3011.95
			Max. Vy	5	38.73	-3002.22	-1.32
			Max. Vx	8	38.81	-0.55	-3011.95
			Max. Torque	4			-4.99
L5	39.88 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-92.26	-1.23	-2.43
			Max. Mx	5	-80.35	-4986.30	-1.42
			Max. My	8	-80.35	-0.72	-5000.01
			Max. Vy	5	44.48	-4986.30	-1.42
			Max. Vx	8	44.56	-0.72	-5000.01
			Max. Torque	4			-5.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	21	92.26	0.00	-36.63
	Max. H_x	11	80.36	44.46	-0.00
	Max. H_z	2	80.36	0.00	44.54
	Max. M_x	2	4997.15	0.00	44.54
	Max. M_z	5	4986.30	-44.46	-0.00
	Max. Torsion	10	5.16	38.50	-22.27
	Min. Vert	33	80.36	0.00	-15.41
	Min. H_x	5	80.36	-44.46	-0.00
	Min. H_z	8	80.36	0.00	-44.54
	Min. M_x	8	-5000.01	0.00	-44.54
	Min. M_z	11	-4984.87	44.46	-0.00
	Min. Torsion	4	-5.16	-38.50	22.27

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	80.36	0.00	0.00	1.39	-0.70	0.00
Dead+Wind 0 deg - No Ice	80.36	0.00	-44.54	-4997.15	-0.72	1.98
Dead+Wind 30 deg - No Ice	80.36	22.23	-38.58	-4327.47	-2493.51	4.12
Dead+Wind 60 deg - No Ice	80.36	38.50	-22.27	-2497.87	-4318.36	5.16
Dead+Wind 90 deg - No Ice	80.36	44.46	0.00	1.42	-4986.30	4.82
Dead+Wind 120 deg - No Ice	80.36	38.50	22.27	2500.72	-4318.36	3.19
Dead+Wind 150 deg - No Ice	80.36	22.23	38.58	4330.32	-2493.51	0.70
Dead+Wind 180 deg - No Ice	80.36	0.00	44.54	5000.01	-0.72	-1.98
Dead+Wind 210 deg - No Ice	80.36	-22.23	38.58	4330.32	2492.08	-4.12
Dead+Wind 240 deg - No Ice	80.36	-38.50	22.27	2500.71	4316.92	-5.16
Dead+Wind 270 deg - No Ice	80.36	-44.46	0.00	1.42	4984.87	-4.82
Dead+Wind 300 deg - No Ice	80.36	-38.50	-22.27	-2497.87	4316.92	-3.19
Dead+Wind 330 deg - No Ice	80.36	-22.23	-38.58	-4327.47	2492.07	-0.70
Dead+Ice+Temp	92.26	0.00	0.00	2.43	-1.23	0.00
Dead+Wind 0 deg+Ice+Temp	92.26	0.00	-36.63	-4170.62	-1.25	1.79
Dead+Wind 30 deg+Ice+Temp	92.26	18.28	-31.72	-3611.53	-2082.39	3.68
Dead+Wind 60 deg+Ice+Temp	92.26	31.66	-18.31	-2084.06	-3605.88	4.59
Dead+Wind 90 deg+Ice+Temp	92.26	36.56	0.00	2.50	-4163.52	4.27
Dead+Wind 120 deg+Ice+Temp	92.26	31.66	18.31	2089.06	-3605.89	2.80
Dead+Wind 150 deg+Ice+Temp	92.26	18.28	31.72	3616.53	-2082.39	0.58
Dead+Wind 180 deg+Ice+Temp	92.26	0.00	36.63	4175.62	-1.25	-1.79
Dead+Wind 210 deg+Ice+Temp	92.26	-18.28	31.72	3616.53	2079.88	-3.68
Dead+Wind 240 deg+Ice+Temp	92.26	-31.66	18.31	2089.06	3603.38	-4.59
Dead+Wind 270 deg+Ice+Temp	92.26	-36.56	0.00	2.50	4161.02	-4.27
Dead+Wind 300 deg+Ice+Temp	92.26	-31.66	-18.31	-2084.06	3603.38	-2.80
Dead+Wind 330 deg+Ice+Temp	92.26	-18.28	-31.72	-3611.53	2079.88	-0.58
Dead+Wind 0 deg - Service	80.36	0.00	-15.41	-1728.35	-0.72	0.68
Dead+Wind 30 deg - Service	80.36	7.69	-13.35	-1496.60	-863.35	1.43
Dead+Wind 60 deg - Service	80.36	13.32	-7.71	-863.46	-1494.85	1.79
Dead+Wind 90 deg - Service	80.36	15.38	0.00	1.43	-1725.99	1.67
Dead+Wind 120 deg - Service	80.36	13.32	7.71	866.31	-1494.85	1.10
Dead+Wind 150 deg - Service	80.36	7.69	13.35	1499.45	-863.35	0.24
Dead+Wind 180 deg - Service	80.36	0.00	15.41	1731.20	-0.72	-0.68
Dead+Wind 210 deg - Service	80.36	-7.69	13.35	1499.45	861.92	-1.43
Dead+Wind 240 deg - Service	80.36	-13.32	7.71	866.31	1493.41	-1.79
Dead+Wind 270 deg - Service	80.36	-15.38	0.00	1.43	1724.55	-1.67
Dead+Wind 300 deg - Service	80.36	-13.32	-7.71	-863.46	1493.41	-1.10
Dead+Wind 330 deg - Service	80.36	-7.69	-13.35	-1496.60	861.92	-0.24

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-80.36	0.00	0.00	80.36	0.00	0.000%
2	0.00	-80.36	-44.54	0.00	80.36	44.54	0.000%
3	22.23	-80.36	-38.58	-22.23	80.36	38.58	0.000%
4	38.50	-80.36	-22.27	-38.50	80.36	22.27	0.000%
5	44.46	-80.36	0.00	-44.46	80.36	-0.00	0.000%
6	38.50	-80.36	22.27	-38.50	80.36	-22.27	0.000%
7	22.23	-80.36	38.58	-22.23	80.36	-38.58	0.000%
8	0.00	-80.36	44.54	0.00	80.36	-44.54	0.000%
9	-22.23	-80.36	38.58	22.23	80.36	-38.58	0.000%
10	-38.50	-80.36	22.27	38.50	80.36	-22.27	0.000%
11	-44.46	-80.36	0.00	44.46	80.36	-0.00	0.000%
12	-38.50	-80.36	-22.27	38.50	80.36	22.27	0.000%
13	-22.23	-80.36	-38.58	22.23	80.36	38.58	0.000%
14	0.00	-92.26	0.00	0.00	92.26	0.00	0.000%
15	0.00	-92.26	-36.63	0.00	92.26	36.63	0.000%
16	18.28	-92.26	-31.72	-18.28	92.26	31.72	0.000%
17	31.66	-92.26	-18.31	-31.66	92.26	18.31	0.000%
18	36.56	-92.26	0.00	-36.56	92.26	0.00	0.000%
19	31.66	-92.26	18.31	-31.66	92.26	-18.31	0.000%
20	18.28	-92.26	31.72	-18.28	92.26	-31.72	0.000%
21	0.00	-92.26	36.63	0.00	92.26	-36.63	0.000%
22	-18.28	-92.26	31.72	18.28	92.26	-31.72	0.000%
23	-31.66	-92.26	18.31	31.66	92.26	-18.31	0.000%
24	-36.56	-92.26	0.00	36.56	92.26	0.00	0.000%
25	-31.66	-92.26	-18.31	31.66	92.26	18.31	0.000%
26	-18.28	-92.26	-31.72	18.28	92.26	31.72	0.000%
27	0.00	-80.36	-15.41	0.00	80.36	15.41	0.000%
28	7.69	-80.36	-13.35	-7.69	80.36	13.35	0.000%
29	13.32	-80.36	-7.71	-13.32	80.36	7.71	0.000%
30	15.38	-80.36	0.00	-15.38	80.36	0.00	0.000%
31	13.32	-80.36	7.71	-13.32	80.36	-7.71	0.000%
32	7.69	-80.36	13.35	-7.69	80.36	-13.35	0.000%
33	0.00	-80.36	15.41	0.00	80.36	-15.41	0.000%
34	-7.69	-80.36	13.35	7.69	80.36	-13.35	0.000%
35	-13.32	-80.36	7.71	13.32	80.36	-7.71	0.000%
36	-15.38	-80.36	0.00	15.38	80.36	0.00	0.000%
37	-13.32	-80.36	-7.71	13.32	80.36	7.71	0.000%
38	-7.69	-80.36	-13.35	7.69	80.36	13.35	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00006550
3	Yes	4	0.00000001	0.00057312
4	Yes	4	0.00000001	0.00044568
5	Yes	4	0.00000001	0.00015644
6	Yes	4	0.00000001	0.00055794
7	Yes	4	0.00000001	0.00048902
8	Yes	4	0.00000001	0.00006556

9	Yes	4	0.00000001	0.00045320
10	Yes	4	0.00000001	0.00059581
11	Yes	4	0.00000001	0.00015638
12	Yes	4	0.00000001	0.00045846
13	Yes	4	0.00000001	0.00051235
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00002182
16	Yes	5	0.00000001	0.00002892
17	Yes	5	0.00000001	0.00002816
18	Yes	5	0.00000001	0.00002201
19	Yes	5	0.00000001	0.00002886
20	Yes	5	0.00000001	0.00002843
21	Yes	5	0.00000001	0.00002187
22	Yes	5	0.00000001	0.00002824
23	Yes	5	0.00000001	0.00002911
24	Yes	5	0.00000001	0.00002199
25	Yes	5	0.00000001	0.00002818
26	Yes	5	0.00000001	0.00002849
27	Yes	4	0.00000001	0.00001493
28	Yes	4	0.00000001	0.00004426
29	Yes	4	0.00000001	0.00003368
30	Yes	4	0.00000001	0.00002563
31	Yes	4	0.00000001	0.00004200
32	Yes	4	0.00000001	0.00003293
33	Yes	4	0.00000001	0.00001498
34	Yes	4	0.00000001	0.00003234
35	Yes	4	0.00000001	0.00004796
36	Yes	4	0.00000001	0.00002560
37	Yes	4	0.00000001	0.00003169
38	Yes	4	0.00000001	0.00003539

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	10.579	33	0.4930	0.0026
L2	131.5 - 119.29	7.283	33	0.4648	0.0015
L3	125.29 - 78.79	6.686	33	0.4532	0.0014
L4	87.21 - 39.88	3.430	33	0.3441	0.0007
L5	49.13 - 1.5	1.156	33	0.2097	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	PD1142-1	33	10.579	0.4930	0.0026	210712
160.00	4 FT DISH	33	10.165	0.4911	0.0025	210712
156.00	A-Ant-23G-2-C	33	9.752	0.4890	0.0023	131695
154.00	LLPX310R	33	9.546	0.4878	0.0023	105356
144.00	(2) APX16PV-16PVL-X	33	8.526	0.4804	0.0019	52678
138.00	(2) RRUS-11	33	7.924	0.4740	0.0017	40521
134.00	7770.00	33	7.528	0.4687	0.0016	35149
124.00	844G65T6ZAXY	33	6.564	0.4505	0.0013	27944
114.00	(4) DB846G90A-XY	33	5.643	0.4264	0.0011	24691

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
51.50	GPS	33	1.258	0.2189	0.0004	11247

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	164 - 131.5	30.531	8	1.4217	0.0076
L2	131.5 - 119.29	21.027	8	1.3412	0.0045
L3	125.29 - 78.79	19.303	8	1.3081	0.0040
L4	87.21 - 39.88	9.904	8	0.9936	0.0021
L5	49.13 - 1.5	3.337	8	0.6056	0.0010

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
164.00	PD1142-1	8	30.531	1.4217	0.0076	73805
160.00	4 FT DISH	8	29.339	1.4162	0.0072	73805
156.00	A-Ant-23G-2-C	8	28.148	1.4103	0.0068	46128
154.00	LLPX310R	8	27.555	1.4071	0.0066	36902
144.00	(2) APX16PV-16PVL-X	8	24.611	1.3861	0.0056	18450
138.00	(2) RRUS-11	8	22.874	1.3678	0.0050	14192
134.00	7770.00	8	21.732	1.3524	0.0047	12308
124.00	844G65T6ZAXY	8	18.951	1.3003	0.0039	9717
114.00	(4) DB846G90A-XY	8	16.292	1.2309	0.0033	8577
51.50	GPS	8	3.632	0.6322	0.0010	3896

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	164 - 131.5 (1)	TP53.42x47x0.3125	32.50	162.50	103.4	13.959	52.6760	-13.95	735.30	0.019
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	12.21	162.50	100.9	14.665	64.7894	-15.59	950.11	0.016
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	46.50	162.50	90.2	18.264	84.5934	-32.64	1545.03	0.021
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	47.33	162.50	81.6	21.155	120.1620	-52.64	2542.07	0.021
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	47.63	162.50	72.8	23.922	134.6840	-80.35	3221.92	0.025

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	373.97	-6.488	36.775	0.176	0.00	0.000	36.775	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	503.31	-6.934	39.000	0.178	0.00	0.000	39.000	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	1634.04	-15.410	39.000	0.395	0.00	0.000	39.000	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	3011.95	-18.120	39.000	0.465	0.00	0.000	39.000	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	5000.01	-23.922	39.000	0.613	0.00	0.000	39.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	164 - 131.5 (1)	TP53.42x47x0.3125	0.019	0.176	0.000	0.195 ✓	1.333	H1-3 ✓
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	0.016	0.178	0.000	0.194 ✓	1.333	H1-3 ✓
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	0.021	0.395	0.000	0.416 ✓	1.333	H1-3 ✓
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	0.021	0.465	0.000	0.485 ✓	1.333	H1-3 ✓
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	0.025	0.613	0.000	0.638 ✓	1.333	H1-3 ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-13.95	980.15	14.7	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-15.59	1266.50	14.6	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-32.64	2059.52	31.2	Pass
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-52.64	3388.58	36.4	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-80.35	4294.82	47.9	Pass
							Summary	
						Pole (L5)	47.9	Pass
						RATING =	**47.9**	**Pass**

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Subject:		Flange Bolt and Plate Analysis
Location:		164-ft EEI Monopole Greenwich, CT
Rev. 0: 4/14/11		Prepared by: T.J.L. Checked by: C.F.C. Job No. 11009. CO12

Flange Bolt and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 374ft·kips	(Input From RisaTower)
Shear Force =	Shear := 20.4·kips	(Input From RisaTower)
Axial Force =	Axial := 19.2·kips	(Input From RisaTower)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	N := 12	(User Input)
Diameter of Bolt Circle =	D_{bc} := 58.00·in	(User Input)
Bolt Ultimate Strength =	F_u := 120·ksi	(User Input)
Bolt Yield Strength =	F_y := 92·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength =	Fy_{bp} := 36.00·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.00·in	(User Input)
Flange Plate Diameter =	D_{bp} := 61.00·in	(User Input)
Outer Pole Diameter =	D_{pole} := 53.42·in	(User Input)

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Subject: Flange Bolt and Plate Analysis

Location: 164-ft EEI Monopole
Greenwich, CT

Rev. 0: 4/14/11

Prepared by: T.J.L. Checked by: C.F.C.
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Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 29 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 14.50 \cdot in$ $d_7 = -14.50 \cdot in$

$d_2 = 25.11 \cdot in$ $d_8 = -25.11 \cdot in$

$d_3 = 29.00 \cdot in$ $d_9 = -29.00 \cdot in$

$d_4 = 25.11 \cdot in$ $d_{10} = -25.11 \cdot in$

$d_5 = 14.50 \cdot in$ $d_{11} = -14.50 \cdot in$

$d_6 = 0.00 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 26.7 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.29 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ etc

Effective Width of Plate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 23.6 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 5.046 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 24.2 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 58.4 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 14.5 \cdot kips$ $C_7 = -11.3 \cdot kips$

$C_2 = 23.9 \cdot kips$ $C_8 = -20.7 \cdot kips$

$C_3 = 27.4 \cdot kips$ $C_9 = -24.2 \cdot kips$

$C_4 = 23.9 \cdot kips$ $C_{10} = -20.7 \cdot kips$

$C_5 = 14.5 \cdot kips$ $C_{11} = -11.3 \cdot kips$

$C_6 = 1.6 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 16 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 35.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 44.5 \cdot \%$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

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Subject: Anchor Bolt and Baseplate Analysis

Location: 164-ft EEI Monopole
Greenwich, CT

Rev. 0: 4/14/11

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 11009. CO12

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 5000·ft·kips	(Input From RisaTower)
Shear Force =	Shear := 45·kips	(Input From RisaTower)
Axial Force =	Axial := 80·kips	(Input From RisaTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 30	(User Input)
Diameter of Bolt Circle =	D_{bc} := 86.00·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strenght =	F_u := 100·ksi	(User Input)
Bolt Yeild Strenght =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 GR 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 3.0·in	(User Input)
Base Plate Diameter =	D_{bp} := 92.00·in	(User Input)
Outer Pole Diameter =	D_{pole} := 76.00·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 43 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N}\right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 8.94 \cdot in$ $d_7 = 42.76 \cdot in$

$d_2 = 17.49 \cdot in$ $d_8 = 42.76 \cdot in$

$d_3 = 25.27 \cdot in$ $d_9 = 40.90 \cdot in$

$d_4 = 31.96 \cdot in$ $d_{10} = 37.24 \cdot in$

$d_5 = 37.24 \cdot in$ $d_{11} = 31.96 \cdot in$

$d_6 = 40.90 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 38 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 4.76 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 4.76 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 2.90 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 2.90 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 41.5 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 2.773 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 90.4 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 46.4 \cdot \%$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.375 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 5.5 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$I := \begin{cases} I & \text{if } I > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } I > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{I_p} + \frac{Axial}{N} = 95.7 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 29.5 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^2}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^3}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = 49.1 \cdot \%$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, "OK", "Overstressed"\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 22.0 \cdot kips$ $C_7 = 95.2 \cdot kips$

$C_2 = 40.5 \cdot kips$ $C_8 = 95.2 \cdot kips$

$C_3 = 57.3 \cdot kips$ $C_9 = 91.1 \cdot kips$

$C_4 = 71.8 \cdot kips$ $C_{10} = 83.2 \cdot kips$

$C_5 = 83.2 \cdot kips$ $C_{11} = 71.8 \cdot kips$

$C_6 = 91.1 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 23.1 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 38.5 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Branford, CT 06405 F: (203) 488-8587

Subject: CAISSON FOUNDATION

Location: 164-ft EEI Monopole
Greenwich, CT

Rev. 0: 4/14/11

Prepared by: TJL Checked by: C.F.C.
Job No. 11009.CO12

Caisson Foundation:

Input Data:

Shear Force = $S := 44.5k$ *USER INPUT-FROM RISATower*

Overturning Moment = $M := 5000ft \cdot k$ *USER INPUT-FROM RISATower*

Applied Axial Load = $A1 := 80k$ *USER INPUT-FROM RISATower*

Bending Moment = $Mu := 5238ft \cdot k$ *USER INPUT--FROM LPILE*

Moment Capacity = $Mn := 12301ft \cdot k$ *USER INPUT--FROM LPILE*

Foundation Diameter = $d := 9.0ft$ *USER INPUT*

Overall Length of Caisson = $L_c := 28.0ft$ *USER INPUT*

Depth From Top of Caisson to Grade = $L_{pag} := 1.0ft$ *USER INPUT*

Number of Rebar = $n := 33$ *USER INPUT*

Area of Rebar = $Ar := 1.560in^2$ *USER INPUT*

Rebar Yield Strength = $fy := 60ksi$ *USER INPUT*

Concrete Comp Strength = $f'c := 3ksi$ *USER INPUT*

Check Foundation Depth:

Depth of Caisson Below Ground Level = $LD := L_c - L_{pag} = 27ft$ (TIA/EIA-222-F 7.2.5)

Depth Required = $LD1 := 2.0ft + \left(\frac{S \cdot ft^2}{3k \cdot d}\right) + 2ft \cdot .5\left(\frac{M \cdot ft}{3 \cdot kd} + \frac{S \cdot ft}{2k} + \frac{S^2 ft^3}{18k^2 d^2}\right)^{.5} = 32.55ft$

$DepthCheck := if(LD1 \le LD, "OK", "NO GOOD")$

$DepthCheck = "NO GOOD"$

Note: Result not applicable. Actual soil is better than normal soil as defined in TIA/EIA 222 F. Refer to L-Pile analysis.

Check Moment Capacity:

Factor of Safety = $FS := \frac{Mn}{Mu} = 2.3$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \ge FS_{reqd}, "OK", "NO GOOD")$

$FOSCheck = "OK"$

Check Axial Capacity:

Concrete Weight = $A2 := .150\frac{k}{ft^3} \cdot LD \cdot \pi \frac{d^2}{4} = 257.6 \cdot kips$

Total Axial Load = $AT := A1 + A2 = 337.6 \cdot kips$

Area of Concrete = $Ag := \pi \cdot \frac{d^2}{4} = 63.62ft^2$

Axial Capacity = $Po := n \cdot Ar \cdot fy + (Ag - n \cdot Ar) \cdot 0.85 \cdot f'c = 26317.8 \cdot kips$

$AxialCheck := if(AT \le Po, "OK", "NO GOOD")$

$AxialCheck = "OK"$

LPILE Plus for Windows, Version 5.0 (5.0.39)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

Staff
Natcomm, Inc.

Path to file locations: J:\Jobs\1100900.WI\CO12 - CT2102 - Greenwich Hospital - 5 Perryridge Road Greenwich, CT\Calcs\Foundation\
Name of input data file: Greenwich Hospiatl Caisson Analysis.lpd
Name of output file: Greenwich Hospiatl Caisson Analysis.lpo
Name of plot output file: Greenwich Hospiatl Caisson Analysis.lpp
Name of runtime file: Greenwich Hospiatl Caisson Analysis.lpr

Time and Date of Analysis

Date: April 14, 2011 Time: 10:15:41

Problem Title

11009.CO12 - CT2102: Greenwich Hospital

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100

- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 336.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = .00 deg.

Structural properties of pile defined using 2 points

Point	Depth X in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	108.00000	6678285.	9160.9000	3600000.
2	336.0000	108.00000	6678285.	9160.9000	3600000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 20.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 20.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 72.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 72.000 in
Distance from top of pile to bottom of layer = 132.000 in
p-y subgrade modulus k for top of soil layer = 150.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 150.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 132.000 in
Distance from top of pile to bottom of layer = 360.000 in
p-y subgrade modulus k for top of soil layer = 250.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 250.000 lbs/in**3

(Depth of lowest layer extends 24.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	.05800
2	48.00	.05800
3	48.00	.06900
4	72.00	.06900
5	72.00	.06900
6	132.00	.06900
7	132.00	.07500
8	360.00	.07500

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	.00000	20.00	------	------
2	48.000	.00000	20.00	------	------
3	48.000	.00000	30.00	------	------
4	72.000	.00000	30.00	------	------
5	72.000	.00000	35.00	------	------
6	132.000	.00000	35.00	------	------
7	132.000	.00000	42.00	------	------
8	360.000	.00000	42.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 44540.000 lbs
Bending moment at pile head = 60003818.000 in-lbs
Axial load at pile head = 80390.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

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Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 108.0000 in

Material Properties:

Compressive Strength of Concrete	=	3.000 kip/in**2
Yield Stress of Reinforcement	=	60. kip/in**2
Modulus of Elasticity of Reinforcement	=	29000. kip/in**2
Number of Reinforcing Bars	=	33
Area of Single Bar	=	1.56000 in**2
Number of Rows of Reinforcing Bars	=	33
Area of Steel	=	51.480 in**2
Area of Shaft	=	9160.884 in**2
Percentage of Steel Reinforcement	=	.562 percent
Cover Thickness (edge to bar center)	=	4.000 in

Unfactored Axial Squash Load Capacity = 26317.78 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	49.943
2	1.560	49.491
3	1.560	48.591
4	1.560	47.250
5	1.560	45.482
6	1.560	43.301
7	1.560	40.729
8	1.560	37.787
9	1.560	34.504
10	1.560	30.908
11	1.560	27.032
12	1.560	22.911
13	1.560	18.583
14	1.560	14.087
15	1.560	9.463
16	1.560	4.753
17	1.560	0.000
18	1.560	-4.753
19	1.560	-9.463

20	1.560	-14.087
21	1.560	-18.583
22	1.560	-22.911
23	1.560	-27.032
24	1.560	-30.908
25	1.560	-34.504
26	1.560	-37.787
27	1.560	-40.729
28	1.560	-43.301
29	1.560	-45.482
30	1.560	-47.250
31	1.560	-48.591
32	1.560	-49.491
33	1.560	-49.943

Axial Thrust Force = 80390.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11414083.	2.282817E+13	5.000000E-07	.00002977	59.53019732	91.48943069	804.36668
22713320.	2.271332E+13	.00000100	.00005689	56.89219111	173.29339	1532.23118
33889205.	2.259280E+13	.00000150	.00008398	55.98770517	253.60051	2259.00164
44950054.	2.247503E+13	.00000200	.00011115	55.57343584	332.75050	2987.97456
55888754.	2.235550E+13	.00000250	.00013826	55.30205852	410.34789	3715.29335
55888754.	1.862958E+13	.00000300	.00008452	28.17303246	251.17167	6592.01910
55888754.	1.596822E+13	.00000350	.00009674	27.64115363	286.24720	7744.67465
55888754.	1.397219E+13	.00000400	.00010898	27.24582285	321.09522	8896.91512
55888754.	1.241972E+13	.00000450	.00012150	26.99999839	356.48342	10041.10960
55888754.	1.117775E+13	.00000500	.00013375	26.75076860	390.82676	11192.92676
55888754.	1.016159E+13	.00000550	.00014597	26.54064542	424.80096	12345.73409
55888754.	9.314792E+12	.00000600	.00015821	26.36814505	458.55028	13498.08861
55888754.	8.598270E+12	.00000650	.00017046	26.22459322	492.07379	14649.98885
55888754.	7.984108E+12	.00000700	.00018273	26.10380691	525.37082	15801.43069
55888754.	7.451834E+12	.00000750	.00019501	26.00124460	558.44051	16952.41161
55888754.	6.986094E+12	.00000800	.00020731	25.91350740	591.28216	18102.92742
55888754.	6.575148E+12	.00000850	.00021962	25.83798820	623.89489	19252.97586
55888754.	6.209862E+12	.00000900	.00023195	25.77266568	656.27793	20402.55303
55888754.	5.883027E+12	.00000950	.00024430	25.71594340	688.43052	21551.65519
55888754.	5.588875E+12	.00001000	.00025667	25.66653711	720.35166	22700.28066

55888754.	5.322738E+12	.00001050	.00026905	25.62342006
752.04073	23848.42383			
55888754.	5.080796E+12	.00001100	.00028144	25.58574253
783.49679	24996.08219			
55888754.	4.859892E+12	.00001150	.00029386	25.55280608
814.71902	26143.25205			
55888754.	4.657396E+12	.00001200	.00030629	25.52402490
845.70644	27289.93104			
55888754.	4.471100E+12	.00001250	.00031874	25.49891621
876.45838	28436.11340			
55888754.	4.299135E+12	.00001300	.00033120	25.47706157
906.97382	29581.79713			
55888754.	4.139908E+12	.00001350	.00034368	25.45811015
937.25191	30726.97804			
56827996.	4.059143E+12	.00001400	.00035618	25.44176263
967.29184	31871.65136			
58739118.	4.050974E+12	.00001450	.00036870	25.42775506
997.09257	33015.81480			
60648045.	4.043203E+12	.00001500	.00038124	25.41586214
1026.65319	34159.46460			
62554782.	4.035792E+12	.00001550	.00039379	25.40589398
1055.97300	35302.59410			
64459300.	4.028706E+12	.00001600	.00040636	25.39767355
1085.05085	36445.20174			
66361583.	4.021914E+12	.00001650	.00041895	25.39104956
1113.88578	37587.28387			
68261629.	4.015390E+12	.00001700	.00043156	25.38589329
1142.47699	38728.83452			
70159409.	4.009109E+12	.00001750	.00044419	25.38208240
1170.82330	39869.85191			
72054923.	4.003051E+12	.00001800	.00045683	25.37951714
1198.92394	41010.32961			
73948155.	3.997198E+12	.00001850	.00046949	25.37810415
1226.77788	42150.26350			
75839089.	3.991531E+12	.00001900	.00048218	25.37775975
1254.38412	43289.64957			
77727700.	3.986036E+12	.00001950	.00049488	25.37840670
1281.74151	44428.48502			
81497929.	3.975509E+12	.00002050	.00052034	25.38242358
1335.70607	46704.48084			
85258717.	3.965522E+12	.00002150	.00054588	25.38969451
1388.66321	48978.21477			
89009950.	3.955998E+12	.00002250	.00057150	25.39984614
1440.60455	51249.64734			
92751483.	3.946872E+12	.00002350	.00059720	25.41256303
1491.52113	53518.74288			
96483199.	3.938090E+12	.00002450	.00062298	25.42759091
1541.40421	55785.45889			
1.002050E+08	3.929606E+12	.00002550	.00064884	25.44471091
1590.24448	58049.75615			
1.038781E+08	3.919929E+12	.00002650	.00067470	25.46047908
1637.86972	60000.00000			
1.067779E+08	3.882832E+12	.00002750	.00069891	25.41483861
1681.23936	60000.00000			
1.092085E+08	3.831878E+12	.00002850	.00072209	25.33656424
1721.72044	60000.00000			
1.113281E+08	3.773835E+12	.00002950	.00074459	25.24019784
1760.02623	60000.00000			
1.135610E+08	3.723312E+12	.00003050	.00076860	25.20000011
1800.02423	60000.00000			
1.149472E+08	3.649118E+12	.00003150	.00079050	25.09528452
1835.46534	60000.00000			
1.165172E+08	3.585145E+12	.00003250	.00081144	24.96743006
1868.48416	60000.00000			
1.178852E+08	3.518962E+12	.00003350	.00083180	24.82998723
1899.80478	60000.00000			

1.192124E+08	3.455433E+12	.00003450	.00085209	24.69828647
1930.26945	60000.00000			
1.203683E+08	3.390656E+12	.00003550	.00087186	24.55935019
1959.21478	60000.00000			
1.215207E+08	3.329333E+12	.00003650	.00089166	24.42915577
1987.52883	60000.00000			
1.225052E+08	3.266804E+12	.00003750	.00091092	24.29118508
2014.35115	60000.00000			
1.234781E+08	3.207225E+12	.00003850	.00093018	24.16059154
2040.52960	60000.00000			
1.243960E+08	3.149266E+12	.00003950	.00094928	24.03246027
2065.82727	60000.00000			
1.252097E+08	3.091599E+12	.00004050	.00096802	23.90182167
2090.00229	60000.00000			
1.260206E+08	3.036642E+12	.00004150	.00098680	23.77834457
2113.60502	60000.00000			
1.268033E+08	2.983607E+12	.00004250	.00100551	23.65899378
2136.49538	60000.00000			
1.274751E+08	2.930463E+12	.00004350	.00102379	23.53534931
2158.24408	60000.00000			
1.281444E+08	2.879650E+12	.00004450	.00104210	23.41802949
2179.44628	60000.00000			
1.288288E+08	2.831402E+12	.00004550	.00106470	23.39999861
2205.03779	60000.00000			
1.295259E+08	2.785504E+12	.00004650	.00108295	23.28927058
2224.84393	60000.00000			
1.300597E+08	2.738099E+12	.00004750	.00110023	23.16278082
2243.00533	60000.00000			
1.305913E+08	2.692605E+12	.00004850	.00111754	23.04215866
2260.67839	60000.00000			
1.311208E+08	2.648906E+12	.00004950	.00113489	22.92705327
2277.86031	60000.00000			
1.316482E+08	2.606894E+12	.00005050	.00115227	22.81714278
2294.54833	60000.00000			
1.321100E+08	2.565244E+12	.00005150	.00116930	22.70487303
2310.37895	60000.00000			
1.325351E+08	2.524478E+12	.00005250	.00118616	22.59353667
2325.53926	60000.00000			
1.329582E+08	2.485199E+12	.00005350	.00120305	22.48692530
2340.23138	60000.00000			
1.333793E+08	2.447326E+12	.00005450	.00121997	22.38478464
2354.45280	60000.00000			
1.337984E+08	2.410783E+12	.00005550	.00123692	22.28687328
2368.20068	60000.00000			
1.342156E+08	2.375497E+12	.00005650	.00125390	22.19297558
2381.47257	60000.00000			
1.345566E+08	2.340115E+12	.00005750	.00127042	22.09423381
2393.87830	60000.00000			
1.348894E+08	2.305801E+12	.00005850	.00128692	21.99862379
2405.79911	60000.00000			
1.352203E+08	2.272611E+12	.00005950	.00130345	21.90671843
2417.26754	60000.00000			
1.358768E+08	2.209379E+12	.00006150	.00133660	21.73330718
2438.83695	60000.00000			
1.367504E+08	2.153550E+12	.00006350	.00137160	21.60000032
2459.59723	60000.00000			
1.371781E+08	2.094323E+12	.00006550	.00141000	21.52674383
2479.99903	60000.00000			
1.376597E+08	2.039403E+12	.00006750	.00144110	21.34970194
2494.45465	60000.00000			
1.381353E+08	1.987558E+12	.00006950	.00147232	21.18444675
2507.28554	60000.00000			
1.386048E+08	1.938529E+12	.00007150	.00150365	21.03001910
2518.47338	60000.00000			
1.390440E+08	1.891755E+12	.00007350	.00153484	20.88210922
2527.92497	60000.00000			

1.393978E+08	1.846329E+12	.00007550	.00156530	20.73245484
2535.52568	60000.00000			
1.397461E+08	1.803176E+12	.00007750	.00159587	20.59192854
2541.54804	60000.00000			
1.400887E+08	1.762122E+12	.00007950	.00162656	20.45985764
2545.97395	60000.00000			
1.404256E+08	1.723013E+12	.00008150	.00165735	20.33564347
2548.78499	60000.00000			
1.407566E+08	1.685708E+12	.00008350	.00168826	20.21874207
2549.96222	60000.00000			
1.410490E+08	1.649696E+12	.00008550	.00171896	20.10474068
2546.02690	60000.00000			
1.412857E+08	1.614693E+12	.00008750	.00174910	19.98977047
2541.05419	60000.00000			
1.415199E+08	1.581228E+12	.00008950	.00177937	19.88117641
2543.51902	60000.00000			
1.415199E+08	1.546665E+12	.00009150	.00181170	19.79999882
2547.09008	60000.00000			
1.417490E+08	1.516032E+12	.00009350	.00185130	19.79999882
2549.59126	60000.00000			
1.423302E+08	1.490369E+12	.00009550	.00188497	19.73793358
2548.63742	60000.00000			
1.425367E+08	1.461914E+12	.00009750	.00191439	19.63478547
2544.42434	60000.00000			
1.427417E+08	1.434590E+12	.00009950	.00194390	19.53667778
2540.19566	60000.00000			
1.429352E+08	1.408228E+12	.00010150	.00197330	19.44139928
2539.72329	60000.00000			
1.430795E+08	1.382411E+12	.00010350	.00200187	19.34169191
2543.26246	60000.00000			
1.432226E+08	1.357561E+12	.00010550	.00203051	19.24655503
2546.06762	60000.00000			
1.433645E+08	1.333624E+12	.00010750	.00205924	19.15574080
2548.12928	60000.00000			
1.435052E+08	1.310550E+12	.00010950	.00208806	19.06903034
2549.43786	60000.00000			
1.436445E+08	1.288292E+12	.00011150	.00211696	18.98620802
2549.98339	60000.00000			
1.437806E+08	1.266789E+12	.00011350	.00214605	18.90797228
2547.20221	60000.00000			
1.439153E+08	1.246020E+12	.00011550	.00217524	18.83321911
2543.66216	60000.00000			
1.440492E+08	1.225951E+12	.00011750	.00220448	18.76153010
2540.11140	60000.00000			
1.441825E+08	1.206548E+12	.00011950	.00223378	18.69275719
2536.54982	60000.00000			
1.443149E+08	1.187777E+12	.00012150	.00226315	18.62675875
2535.60881	60000.00000			
1.444347E+08	1.169512E+12	.00012350	.00229228	18.56097597
2539.25390	60000.00000			
1.445264E+08	1.151605E+12	.00012550	.00232077	18.49218696
2542.25689	60000.00000			
1.446174E+08	1.134254E+12	.00012750	.00234932	18.42601150
2544.77715	60000.00000			
1.447078E+08	1.117435E+12	.00012950	.00237792	18.36233371
2546.80938	60000.00000			
1.447976E+08	1.101122E+12	.00013150	.00240659	18.30104738
2548.34816	60000.00000			
1.448867E+08	1.085293E+12	.00013350	.00243531	18.24204630
2549.38790	60000.00000			
1.449751E+08	1.069927E+12	.00013550	.00246410	18.18523711
2549.92298	60000.00000			
1.450620E+08	1.054996E+12	.00013750	.00249301	18.13098353
2548.70099	60000.00000			
1.451472E+08	1.040482E+12	.00013950	.00252204	18.07914072
2545.81908	60000.00000			

1.455127E+08	1.014026E+12	.00014350	.00258300	18.00000054
2539.54654	60000.00000			
1.466286E+08	9.940921E+11	.00014750	.00265500	18.00000054
2531.33751	60000.00000			
1.476109E+08	9.743296E+11	.00015150	.00272700	18.00000054
2536.11274	60000.00000			
1.476109E+08	9.492664E+11	.00015550	.00279117	17.94963831
2542.51490	60000.00000			
1.476109E+08	9.254604E+11	.00015950	.00284857	17.85938090
2546.17322	60000.00000			
1.476109E+08	9.028191E+11	.00016350	.00290515	17.76850551
2548.55472	60000.00000			
1.476109E+08	8.812593E+11	.00016750	.00296191	17.68306965
2549.80428	60000.00000			
1.476109E+08	8.607051E+11	.00017150	.00301998	17.60919517
2547.98766	60000.00000			
1.476109E+08	8.410879E+11	.00017550	.00307897	17.54397887
2543.32336	60000.00000			
1.476109E+08	8.223450E+11	.00017950	.00313808	17.48233205
2538.63819	60000.00000			
1.476109E+08	8.044192E+11	.00018350	.00319731	17.42403585
2533.93168	60000.00000			
1.476109E+08	7.872583E+11	.00018750	.00325667	17.36888748
2529.20345	60000.00000			
1.476109E+08	7.708143E+11	.00019150	.00331615	17.31671315
2524.45271	60000.00000			
1.476109E+08	7.550431E+11	.00019550	.00337576	17.26733905
2519.67915	60000.00000			
1.476109E+08	7.399044E+11	.00019950	.00343645	17.22532600
2525.73942	60000.00000			
1.476109E+08	7.253608E+11	.00020350	.00349791	17.18876213
2531.99010	60000.00000			
1.476109E+08	7.113780E+11	.00020750	.00355955	17.15447062
2537.35110	60000.00000			
1.476109E+08	6.979240E+11	.00021150	.00362069	17.11911696
2541.67787	60000.00000			
1.476109E+08	6.849695E+11	.00021550	.00368033	17.07809526
2544.89240	60000.00000			
1.476109E+08	6.724872E+11	.00021950	.00374012	17.03927833
2547.34202	60000.00000			
1.476109E+08	6.604516E+11	.00022350	.00380007	17.00256640
2549.00865	60000.00000			

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =
147610.93014 in-kip

Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Specified shear force at pile head = 44540.000 lbs
Specified moment at pile head = 60003818.000 in-lbs
Specified axial load at pile head = 80390.000 lbs

Non-zero moment for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment)condition.

Depth	Deflect.	Moment	Shear	Slope	Total	Flx. Rig.	Soil Res.
Es*h							
X	y	M	V	S	Stress	EI	p
F/L							

in	in	lbs-in	lbs	Rad.	lbs/in**2	lbs-in**2	lbs/in
0.000	.593914	6.00E+07	44540.	-.004061	493.961	4.05E+12	0.000
0.000							
26.880	.490141	6.12E+07	43401.	-.003658	503.663	4.04E+12	-145.866
999.936							
53.760	.397309	6.23E+07	34744.	-.003247	512.496	4.04E+12	-788.794
6670.753							
80.640	.315619	6.29E+07	1641.888	-.002830	517.002	4.03E+12	-1769.440
18837.							
107.520	.245165	6.21E+07	-59495.	-.002413	511.261	4.04E+12	-2747.204
37651.							
134.400	.185802	5.95E+07	-1.36E+05	-.002007	490.182	4.05E+12	-3522.375
63698.							
161.280	.136438	5.46E+07	-2.32E+05	-.001742	450.186	2.24E+13	-3503.413
86277.							
188.160	.090470	4.71E+07	-3.20E+05	-.001680	389.994	2.24E+13	-2931.007
1.09E+05							
215.040	.046013	3.76E+07	-3.84E+05	-.001629	312.943	2.25E+13	-1799.936
1.31E+05							
241.920	.002759	2.68E+07	-4.11E+05	-.001591	225.636	2.27E+13	-126.480
1.54E+05							
268.800	-.039640	1.60E+07	-3.86E+05	-.001566	137.847	2.28E+13	2083.361
1.77E+05							
295.680	-.081528	6.64E+06	-2.95E+05	-.001553	62.487	2.28E+13	4832.764
1.99E+05							
322.560	-.123196	8.47E+05	-1.22E+05	-.001549	15.624	2.28E+13	8130.664
2.22E+05							

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection	=	.59391430 in
Computed slope at pile head	=	-.00406135
Maximum bending moment	=	62853315. lbs-in
Maximum shear force	=	-411502.03834 lbs
Depth of maximum bending moment	=	80.64000000 in
Depth of maximum shear force	=	245.28000 in
Number of iterations	=	66
Number of zero deflection points	=	1

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians

Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 44540.	M= 6.00E+07	80390.0000	.5939143	6.2853E+07	-411502.

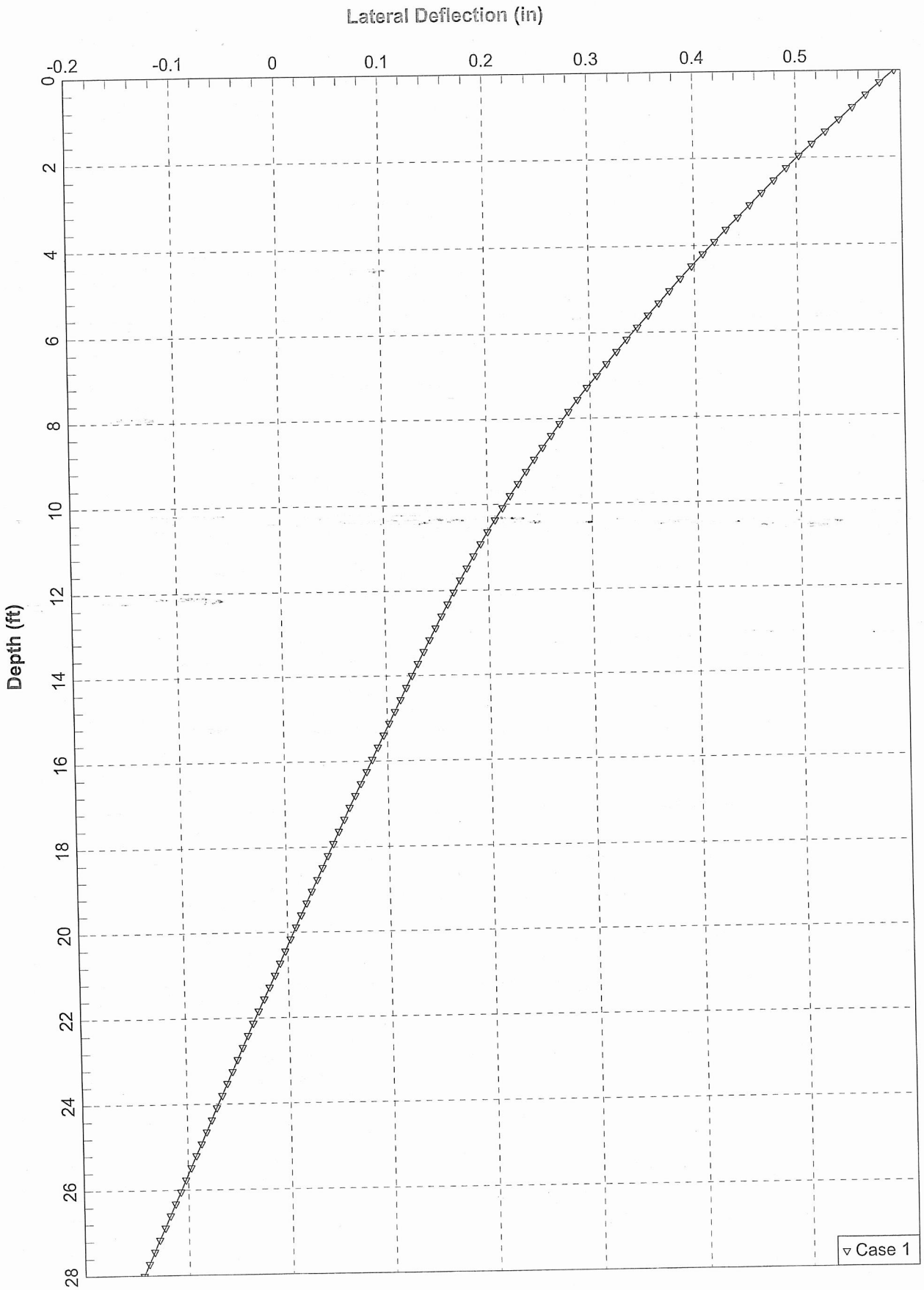
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

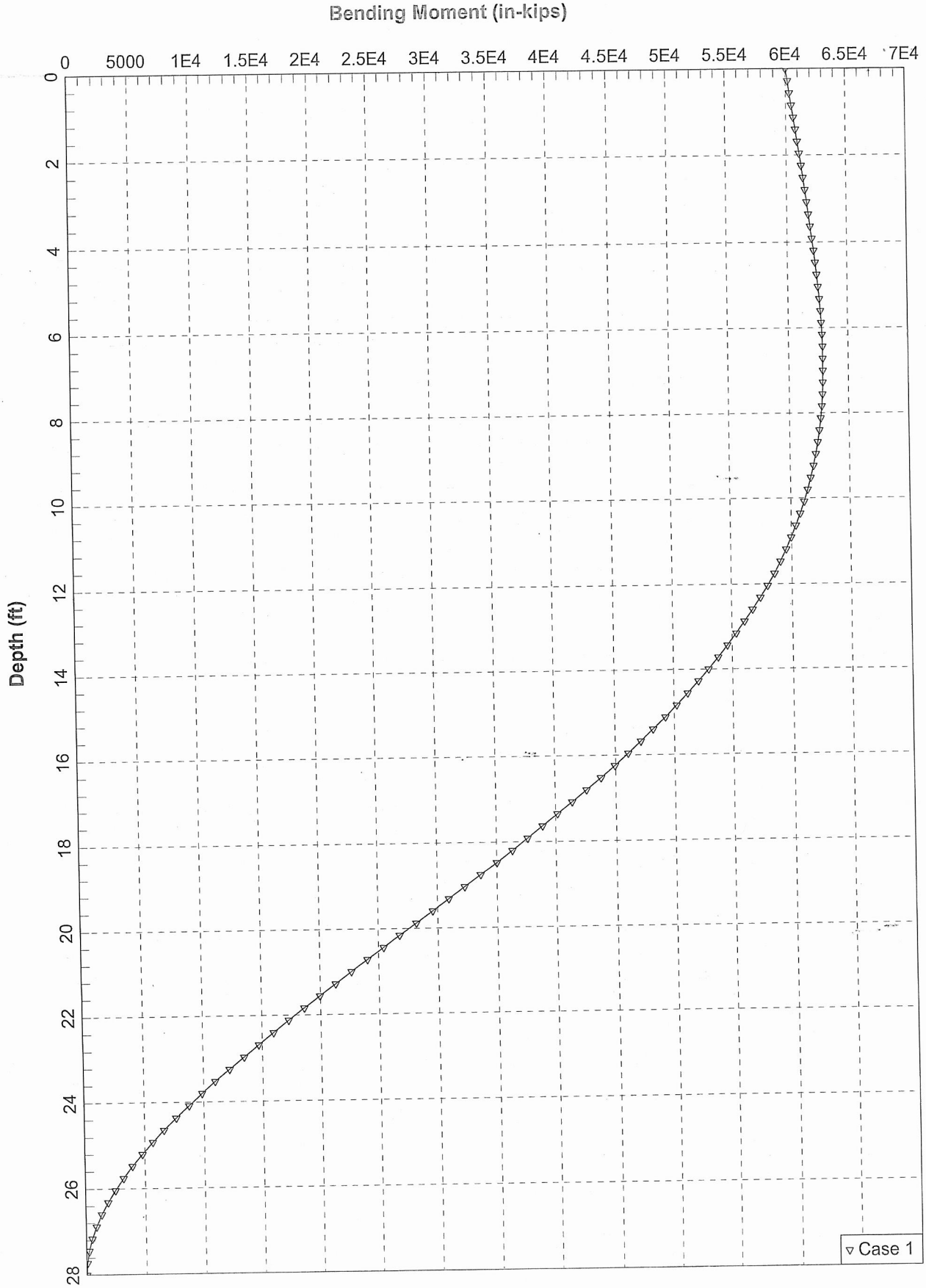
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
.00118833	4454.00007	900238.67670	3748109.	7.575646E+08
.00357724	13407.87601	2709988.	3748109.	7.575646E+08
.00566979	21250.98068	4295230.	3748109.	7.575646E+08
.00715447	26815.75201	5419977.	3748109.	7.575646E+08
.00830609	31132.12399	6292398.	3748109.	7.575646E+08
.00924702	34658.85669	7005218.	3748109.	7.575646E+08
.01004257	37640.66670	7607899.	3748109.	7.575646E+08
.01073171	40223.62802	8129965.	3748109.	7.575646E+08
.01133957	42501.96137	8590460.	3748109.	7.575646E+08
.01188332	44540.00000	9002387.	3748109.	7.575646E+08

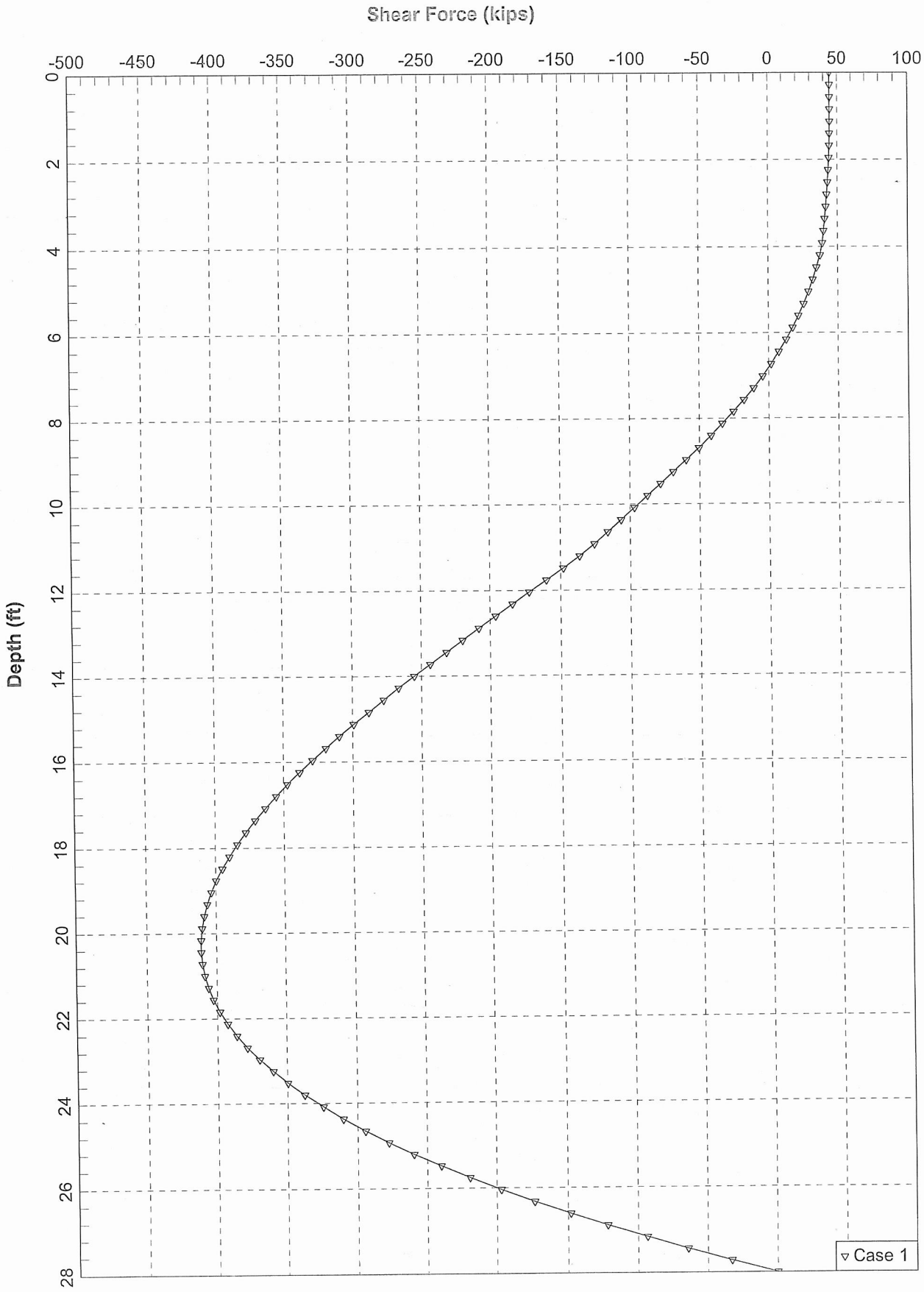
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
.00003241	24553.90891	6000382.	7.575646E+08	1.851305E+11
.00009769	73917.20324	18062949.	7.566833E+08	1.849087E+11
.00015516	117170.05630	28629097.	7.551385E+08	1.845090E+11
.00019612	147866.82133	36125898.	7.539529E+08	1.842011E+11
.00022800	171681.91043	41940869.	7.529864E+08	1.839501E+11
.00025411	191143.42358	46692046.	7.522207E+08	1.837506E+11
.00027623	207600.10754	50709109.	7.515457E+08	1.835751E+11
.00029543	221857.23202	54188847.	7.509594E+08	1.834226E+11
.00031316	234436.23842	57258194.	7.486076E+08	1.828383E+11
.00033533	245712.19045	60003818.	7.327531E+08	1.789410E+11

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
6.5E4
7E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

Section 1 - LTE GENERAL INFORMATION

RFDS NAME:	CT2102	DATE:	3/17/2011 10:31	RF DESIGN ENG:	Francis Malabanan	RF PERF ENG:	TBD
ISSUE:	Final	Approved? (Y/N)	Y	RF DESIGN PHONE:	(860) 315-2291	RF PERF PHONE:	TBD
REVISION:	V02	RF MANAGER:	Walter Saddig	RF DESIGN EMAIL:	fm4830@att.com	RF PERF EMAIL:	TBD
INITIATIVE / PROJECT:	LTE					TRIDENT:	
						GSM FREQUENCY:	Dual Band
						UMTS FREQUENCY:	Dual Band
						LTE FREQUENCY:	700
						I-PLAN JOB # 1:	TBD
						I-PLAN JOB # 2:	
						I-PLAN JOB # 3:	
						I-PLAN JOB # 4:	

Section 2 - LOCATION INFORMATION

USID:	100184	FA LOCATION CODE:	10128691	LOCATION NAME:	GREENWICH PERRYRIDGE RD TWR	ORACLE PRJT # 1:	2051003228
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CT	ORACLE PRJT # 2:	
ADDRESS:	5 PERRYRIDGE ROAD DUP	CITY:	GREENWICH	STATE:	CT	ORACLE PRJT # 3:	
ZIP CODE:	06830	COUNTY:	FAIRFIELD	MSA/RSA:	42	ORACLE PRJT # 4:	
LATTITUDE (D-M-S)	41?2' 3.12"	LONGITUDE (D-M-S)	73?3?' 51.24"	LAT (DEC. DEG.)	41.0342	SEARCH RING NAME:	N/A
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	TBD					SEARCH RING ID:	N/A
						BTA:	321
						LONG (DEC. DEG.):	-73.6309
						BORDER CELL WITH	TBD
						AM STUDY REQ'D (Y/N):	TBD
						FREQ COORD:	TBD

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED:	TBD	CGSA LOSS:	TBD	PCS REDUCED - UPS ZIP:	TBD
CGSA - MINOR FILING NEEDED:	TBD	CGSA EXT AGMT NEEDED:	TBD	PCS POPS REDUCED:	TBD
CGSA - MAJOR FILING NEEDED:	TBD	CGSA SCORECARD UPDATED:	TBD		

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	TBD	GROUND ELEVATION (ft):	151'	STRUCTURE TYPE:	MONOPOLE	MKT LOCATION 850 MHZ CALL SIGN(S):	TBD
ADDTIONAL REGULATORY?:	TBD	HEIGHT OVERALL (ft):	TBD	FCC ASR NUMBER:	TBD	MKT LOCATION 1900 MHZ CALL SIGN(S)	TBD
SUB-LEASE RIGHTS?:	TBD	STRUCTURE HEIGHT (ft):	TBD			MKT LOCATION 700 MHZ CALL SIGN(S):	TBD
LIGHTING TYPE:	TBD					MKT LOCATION AWS MHZ CALL SIGN(S):	TBD

Section 5 - E-911 INFORMATION

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:
ALPHA	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
BETA	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
GAMMA	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
DELTA								
EPSILON								
PSI								

Section 6 - RBS GENERAL INFORMATION

4-DIGIT SITE ID:	2102	COW OR TOY?:	NO	CELLULAR NETWORK:	GOLD	DISASTER PRIORITY:	TBD
CELL SITE TYPE:	SECTORIZED	SITE TYPE:	MACRO	OPS DISTRICT:	CT-South	OPS ZONE:	NE_CT_S_FRFD_SW_CS
BTS LOCATION ID:	TBD	ORIGINATING CO:	ATT	RF DISTRICT:	BRIDGEPORT	RF ZONE:	BBP01

Section 7 - RBS SPECIFIC INFORMATION

	GSM RBSs	UMTS 1ST CARRIER RBSs	UMTS 2ND CARRIER RBSs	UMTS 3RD CARRIER RBSs	UMTS 4TH CARRIER RBSs	LTE RBSs
MSC	MBP01	TBD	TBD	TBD	N/A	N/A
BSC/RNC	BRPTCTBSC01	BRPTCT04RNC001	BRPTCT04RNC001	BRPTCT04RNC001	N/A	N/A
LAC	05010	5999	5999	5999	N/A	N/A
RAC	TBD	255	255	255	N/A	N/A
EQUIPMENT VENDOR	NOKIA	ERICSSON	ERICSSON	ERICSSON	N/A	N/A
EQUIPMENT TYPE	TBD	RBS3206	RBS3206	RBS3206	N/A	N/A
LOCATION	TBD	TBD	TBD	N/A	N/A	N/A
CABINET LOCATION	TBD	TBD	TBD	N/A	N/A	N/A

Section 8 - RBS INDIVIDUAL INFORMATION

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
CELL ID/BCF	321D2102	321P2102	N/A	CTU2102	CTU2102	N/A	N/A	CTU6102	N/A	N/A	N/A	N/A
CTS COMMON ID	321D2102	321P2102	N/A	CTU2102	CTV2102	N/A	N/A	CTU6102	N/A	N/A	N/A	N/A

Section 9 - SOFT SECTOR ID

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)	321G21021	321P21021	N/A	CTU21027	CTV21021	N/A	N/A	CTU61024	N/A	N/A	N/A	N/A
BETA	321G21022	321P21022	N/A	CTU21028	CTV21022	N/A	N/A	CTU61025	N/A	N/A	N/A	N/A
GAMMA	321G21023	321P21023	N/A	CTU21029	CTV21023	N/A	N/A	CTU61026	N/A	N/A	N/A	N/A
DELTA												
EPSILON												
PSI												

Section 10 - CID/SAC

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)	21021	21021	N/A	21027	21021	N/A	N/A	61024	N/A	N/A	N/A	N/A
BETA	21022	21022	N/A	21028	21022	N/A	N/A	61025	N/A	N/A	N/A	N/A
GAMMA	21023	21023	N/A	21029	21023	N/A	N/A	61026	N/A	N/A	N/A	N/A
DELTA												
EPSILON												
PSI												

Section 11 - CURRENT RADIO COUNTS (Existing)

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)	3	N/A	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BETA	4	2	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
GAMMA	3	N/A	N/A	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DELTA												
EPSILON												
PSI												

Section 12 - CURRENT BASE BAND CONFIGURATION (Existing)

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s	TBD	TBD	TBD	TBD		
LINK PROFILE	TBD	TBD	TBD	TBD		
RF Combining						
Fiber or Ethernet?	TBD	TBD	TBD	TBD		
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - Type[Qty-Model]						
Fiber Jumper						
DC Cable						
DC/Fiber Dem. Box						
Bundled Fiber Cable						
Bundled DC Cable						

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2ND 850 RBS	UMTS 2ND 1900 RBS	UMTS 3RD 850 RBS	UMTS 3RD 1900 RBS	UMTS 4TH 850 RBS	UMTS 4TH 1900 RBS	LTE 700 RBS	LTE AWS RBS
ALPHA (OR OMNI)	3	N/A	N/A	1	1	N/A	N/A	1	N/A	N/A	N/A	N/A
BETA	4	2	N/A	1	1	N/A	N/A	1	N/A	N/A	N/A	N/A
GAMMA	3	N/A	N/A	1	1	N/A	N/A	1	N/A	N/A	N/A	N/A
DELTA												
EPSILON												
PSI												

Section 14 - NEW/PROPOSED BASE BAND CONFIGURATION

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet
# T1s						
LINK PROFILE						
RF Combining						
Fiber or Ethernet?						
Tx Board Model						
Tx Board QTY						
RAX/ECU Board Model						
RAX/ECU Board QTY						
BBU Board Model						
BBU Board QTY						
RRU - Type[Qty-Model]						
Fiber Jumper						
DC Cable						
DC/Fiber Dem. Box						
Bundled Fiber Cable						
Bundled DC Cable						

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx / TxRx | TxRx / TxRx			TxRx / Rx | TxRx / Rx	
TECHNOLOGY	GSM / 850 | N/A			UMTS / 850 | UMTS / 1900	
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE	1 5/8" - CommScope			1 5/8" - CommScope	
Feeder Length (feet)	160 '			160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	7770			7770	
ANTENNA VENDOR	Powerwave			Powerwave	
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0			55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	35			35	
ANTENNA GAIN	13.5 dBi | 16.5 dBi			13.5 dBi | 16.5 dBi	
AZIMUTH	0 °			0 °	
RADIATION CENTER (feet)	71 '			71 '	
ANTENNA TIP HEIGHT	73 '			73 '	
ELECTRICAL TILT (700/850/1900/AWS)	0 ° | 0 °			0 ° | 0 °	
MECHANICAL DOWNTILT	0 °			0 °	
FEEDER AMOUNT	2			2	
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)			1 / Powerwave / 7020 (DB)	
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)	N/A			N/A	
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band -			N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser / 1000860			N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)			1 / Polyphaser / 1000860	
SURGE ARRESTOR (QTY/MODEL)	N/A			2 + 2 / Powerwave / LGP 21901	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901			N/A	
HYBRID COMBINER (QTY/MODEL)	N/A			N/A	
DUPLEXER (QTY/MODEL)	N/A			N/A	
FILTER (QTY/MODEL)	N/A			N/A |	
RXAIT KIT MODULE?	N/A			N/A |	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A			N/A |	
SCPA/MCPA MODULE?	N/A			N/A	
Additional Component1	Powerwave			N/A	
Additional Component2	N/A			Daisy chain to CILOC from ANT4	
Additional Component3	Daisy chain to ANT4			-14 °	
MAGNETIC DECLINATION	-14 °			TBD | TBD	
HATCHPLATE POWER (Watts)	TBD | TBD			TBD | TBD	
ERP (Watts)	TBD | TBD				
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx / TxRx | TxRx / TxRx			TxRx / Rx | TxRx / Rx	
TECHNOLOGY	GSM / 850 | GSM / 1900			UMTS / 850 | UMTS / 1900	
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE	1 5/8" - CommScope			1 5/8" - CommScope	
Feeder Length (feet)	160 '			160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	7770			7770	
ANTENNA VENDOR	Powerwave			Powerwave	
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0			55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	35			35	
ANTENNA GAIN	13.5 dBi | 16.5 dBi			13.5 dBi | 16.5 dBi	
AZIMUTH	100 °			100 °	
RADIATION CENTER (feet)	71 '			71 '	
ANTENNA TIP HEIGHT	73 '			73 '	
ELECTRICAL TILT (700/850/1900/AWS)	2 ° | 2 °			2 ° | 2 °	
MECHANICAL DOWNTILT	0 °			0 °	
FEEDER AMOUNT	2			2	
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)			1 / Powerwave / 7020 (DB)	
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)	N/A			N/A	
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band -			N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser / 1000860			N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)			1 / Polyphaser / 1000860	
SURGE ARRESTOR (QTY/MODEL)	N/A			2 + 2 / Powerwave / LGP 21901	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901			N/A	
HYBRID COMBINER (QTY/MODEL)	N/A			N/A	
DUPLEXER (QTY/MODEL)	N/A			N/A	
FILTER (QTY/MODEL)	N/A			N/A |	
RXAIT KIT MODULE?	N/A			N/A |	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A			N/A |	
SCPA/MCPA MODULE?	Powerwave			N/A	
Additional Component1	N/A			N/A	
Additional Component2	Daisy chain to ANT4			Daisy chain to CILOC from ANT4	
Additional Component3	-14 °			-14 °	
MAGNETIC DECLINATION	TBD | TBD			TBD | TBD	
HATCHPLATE POWER (Watts)	TBD | TBD			TBD | TBD	
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TxRx / TxRx | TxRx / TxRx			TxRx / Rx | TxRx / Rx	
TECHNOLOGY	GSM / 850 | N/A			UMTS / 850 | UMTS / 1900	
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE	1 5/8" - CommScope			1 5/8" - CommScope	
Feeder Length (feet)	160 '			160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	7770			7770	
ANTENNA VENDOR	Powerwave			Powerwave	
ANTENNA SIZE (H x W x D)	55.0 x 11.0 x 5.0			55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	35			35	
ANTENNA GAIN	13.5 dBi | 16.5 dBi			13.5 dBi | 16.5 dBi	
AZIMUTH	250 °			250 °	
RADIATION CENTER (feet)	71 '			71 '	
ANTENNA TIP HEIGHT	73 '			73 '	
ELECTRICAL TILT (700/850/1900/AWS)	4 ° | 2 °			4 ° | 2 °	
MECHANICAL DOWNTILT	0 °			0 °	
FEEDER AMOUNT	2			2	
Antenna RET Motor (QTY/MODEL)	1 / Powerwave / 7020 (DB)			1 / Powerwave / 7020 (DB)	
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)	N/A			N/A	
TMA/LNA (TYPE/MODEL)	2 / Powerwave / LGP 21401 (Dual Band -			N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)	Polyphaser / 1000860			N/A	
PDU FOR TMAS (QTY/MODEL) usually per site	LGP 12104 (1900 AND 850 Bypass TMA)			1 / Polyphaser / 1000860	
SURGE ARRESTOR (QTY/MODEL)	N/A			2 + 2 / Powerwave / LGP 21901	
DIPLEXER (QTY/MODEL)	0 + 2 / Powerwave / LGP 21901			N/A	
HYBRID COMBINER (QTY/MODEL)	N/A			N/A	
DUPLEXER (QTY/MODEL)	N/A			N/A	
FILTER (QTY/MODEL)	N/A			N/A |	
RXAIT KIT MODULE?	N/A			N/A |	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)	N/A			N/A |	
SCPA/MCPA MODULE?	Powerwave			N/A	
Additional Component1	N/A			N/A	
Additional Component2	Daisy chain to ANT4			Daisy chain to CILOC from ANT4	
Additional Component3	-14 °			-14 °	
MAGNETIC DECLINATION	TBD | TBD			TBD | TBD	
HATCHPLATE POWER (Watts)	TBD | TBD			TBD | TBD	
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE					
Feeder Length (feet)					
ANTENNA ATOLL					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE (H x W x D)					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER (feet)					
ANTENNA TIP HEIGHT					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
FEEDER AMOUNT					
Antenna RET Motor (QTY/MODEL)					
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)					
PDU FOR TMAS (QTY/MODEL) usually per site					
SURGE ARRESTOR (QTY/MODEL)					
DIPLEXER (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
FILTER (QTY/MODEL)					
RXAIT KIT MODULE?					
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)					
SCPA/MCPA MODULE?					
Additional Component1					
Additional Component2					
Additional Component3					
MAGNETIC DECLINATION					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE					
Feeder Length (feet)					
ANTENNA ATOLL					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE (H x W x D)					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER (feet)					
ANTENNA TIP HEIGHT					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
FEEDER AMOUNT					
Antenna RET Motor (QTY/MODEL)					
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)					
PDU FOR TMAS (QTY/MODEL) usually per site					
SURGE ARRESTOR (QTY/MODEL)					
DIPLEXER (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
FILTER (QTY/MODEL)					
RXAIT KIT MODULE?					
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)					
SCPA/MCPA MODULE?					
Additional Component1					
Additional Component2					
Additional Component3					
MAGNETIC DECLINATION					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?					
TECHNOLOGY					
RRH LOCATION (Top/Bottom/None)					
FEEDERS TYPE					
Feeder Length (feet)					
ANTENNA ATOLL					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE (H x W x D)					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER (feet)					
ANTENNA TIP HEIGHT					
ELECTRICAL TILT (700/850/1900/AWS)					
MECHANICAL DOWNTILT					
FEEDER AMOUNT					
Antenna RET Motor (QTY/MODEL)					
Antenna RET Splitter (QTY/MODEL)					
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)					
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)					
PDU FOR TMAS (QTY/MODEL) usually per site					
SURGE ARRESTOR (QTY/MODEL)					
DIPLEXER (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
FILTER (QTY/MODEL)					
RXAIT KIT MODULE?					
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)					
SCPA/MCPA MODULE?					
Additional Component1					
Additional Component2					
Additional Component3					
MAGNETIC DECLINATION					
HATCHPLATE POWER (Watts)					
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - ALPHA SECTOR

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD		TxRx / Rx | TxRx / TxRx	TxRx / TxRx | TxRx / TxRx	
TECHNOLOGY	LTE / 700		UMTS / 850 | UMTS / MC 1900	GSM / 850 | N/A	
RRH LOCATION (Top/Bottom/None)	TOP				
FEEDERS TYPE	er & 2 DC cables with RAYCAP kit		1 5/8" - CommScope	1 5/8" - CommScope	
Feeder Length (feet)			160 '	160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	P65-16-XLH-RR		7770	7770	
ANTENNA VENDOR	Powerwave		Powerwave	Powerwave	
ANTENNA SIZE (H x W x D)	72.0 x 12.0 x 6.0		55.0 x 11.0 x 5.0	55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	64		35	35	
ANTENNA GAIN	14.0 dBi		13.5 dBi | 16.5 dBi	13.5 dBi | 16.5 dBi	
AZIMUTH	30 °		0 °	0 °	
RADIATION CENTER (feet)	135 '		71 '	71 '	
ANTENNA TIP HEIGHT	138 '		73 '	73 '	
ELECTRICAL TILT (700/850/1900/AWS)	2 °		0 ° | 0 °	0 ° | 0 °	
MECHANICAL DOWNTILT	0 °		0 °	0 °	
FEEDER AMOUNT			2	2	
Antenna RET Motor (QTY/MODEL)	N/A / Powerwave / Built-in RET Equipment		1 / Powerwave / 7020 (DB)	1 / Powerwave / 7020 (DB)	
Antenna RET Splitter (QTY/MODEL)	N/A				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A				
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)			N/A	N/A	
TMA/LNA (TYPE/MODEL)	2 Ericsson RRU (S/L)		2 / Powerwave / LGP 21401 (Dual Band -	N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)			Polyphaser / 1000860	N/A	
PDU FOR TMAS (QTY/MODEL) usually per site			LGP 12104 (1900 AND 850 Bypass TMA)	N/A	
SURGE ARRESTOR (QTY/MODEL)			N/A	1 / Polyphaser / 1000860	
DIPLEXER (QTY/MODEL)			0 + 2 / Powerwave / LGP 21901	2 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)			N/A	N/A	
DUPLEXER (QTY/MODEL)			N/A	N/A	
FILTER (QTY/MODEL)			N/A	N/A	
RXAIT KIT MODULE?			N/A	N/A	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)			N/A	N/A	
SCPA/MCPA MODULE?			Powerwave	N/A	
Additional Component1			N/A	N/A	
Additional Component2			Daisy chain to ANT4	Daisy chain to CILOC from ANT4	
Additional Component3			-14 °	-14 °	
MAGNETIC DECLINATION			TBD | TBD	TBD | TBD	
HATCHPLATE POWER (Watts)			TBD | TBD	TBD | TBD	
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - BETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD		TxRx / Rx | TxRx / TxRx	TxRx / TxRx | TxRx / TxRx	
TECHNOLOGY	LTE / 700		UMTS / 850 | UMTS / MC 1900	GSM / 850 | GSM / 1900	
RRH LOCATION (Top/Bottom/None)	TOP				
FEEDERS TYPE	er & 2 DC cables with RAYCAP kit		1 5/8" - CommScope	1 5/8" - CommScope	
Feeder Length (feet)			160 '	160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	P65-16-XLH-RR		7770	7770	
ANTENNA VENDOR	Powerwave		Powerwave	Powerwave	
ANTENNA SIZE (H x W x D)	72.0 x 12.0 x 6.0		55.0 x 11.0 x 5.0	55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	64		35	35	
ANTENNA GAIN	14.0 dBi		13.5 dBi | 16.5 dBi	13.5 dBi | 16.5 dBi	
AZIMUTH	150 °		100 °	100 °	
RADIATION CENTER (feet)	135 '		71 '	71 '	
ANTENNA TIP HEIGHT	138 '		73 '	73 '	
ELECTRICAL TILT (700/850/1900/AWS)	8 °		2 ° | 2 °	2 ° | 0 °	
MECHANICAL DOWNTILT	0 °		0 °	2	
FEEDER AMOUNT			2	1 / Powerwave / 7020 (DB)	
Antenna RET Motor (QTY/MODEL)	N/A / Powerwave / Built-in RET Equipment		1 / Powerwave / 7020 (DB)		
Antenna RET Splitter (QTY/MODEL)	N/A				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A				
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)			N/A	N/A	
TMA/LNA (TYPE/MODEL)	2 Ericsson RRU (S/L)		2 / Powerwave / LGP 21401 (Dual Band -	N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)			Polyphaser / 1000860	N/A	
PDU FOR TMAS (QTY/MODEL) usually per site			LGP 12104 (1900 AND 850 Bypass TMA)	N/A	
SURGE ARRESTOR (QTY/MODEL)			N/A	1 / Polyphaser / 1000860	
DIPLEXER (QTY/MODEL)			0 + 2 / Powerwave / LGP 21901	2 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)			N/A	N/A	
DUPLEXER (QTY/MODEL)			N/A	N/A	
FILTER (QTY/MODEL)			N/A	N/A	
RXAIT KIT MODULE?			N/A	N/A	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)			N/A	N/A	
SCPA/MCPA MODULE?			Powerwave	N/A	
Additional Component1			N/A	N/A	
Additional Component2			Daisy chain to ANT4	Daisy chain to CILOC from ANT4	
Additional Component3			-14 °	-14 °	
MAGNETIC DECLINATION			TBD | TBD	TBD | TBD	
HATCHPLATE POWER (Watts)			TBD | TBD	TBD | TBD	
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - GAMMA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TX/RX?	TBD		TxRx / Rx | TxRx / TxRx	TxRx / TxRx | TxRx / TxRx	
TECHNOLOGY	LTE / 700		UMTS / 850 | UMTS / MC 1900	GSM / 850 | N/A	
RRH LOCATION (Top/Bottom/None)	TOP				
FEEDERS TYPE	er & 2 DC cables with RAYCAP kit		1 5/8" - CommScope	1 5/8" - CommScope	
Feeder Length (feet)			160 '	160 '	
ANTENNA ATOLL					
ANTENNA MAKE - MODEL	P65-16-XLH-RR		7770	7770	
ANTENNA VENDOR	Powerwave		Powerwave	Powerwave	
ANTENNA SIZE (H x W x D)	72.0 x 12.0 x 6.0		55.0 x 11.0 x 5.0	55.0 x 11.0 x 5.0	
ANTENNA WEIGHT	64		35	35	
ANTENNA GAIN	14.0 dBi		13.5 dBi | 16.5 dBi	13.5 dBi | 16.5 dBi	
AZIMUTH	270 °		250 °	250 °	
RADIATION CENTER (feet)	135 '		71 '	71 '	
ANTENNA TIP HEIGHT	138 '		73 '	73 '	
ELECTRICAL TILT (700/850/1900/AWS)	2 °		4 ° | 2 °	4 ° | 2 °	
MECHANICAL DOWNTILT	0 °		0 °	0 °	
FEEDER AMOUNT			2	2	
Antenna RET Motor (QTY/MODEL)	N/A / Powerwave / Built-in RET Equipment		1 / Powerwave / 7020 (DB)	1 / Powerwave / 7020 (DB)	
Antenna RET Splitter (QTY/MODEL)	N/A				
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)	N/A				
Antenna RET Surge Arrestor (QTY/MODEL)					
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site					
DC BLOCK (QTY/MODEL)			N/A	N/A	
TMA/LNA (TYPE/MODEL)	2 Ericsson RRU (S/L)		2 / Powerwave / LGP 21401 (Dual Band -	N/A	
CURRENT INJECTORS FOR TMA (QTY/MODEL)			Polyphaser / 1000860	N/A	
PDU FOR TMAS (QTY/MODEL) usually per site			LGP 12104 (1900 AND 850 Bypass TMA)	N/A	
SURGE ARRESTOR (QTY/MODEL)			N/A	1 / Polyphaser / 1000860	
DIPLEXER (QTY/MODEL)			0 + 2 / Powerwave / LGP 21901	2 + 2 / Powerwave / LGP 21901	
HYBRID COMBINER (QTY/MODEL)			N/A	N/A	
DUPLEXER (QTY/MODEL)			N/A	N/A	
FILTER (QTY/MODEL)			N/A	N/A	
RXAIT KIT MODULE?			N/A	N/A	
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)			N/A	N/A	
SCPA/MCPA MODULE?			Powerwave	N/A	
Additional Component1			N/A	N/A	
Additional Component2			Daisy chain to ANT4	Daisy chain to CILOC from ANT4	
Additional Component3			-14 °	-14 °	
MAGNETIC DECLINATION			TBD | TBD	TBD | TBD	
HATCHPLATE POWER (Watts)			TBD | TBD	TBD | TBD	
ERP (Watts)					
Local Market Note1					
Local Market Note2					
Local Market Note3					

Section 16D - NEW/PROPOSED SECTOR/CELL INFORMATION - DELTA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 16E - NEW/PROPOSED SECTOR/CELL INFORMATION - EPSILON

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

Section 16F - NEW/PROPOSED SECTOR/CELL INFORMATION - ZETA

ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)		ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TX/RX?										
TECHNOLOGY										
RRH LOCATION (Top/Bottom/None)										
FEEDERS TYPE										
Feeder Length (feet)										
ANTENNA ATOLL										
ANTENNA MAKE - MODEL										
ANTENNA VENDOR										
ANTENNA SIZE (H x W x D)										
ANTENNA WEIGHT										
ANTENNA GAIN										
AZIMUTH										
RADIATION CENTER (feet)										
ANTENNA TIP HEIGHT										
ELECTRICAL TILT (700/850/1900/AWS)										
MECHANICAL DOWNTILT										
FEEDER AMOUNT										
Antenna RET Motor (QTY/MODEL)										
Antenna RET Splitter (QTY/MODEL)										
Antenna RET Earth (Grounding) Clamp (QTY/MODEL)										
Antenna RET Surge Arrestor (QTY/MODEL)										
Antenna RET CONTROL UNIT (QTY/MODEL) usually per site										
DC BLOCK (QTY/MODEL)										
TMA/LNA (TYPE/MODEL)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)										
PDU FOR TMAS (QTY/MODEL) usually per site										
SURGE ARRESTOR (QTY/MODEL)										
DIPLEXER (QTY/MODEL)										
HYBRID COMBINER (QTY/MODEL)										
DUPLEXER (QTY/MODEL)										
FILTER (QTY/MODEL)										
RXAIT KIT MODULE?										
TRIPLEXER or NARROW BAND LLC (QTY/MODEL)										
SCPA/MCPA MODULE?										
Additional Component1										
Additional Component2										
Additional Component3										
MAGNETIC DECLINATION										
HATCHPLATE POWER (Watts)										
ERP (Watts)										
Local Market Note1										
Local Market Note2										
Local Market Note3										

P65-16-XLH-RR ⋮ Dual Broadband Antennas

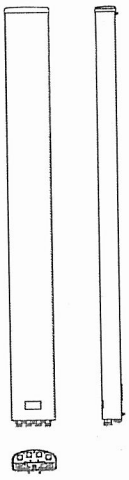
POLARIZATION: Dual linear ±45°
FREQUENCY (MHz): 698-894, 1710-2170
HORIZONTAL BEAM WIDTH (°): 65, 65
GAIN (dBi/dBd): 15.5/13.4 17.5/15.4
TILT: 1-12, 0-8
LENGTH: 72"

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	698-894		1710-2170		
Frequency band (MHz)	698-806	806-894	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	14.8/12.7	15.5/13.4	16.9/14.8	17.2/15.1	17.5/15.4
Polarization	Dual Linear +/- 45			Dual Linear +/- 45	
Nominal Impedance (Ω)	50			50	
VSWR	< 1.5:1			< 1.5:1	
Horizontal beam width, -3 dB (°)	66	65	60	63	63
Vertical beam width, -3 dB (°)	14.7	12.5	6.8	6.4	5.7
Electrical down tilt (°)	1 to 12			0 to 8	
Side lobe suppression, vertical 1st upper (dB)	> 16	>16	> 16		
	>16	>16			
Isolation between inputs (dB)	> 30	> 30	> 30	> 30	
Inter band Isolation (dB)	> 40			> 40	
Tracking, horizontal plane ±60° (dB)	< 2		< 2	< 2	< 2
First null fill (dB)			>-20	>-20	>-20
Vertical beam squint (°)	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Front to back ratio (dB) 180°±30° copolar	>24	>24	> 30	>30	>28
Front to back ratio (dB) 180°±30° total power					
Cross polar discrimination (XPD) 0° (dB)	> 15	> 15	> 15	> 15	> 15
Cross polar discrimination (XPD) ±60° (dB)	> 10	> 10	> 10	> 10	> 10
Far field coupling					
IM3, 2xTx@43dBm (dBc)	<-153			<-153	
IM7, 2xTx@43dBm (dBc)					
Power handling, average per input (W)	500			250	
Power handling, average total (W)	1000			500	

MECHANICAL SPECIFICATIONS*

Connector	4 X 7/16 DIN Female, IP67
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 6" (1829 x 305 x 152)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	29 (64)
Weight, without brackets, kg (lbs)	24 (53)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	150 (67)
Lightning protection	DC Ground
Operating Temperature	-40C to +60C
Radome material	PVC, IP55
Packet size, HxWxD, mm (ft)	87" x 16" x 10" (2225 x 400 x 225)
Radome colour	Light Grey
Shipping weight, kg (lbs)	34 (75)
RET	iRET AISGv1.1, MET and AISGv2.0
Brackets	7256.00, 7454.00



*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visit http://www.powerwave.com/rpa/.

7770.00A DBB90 Broadband Cross Polarized

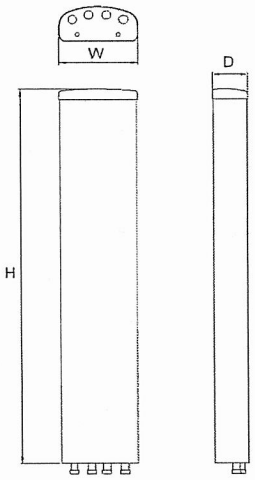
POLARIZATION: XX-Pol
FREQUENCY (MHz): 824-896, 1710-2170
HORIZONTAL BEAM WIDTH (°): 90
GAIN (dBi/dBd): 13.5/11.4, 15.5/13.4
TILT: MET
LENGTH: 1.4m (4'7")

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	824-896	1710-2170		
Frequency band (MHz)	824-896	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	13.5/11.4	15.5/13.4	15.5/13.4	15.5/13.4
Polarization	Dual linear ±45°		Dual linear ±45°	
Nominal Impedance (Ω)	50		50	
VSWR	<1.5:1		<1.5:1	
Horizontal beam width, -3 dB (°)	85	90	90	90
Vertical beam width, -3 dB (°)	15	7	7	7
Electrical down tilt (°)	0 to 10		0 to 8	
Side lobe suppression, vertical 1st upper (dB)	>18	>18	>18	>18
Isolation between inputs (dB)	>30	>30	>30	>25
Inter band Isolation (dB)	>36		>36	
Tracking, horizontal plane ±60° (dB)	<2	<2	<2	<2
First null fill (dB)	-	-	-	-
Vertical beam squint (°)	<1.0	<0.5	<0.5	<0.5
Front to back ratio (dB) 180°±30° copolar	>25	>25	>25	>25
Front to back ratio (dB) 180°±30° total power	>22	>21	>21	>21
Cross polar discrimination (XPD) 0° (dB)	-	-	-	-
Cross polar discrimination (XPD) ±60° (dB)	>10	>10	>10	>10
Far field coupling	-	-	-	-
IM3, 2xTx@43dBm (dBc)	<-153		<-153	
IM7, 2xTx@43dBm (dBc)	-		<-160	
Power handling, average per input (W)	500		250	
Power handling, average total (W)	800		500	

MECHANICAL SPECIFICATIONS*

Connector	4 x 7/16 DIN Female
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	1408x280x125mm
Mounting	Pre-mounted heavy duty brackets
Weight, with brackets, kg (lbs)	17.6 (39)
Weight, without brackets, kg (lbs)	12.1 (27)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	415
Maximum operational wind speed, m/s (mph)	42 (93)
Survival wind speed, m/s (mph)	55 (123)
Lightning protection	DC grounded
Operating Temperature	-40°C to +60°C
Radome material	GRP
Package size, HxWxD, mm (ft)	1550x355x255 (61"x1'2"x10")
Radome colour	Light Grey
Shipping weight, kg (lbs)	21.5 (47.4)
RET	8220.10, 8220.40, 8210.10, 8210.40
Brackets	7256.00, 7454.00

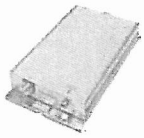


*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visithttp://www.powerwave.com/rpa/.

Tower Mounted Amplifier



1900/850 MHz

Technical Specifications

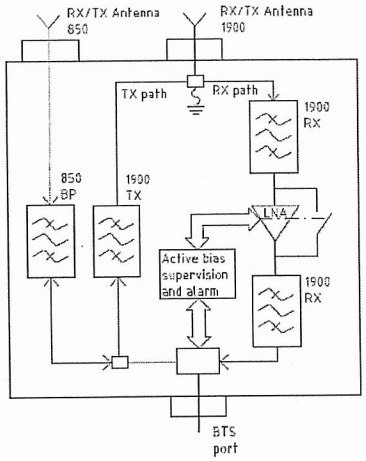
Product Number	LGP214nn	
850 MHz	Bypass (MHz)	824-894
	Return loss* (dB)	> 20
	Insertion loss* (dB)	< 0.3
1900 MHz		
Up-link	Frequency range, full band (60 MHz)	1850-1910
	Nominal gain (dB)	12
	Return loss* (dB)	> 20
	Noise figure* (dB)	< 1.7
	Output 3rd order Intercept Point* (dBm)	> +23
Down-link	Frequency range, full band (60 MHz)	1930-1990
	Insertion loss* (dB)	< 0.6
	Return loss* (dB)	> 20
Intermodulation	2 Tx@x43 dBm (dBc)	<-158
Alarm Functionality	Two levels,individually supervised LNAs	
Power Consumption	@12 VDC	1.2 W

* Typical

All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

Mechanical Specifications

Size,W x H x D (without mounting plate)	235 x 366 x 66 mm (9.2 x 14.4 x 2.6 in)
Weight	6.4 kg (14.1 lbs)
Color	Off white (NCS 1502-R)
Housing	Aluminum
RF-connectors	DIN 7/16 female.
Mounting kit	Mounting kit for pole and wall is included
Temperature range	-40 °C to +65 °C (-40 °F to +149 °F)
MTBF	>1 million hours
Safety	UL 60 950
Ingress protection, IP 65	EN 60 529
Environmental	ETS 300 019
EMC	FCC Part 15



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Powerwave technologies

COVERAGE AND CAPACITY | TECHNOLOGY LEADERSHIP | GLOBAL PARTNER | INTEGRATED SOLUTIONS | QUALITY AND RELIABILITY

P65-16-XLH-RR Dual Broadband Antennas

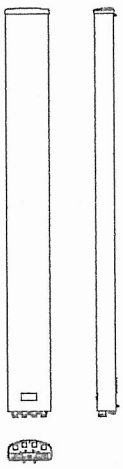
POLARIZATION: Dual linear ±45°
FREQUENCY (MHz): 698-894, 1710-2170
HORIZONTAL BEAM WIDTH (°): 65, 65
GAIN (dBi/dBd): 15.5/13.4 17.5/15.4
TILT: 1-12, 0-8
LENGTH: 72"

ELECTRICAL SPECIFICATIONS*

Frequency range (MHz)	698-894		1710-2170		
Frequency band (MHz)	698-806	806-894	1710-1880	1850-1990	1900-2170
Gain (dBi/dBd)	14.8/12.7	15.5/13.4	16.9/14.8	17.2/15.1	17.5/15.4
Polarization	Dual Linear +/- 45			Dual Linear +/- 45	
Nominal Impedance (Ω)	50			50	
VSWR	< 1.5:1			< 1.5:1	
Horizontal beam width, -3 dB (°)	66	65	60	63	63
Vertical beam width, -3 dB (°)	14.7	12.5	6.8	6.4	5.7
Electrical down tilt (°)	1 to 12			0 to 8	
Side lobe suppression, vertical 1st upper (dB)	> 16	>16	> 16		
	>16	>16			
Isolation between inputs (dB)	> 30	> 30	> 30	> 30	
Inter band Isolation (dB)	> 40			> 40	
Tracking, horizontal plane ±60° (dB)	< 2		< 2	< 2	< 2
First null fill (dB)			>-20	>-20	>-20
Vertical beam squint (°)	< 0.8	< 0.8	< 0.5	< 0.5	< 0.5
Front to back ratio (dB) 180°±30° copolar	>24	>24	> 30	>30	>28
Front to back ratio (dB) 180°±30° total power					
Cross polar discrimination (XPD) 0° (dB)	> 15	> 15	> 15	> 15	> 15
Cross polar discrimination (XPD) ±60° (dB)	> 10	> 10	> 10	> 10	> 10
Far field coupling					
IM3, 2xTx@43dBm (dBc)	<-153			<-153	
IM7, 2xTx@43dBm (dBc)					
Power handling, average per input (W)	500			250	
Power handling, average total (W)	1000			500	

MECHANICAL SPECIFICATIONS*

Connector	4 X 7/16 DIN Female, IP67
Connector position	Bottom
Dimensions, HxWxD, mm (ft)	72" x 12" x 6" (1829 x 305 x 152)
Mounting	Pre-mounted Tilt Brackets
Weight, with brackets, kg (lbs)	29 (64)
Weight, without brackets, kg (lbs)	24 (53)
Wind load, frontal/lateral/rear side 42 m/s Cd=1.6 (N)	1380
Maximum operational wind speed, m/s (mph)	100 (45)
Survival wind speed, m/s (mph)	150 (67)
Lightning protection	DC Ground
Operating Temperature	-40C to +60C
Radome material	PVC, IP55
Packet size, HxWxD, mm (ft)	87" x 16" x 10" (2225 x 400 x 225)
Radome colour	Light Grey
Shipping weight, kg (lbs)	34 (75)
RET	iRET AISGv1.1, MET and AISGv2.0
Brackets	7256.00, 7454.00A



*All specifications subject to change without notice. Please contact your Powerwave representative for complete performance data.

ANTENNA PATTERNS*

For detailed patterns visit http://www.powerwave.com/rpa/.

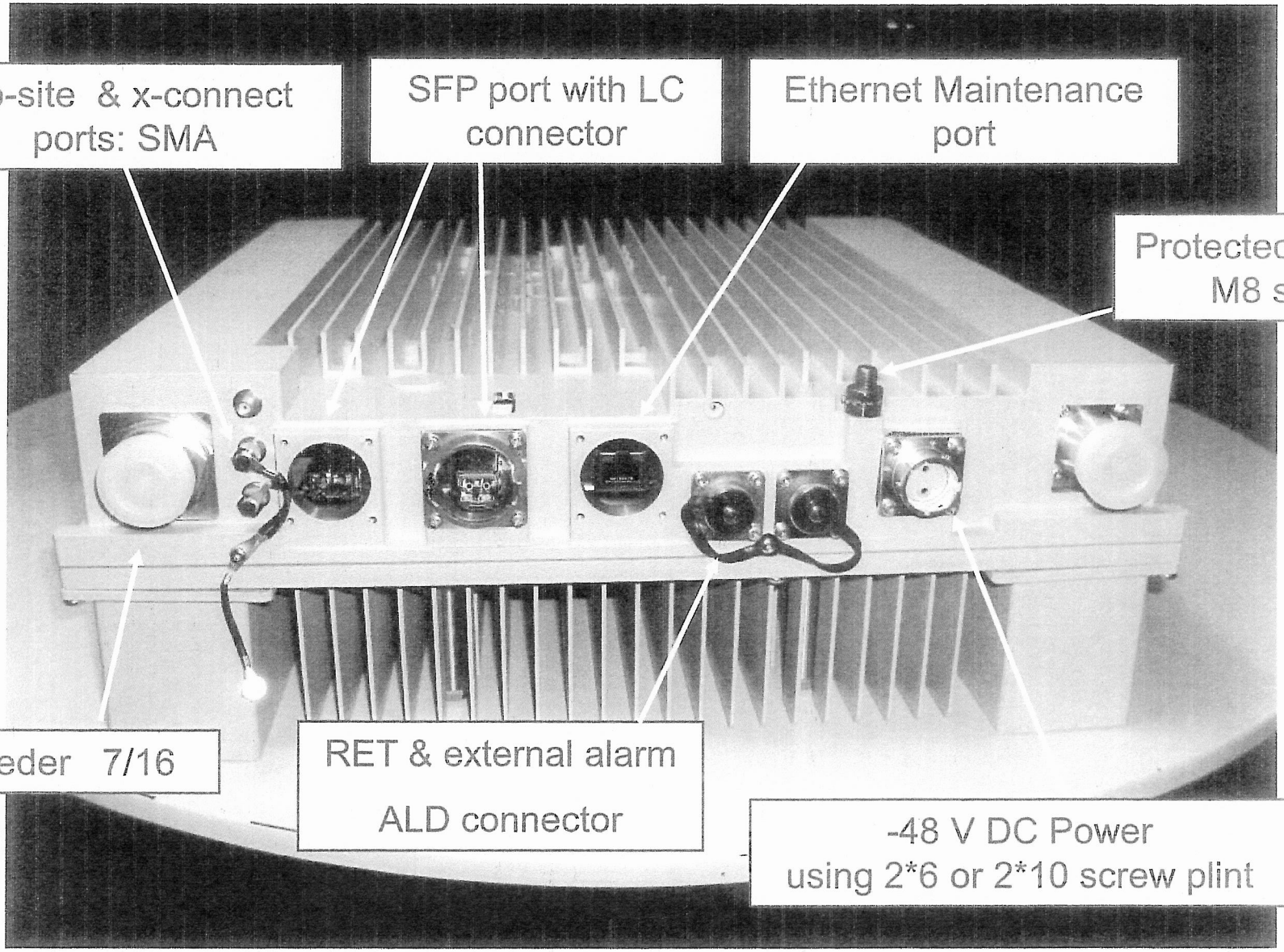
RRUS 11 – Dual PA RRU.

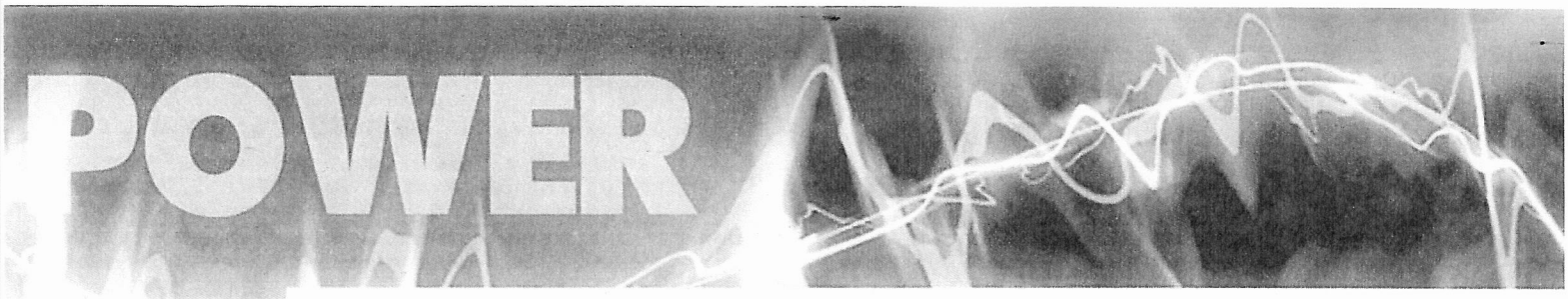
Technical Data

RBS6000

- Multi standard
- RF: 2x30 Watts
- Carrier BW: 1.4 – 20 MHz
- Alarms: 2
- Dimensions (with sunshield):
  - Width: 17.0 in
  - Height: 17.8 in
  - Depth: 7.2 in
  - Weight: 55 lbs (Band 12)
  - Weight: 50 lbs (Band 4)
- Temperature: -40 to +131 F
- Cooling: Self convection
- Power: -48 VDC
- Rec. fuse size 20 Amp
  - Rec. DC cable:
    6 mm^2 up to 60 meters
    10 mm^2 over 60 meters
    Shielded
- Power Cons: 200 Watts typ.

RRUS-11 I/F





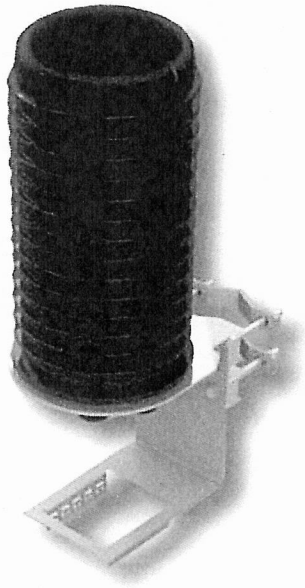
DC6-48-60-18-8F

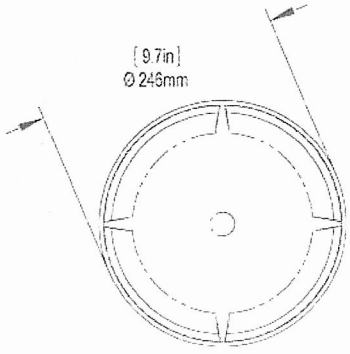
DC Surge Suppression Solution

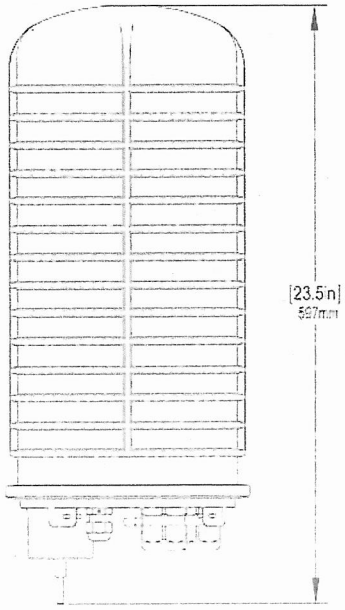
The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.

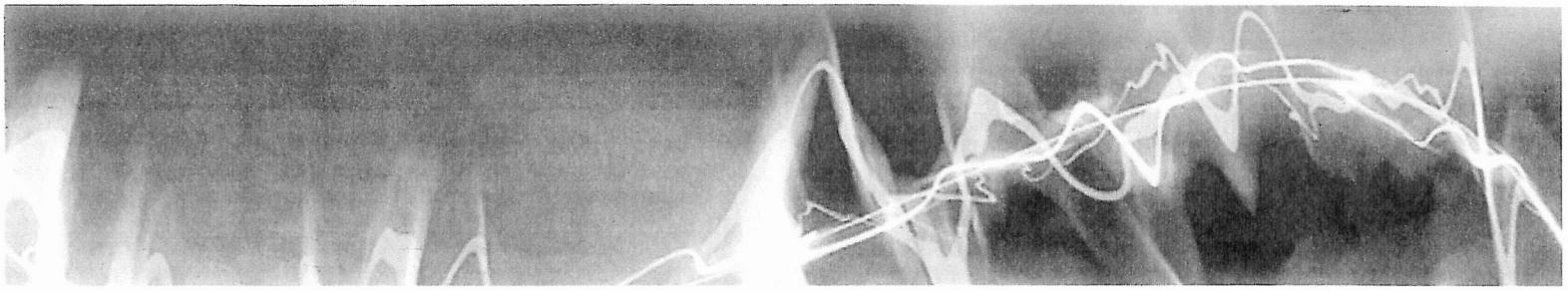






Raycap

Phone 208.777.1166 Toll Free 800.890.2569 Fax 208.777.4466 www.raycapsurgeprotection.com



DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 µs
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 µs
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 – 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)

GS-07F-0435V

Certified to ISO 9001:2000

TÜV Rheinland of North America

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New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067-3900
Phone: (860) 463-5511
Fax: (860) 513-7190

Douglas L. Culp
Real Estate Consultant

May 6, 2011

Honorable Peter Tesei
1st Selectman, Town of Greenwich
Greenwich Town Hall
101 Field Point Road
Greenwich, CT 06830

Re: Telecommunications Facility – 5 Perryridge Road Greenwich, CT

Dear First Selectman Tesei:

In order to accommodate technological changes, implement Uniform Mobile Telecommunications System ("UMTS") and Long Term Evolution ("LTE") capabilities, and enhance system performance in the State of Connecticut, New Cingular Wireless PCS, LLC ("AT&T") will be changing its equipment configuration at certain cell sites.

As required by Regulations of Connecticut State Agencies ("R.C.S.A.") Section 16-50j-73, the Connecticut Siting Council has been notified of the changes and will review AT&T's proposal. Please accept this letter as notification under Section 16-50j-73 of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2).

The accompanying letter to the Siting Council fully describes Cingular's proposal for the referenced cell site. However, if you have any questions or require any further information on our plans or the Siting Council's procedures; please call me at (860) 463-5511 or Ms. Linda Roberts, Executive Director, Connecticut Siting Council at (860) 827-2935.

Sincerely,

Douglas L. Culp
Real Estate Consultant

Enclosure