

Northeast Site Solutions Denise Sabo 199 Brickyard Rd Farmington, CT 06032 860-209-4690 denise@northeastsitesolutions.com

June 30, 2016

Members of the Siting Council Connecticut Siting Council Ten Franklin Square New Britain, CT 06051

RE: Notice of Exempt Modification 99 Meadow Street, Hartford CT 06114

> Latitude: 41.743197 Longitude: -72.667500

T-Mobile Site#: CT11661D\_L1900

#### Dear Ms. Bachman:

T-Mobile currently maintains nine (6) antennas at the 123-foot level of the existing 147-foot monopole at 99 Meadow Street, Hartford CT 06120. The tower is owned by American Tower Corporation. The property is owned by Meadow Street Realty LLC. T-Mobile now intends to add three (3) new 1900 MHz antenna. The antenna would be installed at the 123-foot level of the tower. T-Mobile also intends to add (1) hybrid line.

#### **Planned Modifications:**

Remove: NONE

Remove and Replace: NONE

#### **Install New:**

(3)AIR32 B4A/B2P Antenna

(1) 1-5/8" Fiber Line

#### Existing to Remain:

- (3)Katherine Smart Bias Tee
- (3) Commscope LNX-6515-VTM Antenna
- (3) RFS APX16DWV-16DWVS-VTM
- (3) Ericsson KRY 112 489/1
- (3) Ericsson KRY 112 144/1
- (12) 1-5/8" Coax
- (3) RRU Mounted on Ground



This facility was approved by the City of Hartford PZC. The city file is no longer available – See attached letter from the City Planner.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16- SOj-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-SOj-73, a copy of this letter is being sent to Mayor Luke Bronin, Elected Official for the City of Hartford, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

- 1. The proposed modifications will not result in an increase in the height of the existing structure.
- 2. The proposed modifications will not require the extension of the site boundary.
- 3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
- 4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
- 5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
- 6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

#### Denise Sabo

Mobile: 860-209-4690 Fax: 413-521-0558

Office: 199 Brickyard Rd, Farmington, CT 06032 Email: denise@northeastsitesolutions.com

#### Attachments

cc: Luke Bronin- Mayor - as elected official

American Tower Corporation - as tower owner

Meadow Street Realty LLC - as property owner

# Exhibit A



## CITY OF HARTFORD

### DEPARTMENT OF DEVELOPMENT SERVICES

Planning and Economic Development Division 250 Constitution Plaza, 4<sup>th</sup> Floor Hartford, Connecticut 06103

> Telephone: (860) 757- 9025 Fax: (860) 722-6402 www.hartford.gov



June 7, 2016

Denise Sabo Northeast Site Solutions 54 Main Street Unit 3 Sturbridge MA 01566

RE: 123 Meadow Street (a.k.a 99 Meadow Street)

Dear Ms. Sabo:

In response to your inquiry regarding cell towers at 123 Meadow Street, the Planning Division did not find any original zoning approvals. However, a Certificate of Occupancy was found for the use of cell towers. Building permits indicate that the use of cell towers currently exists on the subject property.

Please feel free to contact me at 860-757-9055, should you have any questions.

Sincerely.

Lynda Crespo,

Administrative Assistant

# Exhibit B

6/9/2016 Summary

HOME SEARCH SUMMARY INTERIOR **EXTERIOR** SALES

Printable Record Card | Previous Assessment | Condo Info I Zoning I Vohoo Man I

#### Card 1 of 1

#### Location 0099 MEADOW ST HARTFORD

Address 99 MEADOW ST

Parcel ID 275-690-115

#### **Current Property Mailing Address**

Owner MEADOW STREET REALTY LLC

City HARTFORD

State CT

Zip 06114-1506

**Zoning ID-1** 

#### **Current Property Sales Information**

Sale Date 4/7/2000

Legal Reference 04225-0189

Sale Price 0

Grantor(Seller) MEADOW STREET REA

### **Two Year Prior Assessment History**

Fiscal Year 2013 **Property Use 242** Total Value 442,680

Fiscal Year 2014 **Property Use 242** 

Total Value 402,430

#### **Current Property Assessment**

Fiscal Year 2015 Land Area 2.850 acres Building Value 160,790 Land Value 234,640 Total Value 402,430

#### 2011 Grand List Revaluation Fair Market Value

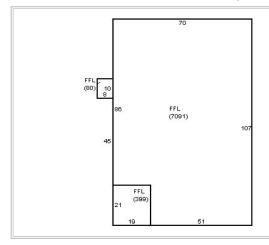
574,900

#### **Narrative Description**

This property contains 2.850 acres of land mainly classified as AUTO REPAIR with a(n) Al SERVICE style building, built about 1979, having Conc Block exterior and Asphalt roof c with 0 unit(s), 0 total room(s), 0 total bedroom(s), 0 total bath(s), 0 total half bath(s), 0 tota bath(s).

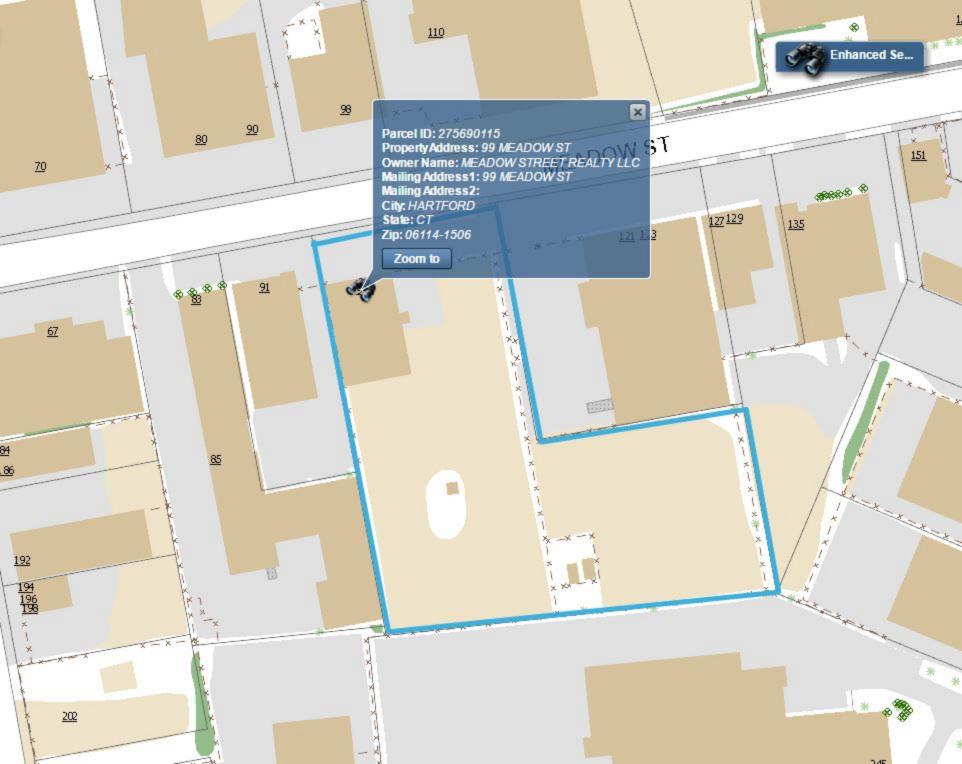
### **Legal Description**

### **Click Property Images to Enlarge**





6/9/2016 Summary



# Exhibit C



# T-MOBILE NORTHEAST LLC

SITE #: CT11661A

SITE NAME: HARTFORD SOUTH 2/FRNKLN AV.

SITE ADDRESS: 99 MEADOW STREET HARTFORD, CT 06114 WIRELESS BROADBAND FACILITY **CONSTRUCTION DRAWINGS** (794DB CONFIGURATION)

## VICINITY MAP



#### DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

CALL BEFORE YOU DIG:

RECLAIMED WATER

CALL THREE WORKING DAYS PRIOR TO DIGGING SAFETY PRECAUTIONS SHALL BE IMPLEMENTED BY CONTRACTOR(S) AT AL TRENCHING IN ACCORDANCE WITH CURRENT OSHA STANDARDS.

COLOR CODE FOR UTILITY LOCATIONS

FLECTRIC - RED GAS/OIL - YELLOW PROPOSED EXCAVATION - WHITE TEL/CATV - ORANGE

WWW CRYD COM

#### CALL 800 922 4455, OR 811

UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR

GENERAL NOTES

3. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION ALL PERSONNEL INVOLVED WITH THE PROJECT

- THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES. RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY MUNICIPAL AND LITHLITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK, THE WORK COORDINATING ALL PORTIONS OF THE WORK UNDER CONTRACT. PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
- THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONSTRUCT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE
- . THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE T-MOBILE REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF THE CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES, THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXPENSIVE WORK, UNLESS DIRECTED IN
- THE SCOPE OF WORK SHALL INCLUDE FURNISHING OF ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
- . THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE
- 5. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT
- 7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS
- DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS. AND ADDENDUM OR CLARIFICATIONS AVAILABLE FOR THE USE BY

#### 9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR

- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ANY PERMITS AND INSPECTIONS WHICH ARE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY, OR LOCAL GOVERNMENT AUTHORITY
- 11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING ETC., DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY
- 12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT. DEBRIS. RUBBISH AND REMOVE FOUIPMENT NOT SPECIFIED. AS REMAINING ON PROPERTY, PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE
- 13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS, AS WELL AS THE LATEST EDITIONS OF ANY PERTINENT STATE SAFFTY REGULATIONS.
- 14. THE CONTRACTOR SHALL NOTIFY THE T-MOBILE REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE T-MOBILE REPRESENTATIVE.
- 15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC., ON THE JOB.
- 16. THE CONTRACTOR SHALL RETURN ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION AT THE COMPLETION OF WORK.
- 17. ATLANTIS DESIGN GROUP, INC. HAS NOT CONDUCTED A STRUCTURAL ANALYSIS FOR THIS PROJECT AND DOES NOT ASSUME ANY LIABILITY FOR THE ADEQUACY OF THE STRUCTURE AND COMPONENTS.

## SITE INFORMATION

SITE NUMBER: HARTFORD SOUTH 2/FRNKLN AV. SITE NAME: 99 MEADOW STREET SITE ADDRESS:

HARTFORD, CT 06114

LAT./LONG.: N 41.743198 / W -72.667564

JURISDICTION CITY OF HARTFORD , CT

PROPERTY OWNER: BRUCE HOFFMASTER PROJECT MANAGER - SITE DEVELOPMENT

AMERICAN TOWER CORPORATION MOBILE 484-942-6339 BRUCE.HOFFMASTER@AMERICANTOWER.COM

## PROJECT SUB-CONTRACTORS

T-MORILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH

BLOOMFIELD, CT 06002 (860) 692-7100

PROJECT MANAGER LISA LIN ALLEN

NORTHEAST SITE SOLUTIONS 54 MAIN STREET STURBRIDGE, MA 01566 (508) 434-5237

ATLANTIS DESIGN GROUP INC.

54 JACQUELINE ROAD, SUITE #7 WALTHAM, MA 02452 (617)-852-3611

### CODE COMPLIANCE

#### CONNECTICUT STATE BUILDING CODE

2005 CONNECTICUT BUILDING CODE WITH 2013 AMENDMENT 2011 NATIONAL FLECTRICAL CODE

CONSTRUCTION TYPE: 2B USE GROUP:

### SHEET INDEX DESCRIPTION SHEET TITLE SHEET N-1 GENERAL AND ELECTRICAL NOTES A-1 SITE PLAN ELEVATION A-3 DETAILS GROUNDING AND COAX/FIBER DIAGRAM GROUNDING DETAILS

## T - Mobile

#### T-MOBILE NORTHEAST, LLC

35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 OFFICE: (860) 692-710 FAX:(860) 692-7159

## TLANTIS DESIGN GROUP, INC.

54 Jacqueline Road, Suite #7 Waltham, WA 02452 Phone number: 617–852–3611 Fax Number : 781–742–2247

	SUBMITTALS		
DATE	ATE DESCRIPTION		
05/09/16	issued for review	A	
05/23/16	FINAL CD	0	
06/14/16	REVISION	1	
06/15/16	FINAL CD	2	
06/27/16	REVISION	3	

DEPT.	DÁTE	APP'D	revisions
RFE			
RF WW.			
ZONING			
OPS			
CONSTR.			
SITE AC.			
	rfe rf Wan. Zoning	RFE RF WAN. ZONING OPS	RFE RF MAN. ZONING OPS

PROJECT NO:	CT11661A
DRAWN BY:	FG
CHECKED BY:	KM



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## SITE NUMBER

## CT11661A

SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET HARTFORD, CT 06114

SHEET TITLE

TITLE SHEET

SHEET NUMBER

| - '

#### **ELECTRICAL NOTES:**

- 1. INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, PLANT SERVICES AND ADMINISTRATIVE TASKS REQUIRED TO COMPLETE AND MAKE OPERABLE THE ELECTRICAL WORK SHOWN ON THE DRAWINGS. AND SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
- A. PREPARE AND SUBMIT SHOP DRAWINGS, DIAGRAMS AND ILLUSTRATIONS.
- B. PROCURE ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL REQUIRED FEES AND CHARGES IN CONNECTION WITH
- C SUBMIT AS-BUILT DRAWINGS OPERATING AND MAINTENANCE
- D. EXECUTE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING OF EXISTING OR NEWLY INSTALLED CONSTRUCTION
  REQUIRED FOR THE WORK OF THIS CONTRACT, FOR SLAB PENETRATIONS THROUGH POST TENSION SLABS, X-RAY EXACT AREA OF PENETRATION PRIOR TO PERFORMING WORK COORDINATE ALL X-RAY WORK WITH BUILDING ENGINEER.
  E. PROVIDE HANGERS, SUPPORTS, FOUNDATIONS, STRUCTURAL
- FRAMING SUPPORTS, AND BASES FOR CONDUIT AND FOUIPMENT PROVIDED OR INSTALLED LINDER THE WORK OF HIS CONTRACT. PROVIDE COUNTER FLASHING, SLEEVES AND SEALS FOR FLOOR AND WALL PENETRATIONS.
- . MAINTAIN ALL EXISTING ELECTRICAL SERVICES IN THE BUILDING AREAS NOT AFFECTED BY THE ALTERATION DURING TEMPORARY JUMPERS, CONDUITS, CAPS, PROTECTIVE DEVICES. CONNECTIONS AND EQUIPMENT REQUIRED. PROVIDE TEMPORARY LIGHT AND POWER FOR CONSTRUCTION
- 2. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IT IS NOT THE INTENT TO GIVE EVERY DETAIL ON THE DRAWINGS AND IN THE SPECIFICATIONS. IF AN ITEM OF WORK IS INDICATED IN THE DRAWINGS IT IS CONSIDERED SUFFICIENT MATERIAL AND FOUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION WHETHER OR I SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS.

#### GENERAL REQUIREMENTS

- 1. PROVIDE ALL WORK IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC) AND LOCAL AND STATE ELECTRICAL
- 2 THE ELECTRICAL PLANS ARE DIAGRAMMATIC ONLY REFER TO THE ARCHITECTURAL PLANS FOR THE EXACT DIMENSIONS OF THE BUILDING
- 3. LOAD CALCULATIONS ARE BASED ON EXISTING BUILDING INFORMATION/DRAWINGS PROVIDED TO ENGINEERING. CONTRACTOR IS TO VERIFY ALL EXISTING RATINGS AND LOADS PRIOR TO PURCHASING OF SPECIFIED FOUIPMENT FOR COMPLIANCE TO NEC. CONTRACTOR TO NOTIFY ENGINEER OF ANY DISCREPANCIES AND REQUEST FURTHER DIRECTION BY
- 4. EXISTING BUILDING EQUIPMENT IS NOTED ON THE DRAWINGS. NEW OR RELOCATED EQUIPMENT IS SHOWN WITH SOLID LINES. FUTURE FOUIPMENT (NOT IN THIS CONTRACT) IS DEPICTED WITH SHADED LINES. REQUEST CLARIFICATION OF DRAWINGS OR OF SPECIFICATIONS PRIOR TO PRICING OR INSTALLATION.
- A. AFTER CAREFULLY STUDYING THE DRAWINGS AND SPECIFICATIONS, AND BEFORE SUBMITTING THE PROPOSAL,
  MAKE A MANDATORY SITE VISIT TO ASCERTAIN CONDITIONS OF THE SITE, AND THE NATURE AND EXACT QUANTITY OF WORK TO BE PERFORMED NO EXTRA COMPENSATION WILL BE ALLOWED FOR FAILURE TO NOTIFY THE OWNER, IN WRITING, OF ANY DISCREPANCIES THAT MAY HAVE BEEN NOTED BETWEEN THE EXISTING CONDITIONS AND THE DRAWINGS AND SPECIFICATIONS.
- B. VERIFY ALL MEASUREMENTS AT THE SITE AND BE RESPONSIBLE FOR CORRECTNESS OF SAME QUALITY, WORKMANSHIP, MATERIALS AND SAFETY
- A. PROVIDE NEW MATERIALS AND EQUIPMENT OF A DOMESTIC MANUFACTURER BY THOSE REGULARLY ENGAGED IN THE PRODUCTION AND MANUFACTURE OF SPECIFIED MATERIALS AND EQUIPMENT. WHERE UL, OR OTHER AGENCY, HAS ESTABLISHED STANDARDS FOR MATERIALS. PROVIDE MATERIALS WHICH ARE LISTED AND LABELED ACCORDINGLY. THE COMMERCIALLY STANDARD ITEMS OF EQUIPMENT AND THE SPECIFIC NAMES MENTIONED HEREIN ARE INTENDED FOR THE PROPER FUNCTIONING OF THE WORK
- B. WORK SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE REQUIRED FOR THE WORK. INSTALL MATERIALS AND EQUIPMENT TO PRESENT A NEAT APPEARANCE WHEN COMPLETED AND IN ACCORDANCE WITH THE APPROVED RECOMMENDATIONS OF THE MANUFACTURER AND IN ACCORDANCE WITH CONTRACT DOCUMENTS.
- C. PROVIDE LABOR, MATERIALS, APPARATUS AND APPLIANCES
  ESSENTIAL TO THE FUNCTIONING OF THE SYSTEMS DESCRIBED OR INDICATED HEREIN, OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL WHENEVER MENTIONED IN THE
- D. MAKE WRITTEN REQUESTS FOR SUPPLEMENTARY INSTRUCTIONS TO ARCHITECT/ENGINEER IN CASE OF DOUBT AS TO WORK INTENDED OR IN EVENT OF NEED FOR EXPLANATION THEREOF.

  E. PERFORMANCE AND MATERIAL REQUIREMENTS SCHEDULED OR
- SPECIFIED ARE MINIMUM STANDARD ACCEPTABLE. THE RIGHT TO JUDGE THE QUALITY OF EQUIPMENT THAT DEVIATES FROM THE CONTRACT DOCUMENT REMAINS SOLELY WITH ARCHITECT/ENGINEER. CONTRACT DOCUMENT OR NOT.

GUARANTEE
1. GUARANTEE MATERIALS, PARTS AND LABOR FOR WORK FOR ONE YEAR FROM THE DATE OF ISSUANCE OF OCCUPANCY PERMIT.
DURING THAT PERIOD. MAKE GOOD FAULTS OR IMPERFECTIONS THAT MAY ARISE DUE TO DEFECTS OR OMISSIONS IN MATERIALS OR WORKMANSHIP WITH NO ADDITIONAL COMPENSATION AND AS

- 1. REMOVE ALL CONSTRUCTION DEBRIS RESULTING FROM THE
- WORK.
  2. CLEAN EQUIPMENT AND SYSTEMS FOLLOWING THE COMPLETION OF THE PROJECT TO THE SATISFACTION OF THE ENGINEER.

#### COORDINATION AND SUPERVISION

 CAREFULLY LAY OUT ALL WORK IN ADVANCE TO AVOID UNNECESSARY CUTTING, CHANNELING, CHASING OR DRILLING OF FLOORS, WALLS, PARTITIONS, CFILINGS OR OTHER SURFACES. WHERE SUCH WORK IS NECESSARY, HOWEVER, PATCH AND REPAIR THE WORK IN AN APPROVED MANNER BY SKILLED MECHANICS AT NO ADDITIONAL COST TO THE OWNER. RENDER FULL COOPERATION TO OTHER TRADES WHERE WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO WORK OF OTHER TRADES. ASSIST IN WORKING OUT SPACE CONDITIONS, IF WORK IS INSTALLED BEFORE COORDINATION WITH OTHER TRADES, OR CAUSES INTERFERENCE, MAKE CHANGES NECESSARY TO CORRECT CONDITIONS WITHOUT EXTRA CHARGE

1 AS-RUILT DRAWINGS.

FOUIPMENT AND SYSTEMS

- A. UPON COMPLETION OF THE WORK, FURNISH TO THE OWNER "AS-BUILT" DRAWINGS.
- A. UPON COMPLETION OF THE WORK, FULLY INSTRUCT T-MOBILE AS TO THE OPERATION AND MAINTENANCE OF ALL MATERIAL,
- B. PROVIDE 3 COMPLETE BOUND SETS OF INSTRUCTIONS FOR OPERATING AND MAINTAINING ALL SYSTEMS AND EQUIPMENT.

#### CUTTING AND PATCHING

- . PROVIDE ALL CUTTING, DRILLING, ROUGH AND FINISH PATCHING
- REQUIRED TO COMPLETE THE WORK.

  2. OBTAIN OWNER APPROVAL PRIOR TO CUTTING THROUGH FLOORS OR WALLS FOR PIPING OR CONDUIT.

#### TESTS, INSPECTION AND APPROVAL

- 515, INSPECTION AND APPROVAL

  1. BEFORE ENERGIZING ANY ELECTRICAL INSTALLATION, INSPECT
  EACH UNIT IN DETAIL. TIGHTEN ALL BOLTS AND CONNECTIONS
  (TORQUE—TIGHTEN WHERE REQUIRED) AND DETERMINE THAT ALL
  COMPONENTS ARE ALIGNED, AND THE EQUIPMENT IS IN SAFE,
- 2. PROVIDE THE COMPLETE ELECTRICAL SYSTEM FREE OF GROUND FAULTS AND SHORT CIRCUITS SUCH THAT THE SYSTEM WILL OPERATE SATISFACTORILY UNDER FULL LOAD CONDITIONS. WITHOUT EXCESSIVE HEATING AT ANY POINT IN THE SYSTEM.

#### SPECIAL REQUIREMENTS

- 1. DO NOT LEAVE ANY WORK INCOMPLETE NOR ANY HAZARDOUS SITUATIONS CREATED WHICH WILL AFFECT THE LIFE OR SAFETY OF THE PUBLIC AND/OR BUILDING OCCUPANTS DO NOT WITHOUT THE OWNER'S WRITTEN PERMISSION.
- 2. WHEN NECESSARY TO TEMPORARILY DISCONNECT ANY EXISTING BLIII DING UTILITIES AND SERVICE SYSTEMS, INCLUDING FEEDER OR BRANCH CIRCUITING SUPPLYING EXISTING FACILITIES, CONFER WITH THE OWNER AND ARRANGE THE PERIOD OF INTERRUPTION FOR A TIME MUTUALLY AGREED UPON. SHUTDOWN NOTE: SCHEDULE AND NOTIFY OWNER 48 HOURS PRIOR TO SHUTDOWN, ALL SHUTDOWN WORK TO BE SCHEDULED AT A TIME CONVENIENT TO OWNER.

- 1. ROUTE ALL GROUNDING CONDUCTORS AS SHOWN ON
- CONDUIT/GROUNDING RISER. 2. ROUTE 500 KCMIL CU. THHN CONDUCTOR FROM THE MGB LOCATION TO BUILDING STEEL VERIEY BUILDING STEEL IS EFFECTIVELY GROUNDED PER NEC TO THE MAIN SERVICE
- GROUNDING ELECTRODE CONDUCTOR (GEC).

  3. MAKE ALL GROUND CONNECTIONS FROM MGB TO ELECTRICAL EQUIPMENT WITH 2 HOLE, CRIMP TYPE, BURNDY COMPRESSION ERMINATIONS, SIZED AS REQUIRED.
- 4. USE 1 HOLE. CRIMP TYPE. BURNDY COMPRESSIONS TERMINATIONS, SIZED AS REQUIRED, AT EQUIPMENT GROUND CONNECTIONS
- 5. HIRE AN INDEPENDENT LAB TO PERFORM THE SPECIFIED OHMS TESTING. PROVIDE 4 SETS OF THE CERTIFIED DOCUMENTS TO THE OWNER FOR VERIFICATION PRIOR TO THE PROJECT COMPLETION.

- ALL WIRING TO BE INSTALLED IN CONDUIT SYSTEMS IN ACCORDANCE WITH THE FOLLOWING:
- A. EXTERIOR FEEDERS AND CONTROL, WHERE UNDERGROUND. TO BE IN SCH 40 PVC.

  B. EXTERIOR. ABOVE GROUND POWER CONDUITS TO BE
- GALVANIZED RIGID STEEL (RGS).
  C. ALL TELECOMMUNICATION CONDUITS, INTERIOR/EXTERIOR, TO
- D. INSTALL PULL ROPES IN ALL NEW EMPTY CONDUITS INSTALLED ON THIS PROJECT.

  E. ALL TELECOM CONDUITS AND PULL BOXES INSTALLED ON THIS PROJECT TO BE LABELED "T—MOBILE". OWNER WILL PROVIDE LABELS FOR CONTRACTOR TO INSTALL.
- F. INTERIOR FEEDERS TO BE INSTALLED IN E.M.T. WITH STEEL COMPRESSION FITTINGS
- G. MINIMUM SIZE CONDUIT TO BE 34" TRADE SIZE UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- H. FINAL CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT TO BE INSTALLED IN LIQUID-TIGHT FLEXIBLE METAL CONDUIT. I. CONDUIT TO BE RUN CONCEALED IN CEILINGS, FINISHED
- AREAS OR DRYWALL PARTITIONS, UNLESS OTHERWISE NOTED J. THE ROUTING OF CONDUITS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC, BEFORE INSTALLING ANY WORK, EXAMINE THE WORKING LAYOUTS AND SHOP DRAWINGS OF THE OTHER TRADES TO DETERMINE THE EXACT LOCATIONS AND
- K. ALL EXTERIOR MOUNTING HARDWARE TO BE GALVANIZED STEEL. COORDINATE WITH BUILDING ENGINEER PRIOR TO ATTACHING TO BUILDING STRUCTURE.

- RACEWAYS CONT'D
  L. PENETRATIONS OF WALLS, FLOORS AND ROOFS, FOR THE PASSAGE OF ELECTRICAL RACEWAYS, TO BE PROPERLY SEALED AFTER INSTALLATION OF RACEWAYS SO AS TO MAINTAIN THE STRUCTURAL OR WATERPROOF INTEGRITY OF THE WALL, FLOOR OR ROOF SYSTEM TO BE PENETRATED. SEAL ALL CONDUIT PENETRATIONS THROUGH FIRE OR SMOKE RATED WALLS. CEILINGS OR SMOKE TIGHT CORRIDOR PARTITIONS TO MAINTAIN PROPER RATING OF WALL OR
  - M. PROVIDE ALL CONDUIT ENDS WITH INSULATED METALLIC GROUNDING BUSHINGS.
    N. CONDUIT TO BE SUPPORTED AT MAXIMUM DISTANCE OF
  - 8'-0", OR AS REQUIRED BY NEC, IN HORIZONTAL AND
  - O. PROVIDE STAINLESS STEEL BLANK COVER PLATES FOR ALL JUNCTION BOXES AND/OR OUTLET BOXES NOT USED IN EXPOSED AREAS. PROVIDE ALL OTHER UNUSED BOXES WITH STANDARD STEEL COVER PLATES.
  - P. WHERE APPLICABLE, PROVIDE ROOFTOP CONDUIT SUPPORT SYSTEM, CONFORMING TO ROOFTOP WARRANTY REQUIREMENTS,

#### WIRES AND CABLES

- 1. CONTRACTOR TO COORDINATE WITH EQUIPMENT SUPPLIER AND VENDOR FOR EXACT EQUIPMENT OVER-CURRENT PROTECTION VOLTAGE, WIRE SIZE AND PLUG CONFIGURATION, IF APPLICABLE, PRIOR TO RID
- 2. ALL EQUIPMENT/DEVICES TO BE PROVIDED WITH INSULATED GROUND CONDUCTOR 3. ALL WIRE AND CABLE TO BE 600VOLT, COPPER, WITH THWN/
- THHN INSULATION, EXCEPT AS NOTED.

  4. WIRE FOR POWER AND LIGHTING WILL NOT BE LESS THAN NO.
- 12AWG, ALL WIRE NO. 8 AND LARGER TO BE STRANDED. 5. CONTROL WIRING IS NOT TO BE LESS THAN NO. 14AWG, FLEXIBLE IN SINGLE CONDUCTORS OR MULTI-CONDUCTOR CABLES, CONTROL WIRING WILL CONSIST OF MULTI-CONDUCTOR CABLES WHEREVER POSSIBLE, CABLES TO BE PROVIDED WITH AN OVERALL FLAME-RETARDANT, EXTRUDED JACKET AND RATED FOR PLENUM USE, ALL CONTROL WIRE TO BE 600VOLT RATED.
- 6. WIRE PREVIOUSLY PULLED INTO CONDUIT IS CONSIDERED USED AND IS NOT TO BE RE-PULLED
- 7. HOME RUNS AND BRANCH CIRCUIT WIRING FOR 20A, 120V CIRCUITS: LENGTH (FT.) HOME RUN WIRE SIZE
- NO. 12 NO. 10 101 TO 150 8. VOLTAGE DROP IS NOT TO EXCEED 3%.
- MAKE ALL CONNECTIONS WITH UL APPROVED, SOLDERLESS,
   PRESSURE TYPE INSULATED CONNECTORS: SCOTCHLOK OR AND APPROVED EQUAL.

## 1. ALL RECEPTACLES INSTALLED IN THIS PROJECT TO BE

- GROUNDING TYPE, WITH GROUNDING PIN SLOT CONNECTED TO DEVICE GROUND SCREW FOR GROUND WIRE CONNECTION. DISCONNECT SWITCHES AND FUSES

  1. DISCONNECT SWITCHES TO BE VOLTAGE—RATED TO SUIT THE
- CHARACTERISTICS OF THE SYSTEM FROM WHICH THEY ARE
- 2. PROVIDE HEAVY-DUTY, METAL-ENCLOSED, EXTERNALLY-OPERATED DISCONNECT SWITCHES, FUSED OR UNFUSED, OF SUCH TYPE AND SIZE AS REQUIRED TO PROPERLY PROTECT OR DISCONNECT THE LOAD FOR WHICH THEY ARE INTENDED.
- 3. PROVIDE NEMA 1 DISCONNECT SWITCHES FOR INTERIOR INSTALLATION. NEMA 3R FOR EXTERIOR INSTALLATION. 4. DISCONNECT SWITCHES TO BE MANUFACTURED BY
- A. GENERAL ELECTRIC COMPANY

## 5. PROVIDE RK-1 TYPE FUSES, UNLESS NOTED OTHERWISE.

- 1. INSTALL DISCONNECT SWITCHES WHERE INDICATED ON
- 2. INSTALL FUSES IN FUSIBLE DISCONNECT SWITCHES. FUSES MUST MATCH IN TYPE AND RATING.

  3. FUSES TO BE MOUNTED SO THAT THE LABELS SHOWING THEIR
- RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.

  4. FURNISH AND DEPOSIT SPARE FUSES AT THE JOB SITE AS
- A. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60A, USED FOR INITIAL FUSING.

  B. TEN PERCENT SPARES FOR EACH TYPE AND SIZE. UP TO
- AND INCLUDING 60A, USED FOR INITIAL FUSING. IN NO CASE WILL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND

#### **GENERAL NOTES:**

#### INTENT

- 1. THESE SPECIFICATIONS AND CONSTRUCTION DRAWINGS
  ACCOMPANYING THEM DESCRIBE THE WORK TO BE DONE AND
- THE MATERIALS TO BE FURNISHED FOR CONSTRUCTION.
  2. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO BE FULLY EXPLANATORY AND SUPPLEMENTARY. HOWEVER, SHOULD ANYTHING BE SHOWN, INDICATED, OR SPECIFIED ON ONE AND NOT THE OTHER, IT SHALL BE DONE THE SAME AS IF SHOWN, INDICATED OR SPECIFIED IN BOTH
- 3. THE INTENTION OF THE DOCUMENTS IS TO INCLUDE ALL LABOR
  AND MATERIALS REASONABLY NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK AS STIPULATED IN THE CONTRACT
- 4. THE PURPOSE OF THE SPECIFICATIONS IS TO INTERPRET THE INTENT OF THE DRAWINGS AND TO DESIGNATE THE METHOD OF THE PROCEDURE, TYPE AND QUALITY OF MATERIALS REQUIRED TO COMPLETE THE WORK.

  5. MINOR DEVIATIONS FROM THE DESIGN LAYOUT ARE ANTICIPATED AND SHALL BE CONSIDERED AS PART OF THE WORK. NO CHANGES THAT ALTER THE CHARACTER OF THE WORK WILL BE MADE OR PERMITTED BY THE OWNER WITHOUT ISSUING A

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATIONS OF ALL MEASUREMENTS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK, NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE CONSTRUCTION DRAWINGS. ANY SUCH DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO THE DWNER FOR CONSIDERATION BEFORE THE CONTRACTOR
- PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.

  2. THE BIDDER, IF AWARDED THE CONTRACT, WILL NOT BE ALLOWED ANY EXTRA COMPENSATION BY REASON OF ANY FULLY INFORMED THEMSELVES PRIOR TO THE BIDDING
- 3. NO PLEA OF IGNORANCE OF CONDITIONS THAT EXIST, OR OF DIFFICULTIES OR CONDITIONS THAT MAY BE ENCOUNTERED OR ANY OTHER RELEVANT MATTER CONCERNING THE WORK TO BE PERFORMED IN THE EXECUTION OF THE WORK WILL BE ACCEPTED AS AN EXCUSE FOR ANY FAILURE OR OMISSION ON THE PART OF THE CONTRACTOR TO FULFILL EVERY DETAIL OF ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS

#### CONTRACTS AND WARRANTIES

- 1. CONTRACTOR IS RESPONSIBLE FOR APPLICATION AND PAYMENT OF CONTRACTOR LICENSES AND BONDS.
- 2. SEE MASTER CONTRACTION SERVICES AGREEMENT FOR ADDITIONAL DETAILS.

1. ALL MATERIALS MUST BE STORED IN A LEVEL AND DRY FASHION AND IN A MANNER THAT DOES NOT NECESSARILY OBSTRUCT THE FLOW OF OTHER WORK. ANY STORAGE METHOD MUST MEET ALL RECOMMENDATIONS OF THE ASSOCIATED MANUFACTURER.

- THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH CAUSED BY THEIR EMPLOYEES AT WORK AND AT THE COMPLETION OF THE WORK, THEY SHALL REMOVE ALL RUBBISH FROM AND ABOUT THE BUILDING AREA, INCLUDING ALL THEIR TOOLS, SCAFFOLDING AND SURPLUS MATERIALS AND SHALL LEAVE THEIR WORK CLEAN AND READY TO USE.
- FXTFRIOR A. VISUALLY INSPECT EXTERIOR SURFACES AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER.
- B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM
- ADJACENT SURFACES.

  C. IF NECESSARY, TO ACHIEVE A UNIFORM DEGREE OF CLEANLINESS, HOSE DOWN THE EXTERIOR OF THE STRUCTURE.
- 3 INTERIOR A. VISUALLY INSPECT INTERIOR SURFACE AND REMOVE ALL TRACES OF SOIL, WASTE MATERIALS, SMUDGES AND OTHER FOREIGN MATTER FROM WALLS, FLOOR, AND CEILING.
- B. REMOVE ALL TRACES OF SPLASHED MATERIALS FROM ADJACENT SURFACES.
  C. REMOVE PAINT DROPPINGS, SPOTS, STAINS, AND DIRT FROM FINISHED SURFACES.

CHANGE ORDER PROCEDURE:

1. REFER TO SECTION 17 OF SIGNED MCSA: SEE PROFESSIONAL SERVICE AGREEMENT FOR MCSA.

#### RELATED DOCUMENTS AND COORDINATION

- LEATED DOCUMENTS AND CONCENTRATION.

  1. GENERAL CAPPENTRY, ELECTRICAL AND ANTENNA DRAWINGS ARE INTERRELATED, IN PERFORMANCE OF THE WORK, THE CONTRACTOR MUST REFER TO ALL DRAWINGS. ALL COORDINATION TO BE THE RESPONSIBILITY OF THE CONTRACTOR. SHOP DRAWINGS
- I. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AS REQUIRED AND LISTED IN THESE SPECIFICATIONS TO THE OWNER FOR
- 2. ALL SHOP DRAWINGS SHALL BE REVIEWED, CHECKED AND CORRECTED BY CONTRACTOR PRIOR TO SUBMITTAL TO THE

#### PRODUCTS AND SUBSTITUTIONS

- 1. SUBMIT 3 COPIES OF EACH REQUEST FOR SUBSTITUTION. IN EACH REQUEST, IDENTIFY THE PRODUCT OR FABRICATION OR INSTALLATION METHOD TO BE REPLACED BY THE SUBSTITUTION INCLUDE RELATED SPECIFICATION SECTION AND DRAWING NUMBERS AND COMPLETE DOCUMENTATION SHOWING COMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS
- CUMPLIANCE WITH THE REQUIREMENTS FOR SUBSTITUTIONS.

  SUBMIT ALL NECESSARY PRODUCT DATA AND CUT SHEETS
  WHICH PROPERLY INDICATE AND DESCRIBE THE ITEMS,
  PRODUCTS AND MATERIALS BEING INSTALLED. THE CONTRACTOR
  SHALL, IF DEEMED NECESSARY BY THE OWNER, SUBMIT ACTUAL SAMPLES TO THE OWNER FOR APPROVAL IN LIEU OF CUT

ARCHITECTURAL SYMBOLS

STORAGE

38

DETAIL REFERENCE KEY

- DRAWING DETAIL NUMBER-

EXISTING N.I.C.

LSHEET NUMBER OF DETAIL-

(3)-

REFER TO

RE: 2/A-3

#### QUALITY ASSURANCE

ADMINISTRATION

1. ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS. THESE SHALL INCLUDE, BUT NOT BE LIMITED TO THE APPLICABLE CODES SET FORTH BY THE LOCAL GOVERNING BODY. SEE "CODE COMPLIANCE" T-1.

## 1. BEFORE THE COMMENCEMENT OF ANY WORK, THE CONTRACTOR WILL ASSIGN A PROJECT MANAGER WHO WILL ACT AS A SINGLE POINT OF CONTACT FOR ALL PERSONNEL INVOLVED IN THIS PROJECT, THIS PROJECT MANAGER WILL DEVELOP A MASTER

- PROJECT. HIS PROJECT MANAGER WILL DEVELOP A MASTER SCHEDULE FOR THE PROJECT WHICH WILL BE SUBMITTED TO THE OWNER PRIOR TO THE COMMENCEMENT OF ANY WORK.

  2. SUBMIT A BAR TYPE PROGRESS CHART, NOT MORE THAN 3 DAYS AFTER THE DATE ESTABLISHED FOR COMMENCEMENT OF THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR THE WORK ON THE SCHEDULE, INDICATING A TIME BAR FOR EACH MAJOR CATEGORY OR UNIT OF WORK TO BE PERFORMED AT THE SITE, PROPERLY SEQUENCED AND COORDINATED WITH OTHER ELEMENTS OF WORK AND SHOWING COMPLETION OF THE WORK SUFFICIENTLY IN ADVANCE OF THE DATE ESTABLISHED
- FOR SUBSTANTIAL COMPLETION OF THE WORK.

  3. PRIOR TO COMMENCING CONSTRUCTION, THE OWNER SHALL SCHEDULE AN ON-SITE MEETING WITH ALL MAJOR PARTIES. THIS WOULD INCLUDE, BUT NOT LIMITED TO, THE OWNER, PROJECT MANAGER, CONTRACTOR, LAND OWNER REPRESENTATIVE, LOCAL TELEPHONE COMPANY, TOWER ERECTION FOREMAN (IF
- SUBCONTRACTED).

  4. CONTRACTOR SHALL BE EQUIPPED WITH SOME MEANS OF CONSTANT COMMUNICATIONS, SUCH AS A MOBILE PHONE OR A BEFPER. THIS EQUIPMENT WILL NOT BE SUPPLIED BY THE OWNER, NOR WILL WIRELESS SERVICE BE ARRANGED.
- 5. DURING CONSTRUCTION, CONTRACTOR MUST ENSURE THAT EMPLOYEES AND SUBCONTRACTORS WEAR HARD HATS AT ALL TIMES. CONTRACTOR WILL COMPLY WITH ALL WPCS SAFETY
  REQUIREMENTS IN THEIR AGREEMENT.
- 6. PROVIDE WRITTEN DAILY UPDATES ON SITE PROGRESS TO THE
- 7. COMPLETE INVENTORY OF CONSTRUCTION MATERIALS AND EQUIPMENT IS REQUIRED PRIOR TO START OF CONSTRUCTION.

  8. NOTIFY THE OWNER/PROJECT MANAGER IN WRITING NO LESS THAN 48 HOURS IN ADVANCE OF CONCRETE POURS, TOWER ERECTIONS, AND EQUIPMENT CABINET PLACEMENTS.

#### INSURANCE AND BONDS

1. CONTRACTOR, AT THEIR OWN EXPENSE, SHALL CARRY AND MAINTAIN, FOR THE DURATION OF THE PROJECT, ALL INSURANCE, AS REQUIRED AND LISTED, AND SHALL NOT COMMENCE WITH THEIR WORK UNTIL THEY HAVE PRESENTED AN ORIGINAL CERTIFICATE OF INSURANCE STATING ALL COVERAGES TO THE OWNER, REFER TO THE MASTER AGREEMENT FOR REQUIRED INSURANCE LIMITS.

ADJ

AGL

BTS CAB

CLG

CONC

CONT

D₩G

ELEC

ELEV

EQ

(E) EXT

FF GA

(N) NIC NTS OC

OPP

(P) PCS PPC SF SHT SIM SS STL TOC

TOM TYP VIF UON

EQUIP EGB

ΕÁ

DIA OR Ø

APPROX

THE OWNER SHALL BE NAMED AS AN ADDITIONAL INSURED ON ALL POLICIES. 3. CONTRACTOR MUST PROVIDE PROOF OF INSURANCE

**ABBREVIATIONS** 

ADJUSTABLE

APPROXIMATE

CEILING

CONCRETE

DIAMETER

DRAWING

ELECTRICAL

ELEVATION

FXISTING

EXTERIOR

FINISHED FLOOR

NOT IN CONTRACT

NOT TO SCALE

SQUARE FOOT

STAINLESS STEEL

STEEL TOP OF CONCRETE

TOP OF MASONRY

UNLESS OTHERWISE NOTED

WELDED WIRE FABRIC

TYPICAL VERIFY IN FIELD

ON CENTER

OPPOSITE

PROPOSED

SHFFT

SIMILAR

FACH

CONTINUOUS

ABOVE GROUND LINE

BASE TRANSMISSION STATION CABINET

EQUAL EQUIPMENT EQUIPMENT GROUND BAR

# CONNE OF CONNEC GSEIN VALVE C 10 ARI. 11167 NED AROTTO

T - Mobile -

T-MOBILE NORTHEAST, LLC

35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002

OFFICE: (860) 692-7100 FAX:(860) 692-7159

**TLANTIS DESIGN** 

GROUP, INC.

54 Jacqueline Road, Suite #7 Waltham, WA 02452 Phone number: 617–852–3611 Fax Number : 781–742–2247

SUBMITTALS

DESCRIPTION

ISSUED FOR REVIEW

FINAL CD

FINAL CD

05/23/16

06/15/16

06/27/16

ZONING

CONSTR.

SITE AC.

DEPT. DATE APP'D

PROJECT NO:

DRAWN BY

CHECKED BY

A

REVISIONS

CT11661A

KM

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PROFESSIONAL SEAL

#### SITE NUMBER CT11661A

SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

SHEET TITLE **GENERAL** AND ELECTRICAL

SHEET NUMBER

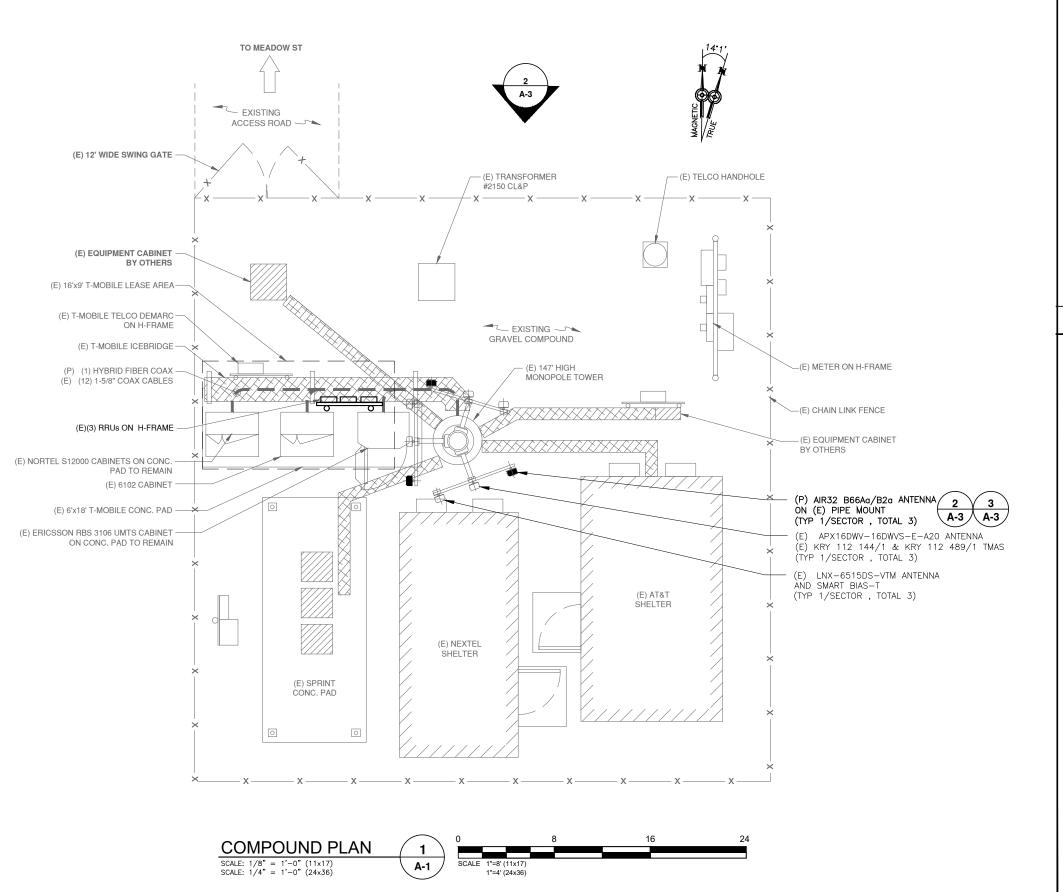
GAUGE GALV GC GRND GAI VANIZED GENERAL CONTRACTOR GROUND LG MAX LONG MAXIMUM MECHANICAL MECH MICROWAVE DISH MW MFR MANUFACTURER MASTER GROUND BAR MGB MIN MTL MINIMUM

PERSONAL COMMUNICATION SYSTEM

POWER PROTECTION CABINET

99 MEADOW STREET HARTFORD, CT 06114

NOTES



### GENERAL SITE NOTES

- 1. SITE INFORMATION WAS OBTAINED FROM A FIELD INVESTIGATION PERFORMED BY ATLANTIS DESIGN GROUP, INC. CONTRACTOR TO FIELD VERIFY DIMENSIONS AS NECESSARY BEFORE CONSTRUCTION.
- 2. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE SIGNS OF ADVERTISING.
- 3. THE PROPOSED DEVELOPMENT IS UNMANNED AND THEREFORE DOES NOT REQUIRE A MEANS OF WATER SUPPLY OR SEWAGE DISPOSAL.
- 4. NO LANDSCAPING WORK IS PROPOSED IN CONJUNCTION WITH THIS DEVELOPMENT OTHER THAN THAT WHICH IS
- 5. THE PROPOSED DEVELOPMENT DOES NOT INCLUDE OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES.
- 6. UTILITIES SHOWN ON PLAN ARE TAKEN FROM OWNERS RECORDS AND FIELD LOCATION OF VISIBLE SURFACE FEATURES. THE EXISTENCE, EXTENT AND EXACT HORIZONTAL AND VERTICAL LOCATIONS OF UTILITIES HAS NOT BEEN VERIFIED. ANY CONTRACTOR PERFORMING WORK ON THIS SITE MUST CONTACT CALL BEFORE YOU DIG THREE WORKING DAYS PRIOR TO COMMENCING WORK.
- 7. ALL OBSOLETE OR UNUSED FACILITIES SHALL BE REMOVED WITHIN 12 MONTHS OF CESSATION OF OPERATIONS.

## SITE LEGEND

SITE PROPERTY LINE STREET OR ROAD CHAIN LINK FENCE OPAQUE WOODEN FENCE BOARD ON BOARD FENCE DECIDUOUS TREES/SHRUBS EVERGREEN TREES/SHRUBS TREE LINE Ø UTILITY POLE (E) EXISTING (N) NEW (P) PROPOSED (F) **FUTURE** PROP. LTE ANTENNA PROP. UMTS/GSM ANTENNA EX. GSM ANTENNA EX. UMTS ANTENNA



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06/14/16	REVISION	1			
06/15/16	FINAL CD	2			
06/27/16	REVISION	3			

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OPS			
CONSTR.			
SITE AC.			

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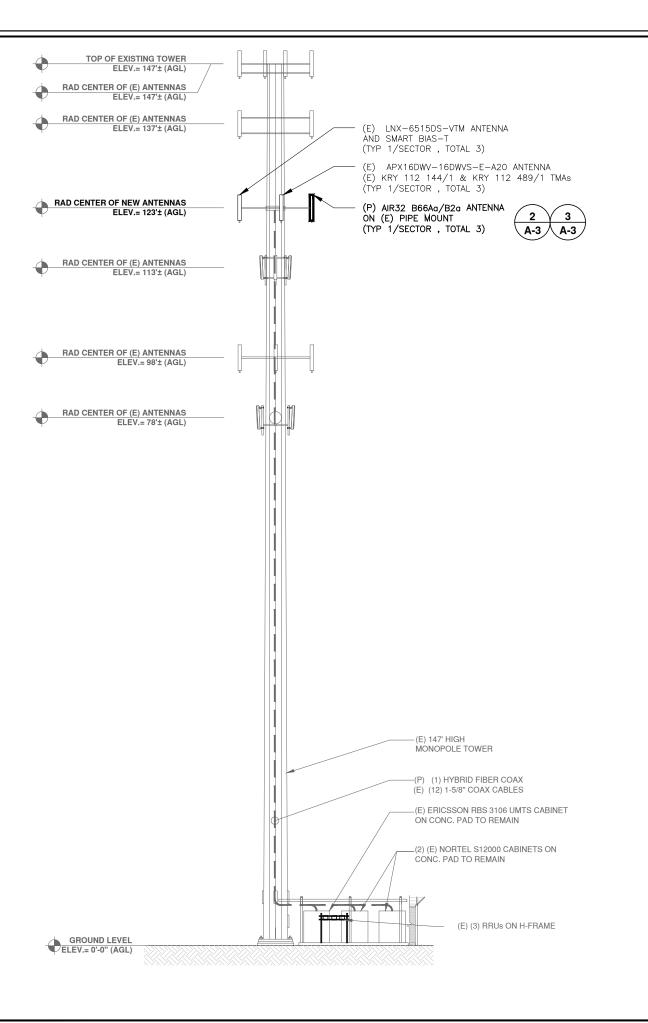
SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET HARTFORD, CT 06114

SHEET TITLE

SITE PLAN

SHEET NUMBER



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DEPT.	DATE	APP'D	revisions
RFE			
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### SITE NUMBER CT11661A

SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET HARTFORD, CT 06114

SHEET TITLE

**ELEVATION** 

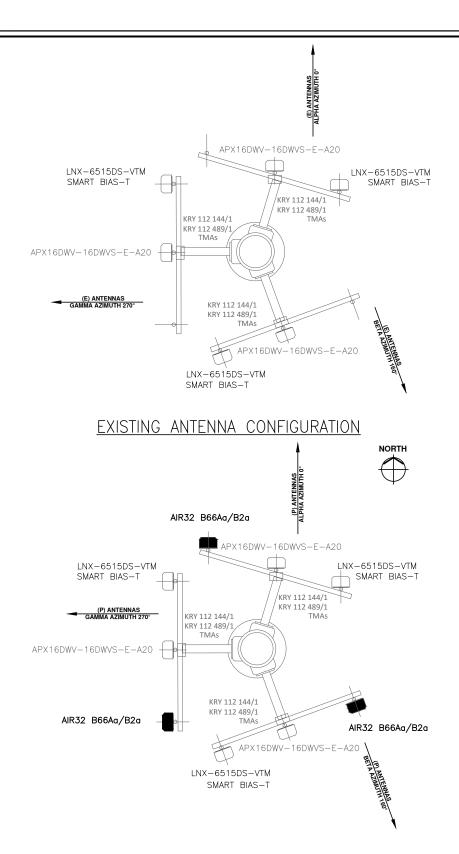
**ELEVATION** 

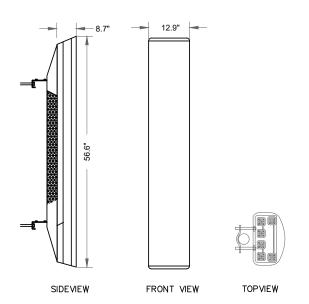
1"=8' (24x36)

SCALE: 1/16" = 1'-0" (11x17) SCALE: 1/8 " = 1'-0" (24x36)

SHEET NUMBER

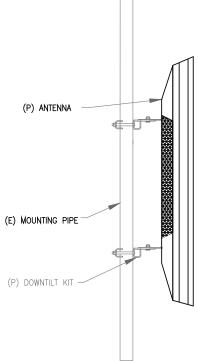
A-2





MANUFACTURER: ERICSSON MODEL NO.:ERICSSON AIR32 AIR32 B66Aa/B2a DIMENSIONS - HxWxD, (IN) 56.6"x12.9"x8.7"

ERICSSON AIR32 B66Aa/B2a **ANTENNA DETAILS** A-3 SCALE: N.T.S



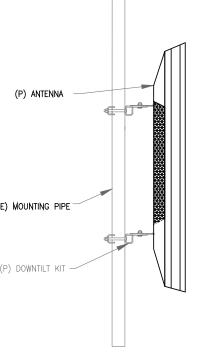
ANTENNA MOUNT DETAILS

SCALE: N.T.S



## PROPOSED ANTENNA CONFIGURATION

ANTENNA PLAN SCALE: NTS A-3



SITE NUMBER

CT11661A SITE NAME

PROFESSIONAL SEAL

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54 Jacqueline Road, Suite #7 Waltham, MA 02452 Phone number: 617-852-3611 Fax Number : 781-742-2247

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CONSTR.
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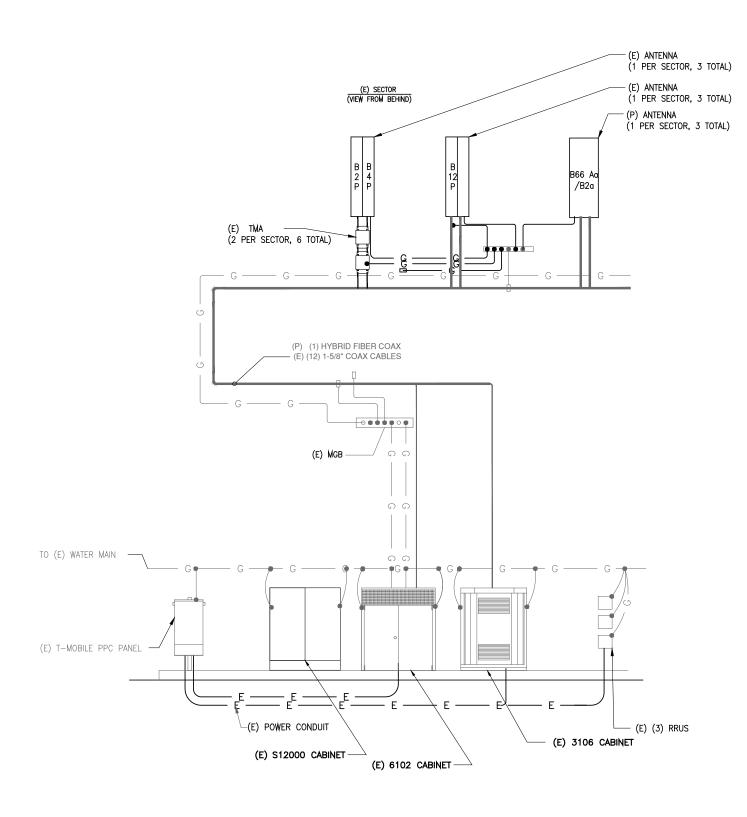
HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET

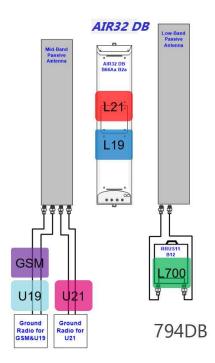
HARTFORD, CT 06114

SHEET TITLE ANTENNA PLAN AND DETAILS

SHEET NUMBER **A-3** 







#### TRUNK FIBER NOTES:

- 1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO 7/8" COAXIAL CABLE, AND SIMILAR INSTALLATION TECHNIQUES APPLY. ALL CABLES ARE INDIVIDUALLY SERIALIZED, BE SURE TO WRITE DOWN THE CABLE SERIAL NUMBER FOR FUTURE REFERENCE.
- 2, THE TERMINATED FIBER ENDS (THE BROKEN OUT FIBERS PLUS CONNECTORS) HOWEVER ARE FRAGILE, AND THESE MUST BE PROTECTED DURING THE INSTALLATION PROCESS.
- 3. LEAVE THE PROTECTIVE TUBE AND SOCK AROUND THE FIBER TAILS AND CONNECTORS IN PLACE DURING HOISTING AND SECURING THE CABLE. REMOVE THIS ONLY JUST PRIOR TO MAKING THE FINAL CONNECTIONS TO THE OVP BOX.
- 4. DO NOT BEND THE FIBER ENDS (IN THE ORANGE FURCATION TUBES) TIGHTER THAN 34" (19MM) BEND RADIUS, ELSE THERE IS A RISK OF BREAKING THE GLASS FIBERS.
- 5. BE SURE THAT THE LACE UP ENDS AND FIBER CONNECTORS ARE NOT DAMAGED BY ATTACHMENT OF A HOISTING GRIP OR DURING THE HOISTING PROCESS. ATTACH A HOISTING GRIP ON THE JACKETED CABLE NO LESS THAN 6 INCHES BELOW THE FIBER BREAKOUT POINT. IF A HOISTING GRIP IS NOT EASILY ATTACHED, USE A SIMPLE LINE ATTACHED BELOW THE FIBER BREAK-OUT POINT (I.E. AT THE CABLE OUTER JACKET). PREVENT THE FIBER TAILS (IN PROTECTIVE TUBE) AT THE CABLE END FROM UNDUE MOYEMENT DURING HOISTING BY SECURING THE PROTECTIVE TUBE (WITH OUTER SOCK) TO THE HOISTING LINE.
- 6. DURING HOISTING ENSURE THAT THERE IS A FREE PATH AND THAT THE CABLE, AND ESPECIALLY THE FIBER ENDS, WILL NOT BE SNAGGED ON TOWER MEMBERS OR OTHER OBSTACLES.
- 7. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO +70C).
- 8. MINIMUM CABLE BEND RADII ARE 22.2" (565MM) LOADED (WITH TENSION ON THE CABLE) AND 11.1" (280MM) UNLOADED.
- 9. MAXIMUM CABLE TENSILE LOAD IS 3560 N (800 LB) SHORT TERM (DURING INSTALLATION) AND 1070 N (240 LB) LONG TERM. 10. COMMSCOPE NON LACE UP GRIP RECOMMENDED FOR MONOPOLE INSTALLATIONS.
- 11. MAXIMUM HANGER SPACING 3FT (0.9 M).

#### HYBRID FIBER/POWER JUMPER NOTES:

- 1. IN GENERAL THIS CABLE WILL HANDLE SIMILARLY TO A 3/8" COAXIAL CABLE.
- 2. THE TERMINATED FIBER ENDS HOWEVER ARE FRAGILE AND MUST BE PROTECTED DURING INSTALLATION. LEAVE THE PACKAGING AROUND THE FIBER ENDS IN PLACE UNTIL READY TO CONNECT THE JUMPER BETWEEN OVP AND RRU OR BBU.
- 3. DO NOT BEND THE FIBER BREAKOUT CABLE (BETWEEN THE MAIN CABLE AND THE FIBER CONNECTOR) TIGHTER THAN 34" (19MM) RADIUS. ELSE THERE IS A RISK OF BREAKING THE GLASS.
- 4. ATTACH THE MAIN CABLE SECURELY TO THE STRUCTURE OR EQUIPMENT USING HANGERS AND/OR CABLE TIES TO PREVENT STRAIN ON CONNECTIONS FROM MOVEMENT IN WIND OR SNOW/ICE CONDITIONS.
- 5. ENSURE THE LC FIBER CONNECTORS ARE SEATED FIRMLY IN PANEL IN OVP OR IN EQUIPMENT.
- 6. INSTALLATION TEMPERATURE RANGE IS -22F TO 158F (-30C TO 70C).
- 7. MINIMUM CABLE BEND RADII ARE 10.3 INCH (265MM) LOADED (WITH TENSION ON THE CABLE) AND 5.2 INCH (130MM) UNLOADED.
- 8. MAXIMUM CABLE TENSILE LOAD IS 350 LB (1560N) SHORT TERM (DURING INSTALLATION) AND 105 LB (470N)
- 9. STANDARD LENGTHS AVAILABLE ARE 6 FEET, 15 FEET AND 20 FEET

## 794DB CONFIGURATION COAX/FIBER PLUMBING DIAGRAM

SCALE: N.T.S



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OPS			
CONSTR.			
SITE AC.			
	RFE RF MAN. ZONING OPS CONSTR.	RFE RF MAN. ZONING OPS CONSTR.	RFE RF WAN. ZONING OPS CONSTR.

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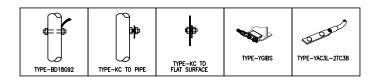
SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET

HARTFORD, CT 06114

SHEET TITLE GROUNDING AND ONE LINE DIAGRAM COAX/FIBER DIAGRAM

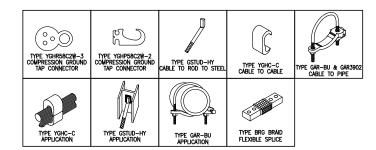
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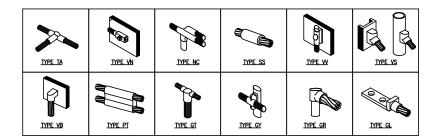
### **BURNDY GROUNDING DETAILS**

SCALE: N.T.S.











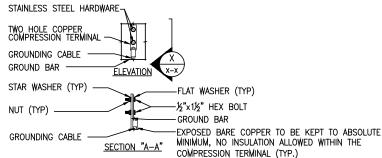
TERMINATION TYPES:

A. MECHANICAL COMPRESSION LUG B. DOUBLE BARRELL COMPRESSION CONNECTOR C. EXOTHERMIC TERMINATION D. BEAM CLAMP SOLID #2 TINNED COPPER B OR C B OR C #6 GROUND LEAD B OR C #2/O STRANDED GRNDG MASTER GROUND BAR STRUCTURAL OR TOWER STEEL A, C, OR D A, C, OR D A, C, OR D GROUND RING C

**GROUNDING TERMINATION MATRIX** 7

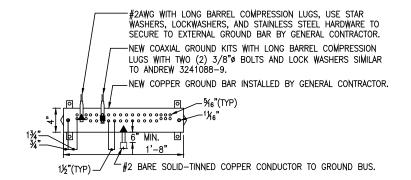
SCALE: N.T.S





#### NOTES:

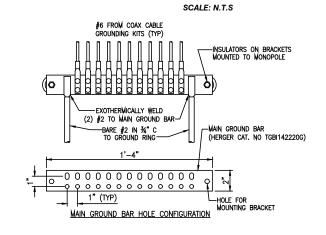
1. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

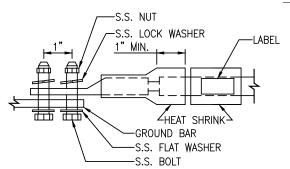


- 1. ALL HARDWARE STAINLESS STEEL COAT ALL SURFACES WITH KOPR-SHIELD BEFORE MATING.
- FOR GROUND BOND TO STEEL ONLY: INSERT A TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH KOPR-SHIELD.
- 3. ALL HOLES ARE COUNTERSUNK 1/6".

### TYPICAL GROUND BAR CONNECTIONS DETAIL







## **GROUND BAR DETAIL** ( 5

SCALE: N.T.S

#### LUG NOTES:

- 1. ALL HARDWARE IS 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS.
- 2. ALL HARDWARE SHALL BE S.S. ¾"ø OR LARGER.
- 3. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL. COAT ALL SURFACES WITH ANTI-OXIDIZATION COMPOUND PRIOR TO MATING.

### **GROUND BAR DETAIL** (6)

SCALE: N.T.S

E-3

E-3

## T - Mobile -

# T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002

OFFICE: (860) 692-7100 FAX:(860) 692-7159

# TLANTIS DESIGN GROUP, INC.

54 Jacqueline Road, Suite #7 Waltham, MA 02452 Phone number: 617-852-3611 Fax Number : 781-742-2247

	SUBMITTALS	,
DATE	DESCRIPTION	REVISION
05/09/16	issued for review	Α
05/23/16	FINAL CD	0
06/14/16	REVISION	1
06/15/16	FINAL CD	2
06/27/16	REVISION	3

DEPT.	DATE	APP'D	revisions
RFE			
RF MAN.			
ZONING			
OPS			
CONSTR.			
SITE AC.			

PROJECT NO:	CT11661A
DRAWN BY:	FG
CHECKED BY:	KM



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## SITE NUMBER

## CT11661A

SITE NAME HARTFORD SOUTH 2/FRNKLN AV. SITE ADDRESS

99 MEADOW STREET

HARTFORD, CT 06114

SHEET TITLE

**GROUNDING DETAILS** 

SHEET NUMBER

# Exhibit D



## **Structural Analysis Report**

Structure : 147.9 ft Monopole

ATC Site Name : Petro Lock, CT

ATC Site Number : 302468

Engineering Number : 663406KK2

Proposed Carrier : T-Mobile

Carrier Site Name : Hartford South2/Frnkln Ave

Carrier Site Number : CT11661D

Site Location : 99 Meadow St

Hartford, CT 06114-1598

41.743197,-72.667500

County : Hartford

Date : May 17, 2016

Max Usage : 92%

Result : Pass

Prepared By: Amir H. Tabarestani, E.I. Structural Engineer II

COA: PEC.0001553



## **Table of Contents**

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### Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 147.9 ft monopole to reflect the change in loading by T-Mobile.

#### **Supporting Documents**

Tower Drawings	FWT Job #21719000 Rev. 1, dated July 18, 2000
Foundation Drawing	FWT Job #21719000 Rev. 1, dated July 18, 2000
Geotechnical Report	Osprey Environmental Engineering Job #98083-01, dated August 28, 1998

#### **Analysis**

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/EIA-222.

Basic Wind Speed:	80 mph (Fastest Mile)
Basic Wind Speed w/ Ice: 69 mph (Fastest Mile)w/ 1/2" radial ice concurrent	
Code: ANSI/TIA/EIA-222-F / 2003 IBC , Sec. 1609.1.1, Exception (5) & Sec. 3108.4	
	Supplement & 2009 CT Amendment

### **Conclusion**

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



## **Existing and Reserved Equipment**

Elevatio	on¹ (ft)	٥.	Autous	N 4 T	Lines	Camian
Mount	RAD	Qty	Antenna	Mount Type	Lines	Carrier
140.0	149.0	4	Decibel DB844H90E-XY	Platform w/ Handrails	(12) 1 5/8" Coax	Corint Novtol
149.0	149.0	8	Andrew 844G65VTZASX	Platiorii W/ Handraiis	(1) 1/2" Coax	Sprint Nextel
			Powerwave LGP21401			
		3	Ericsson RRUS 11 (Band 12) (55 lb)			
		3	Ericsson RRUS 11 w/ RRUS A2			
		3	Ericsson RRUS-32		(42) 4 5 (0)  6	
	137.0	3	Powerwave 7750.00	Platform w/ Handrails	(12) 1 5/8" Coax (2) 0.78" 8 AWG 6	
135.0		2	KMW AM-X-CD-16-65-00T-RET		(2) 0.78 8 AWG 6 (1) 0.39" Cable	AT&T Mobility
		2	Quintel QS66512-3 (112 lbs.)		(1) 0.39 Cable (1) 3" Conduit	
		1	Andrew SBNH-1D6565C		(1) 5 Conduit	
		1	CCI TPA-65R-LCUUUU-H8			
	125.0	6	CCI TPX-070821			
	135.0	2	Raycap DC6-48-60-18-8F			
		3	Kathrein Smart Bias Tee			T-Mobile
		3	RFS APX16DWV-16DWVS-E-A20	T-Arms	(12) 1 5/8" Coax	
123.0	123.0 123.0	3	Andrew LNX-6515DS-VTM			
		3	Ericsson KRY 112 144/1			
		3	Ericsson KRY 112 489/1			
113.0	113.0	3	RFS APXV18-206517	Flush	(6) 1 5/8" Coax	Metro PCS
		3	RFS IBC1900BB-1		(4) 1 1/4" Hybriflex	s Sprint Nextel
	:	3	RFS IBC1900HG-2A			
		3	Alcatel-Lucent 800MHz 2X50W RRH w/			
			Filter			
98.0	98.0	3	Alcatel-Lucent 4x40W RRH (88 lb)	Low Profile Platform		
		3	Alcatel-Lucent TD-RRH8x20-25 w/ Solar			
			Shield			
		3	RFS APXVTM14-C-I20			
		3	RFS APXVSPP18-C-A20			
		3	DragonWave Horizon Compact		(6) 5/16" Coax (3) 1/2" Coax	
		3	NextNet BTS-2500			
89.0	89.0	2	DragonWave A-ANT-18G-2-C	Side Arms		Clearwire
		3	Argus LLPX310R		(1) 2" Conduit	
		1	DragonWave A-ANT-11G-2.5-C			
		3	Alcatel-Lucent RRH2X60-AWS		(2) 1 5/8" Hybriflex	
		3	Alcatel-Lucent RRH2x60 700			
79.0	79.0	3	Alcatel-Lucent RRH2x60 Low Prof	Low Profile Platform		Verizon
		2	RFS DB-T1-6Z-8AB-0Z			
		12	Commscope SBNHH-1D65B			
20.0	20.0	1	Lucent KS-24019	Flush	(1) 1/2" Coax	Sprint Nextel

## **Equipment to be Removed**

Elevation¹ (ft)  Mount RAD Oty	Antenna	Mount Type	Lines	Carrier		
No loading considered as to be removed						



#### **Proposed Equipment**

Elevation	on¹ (ft)	t) Qty	Antonna	Mount Type	Linos	Carrier
Mount	RAD	Qty	Antenna	iviount rype	Lines	Carrier
123.0	123.0	3	Ericsson AIR 32 B4A-B2P	T-Arms	(1) 1 5/8" Fiber	T-Mobile

<sup>&</sup>lt;sup>1</sup>Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Install proposed coax alongside existing lines outside the pole shaft. Stacking is not allowed.

#### **Structure Usages**

Structural Component	Controlling Usage	Pass/Fail				
Anchor Bolts	91%	Pass				
Shaft	92%	Pass				
Base Plate	49%	Pass				

### **Foundations**

Reaction Component	Analysis Reactions
Moment (Kips-Ft)	3,640.3
Axial (Kips)	45.2
Shear (Kips)	35.3

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

### **Deflection and Sway\***

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
123.0	Ericsson AIR 32 B4A-B2P	T-Mobile	1.868	1.569
89.0	DragonWave A-ANT-18G-2-C	- Clearwire 1.021	1 021	1 257
	DragonWave A-ANT-11G-2.5-C		1.257	

<sup>\*</sup>Deflection and Sway was evaluated considering a design wind speed of 50 mph (Fastest Mile) per ANSI/TIA/EIA-222-F.



#### **Standard Conditions**

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

- -- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC 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 that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. 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.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

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# 1<u>47-11 149'-0"</u> 53'-0" 5/16" Thick (65 KSI) 113'-0" 59" 53'-0" 3/8" Thick (65 KSI) 147-11" 53'-0" 74" 46'-10" 53'-0" 3/8" Thick (65 KSI) 20'-0" 0'0"

#### Job Information

Pole: 302468 Code: TIA/EIA-222-F

Description: 148' FWT Monopole

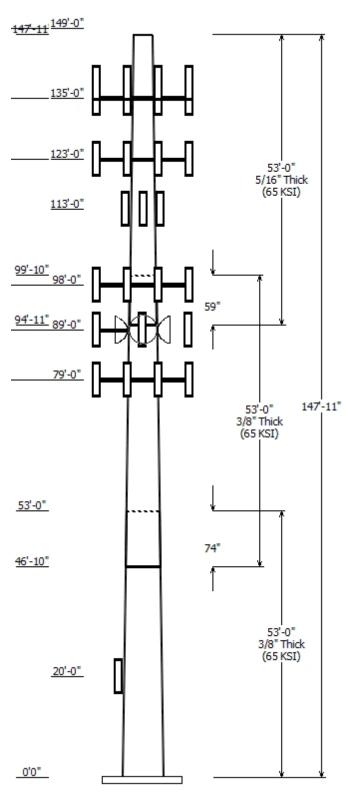
Client: T-MOBILE Location: Petro Lock, CT Shape: 18 Sides Height: 147.92 (ft)

Base Elev (ft): 0.00

Taper: 0.21456(in/ft)

	Sections Properties												
Shaft Section	•		eter (in) ess Flats Bottom	Thick (ın)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)					
1	53.000	45.20	56.58	0.375		0.000	0.214600	65					
2	53.000	35.90	47.28	0.375	Slip Joint	74.000	0.214600	65					
3	53.000	26.21	37.58	0.313	Slip Joint	59.000	0.214600	65					

		Discr	ete Appurtenance
Attach	Force		
Elev (ft)	Elev (ft)	Qty	Description
149.000	149.000	1	Flat Platform w/ Handrails
149.000	149.000	8	Andrew 844G65VTZASX
149.000	149.000	4	Decibel DB844H90E-XY
135.000	137.000	1	CCI TPA-65R-LCUUUU-H8
135.000	137.000	2	Quintel QS66512-3 (112 lbs.)
135.000	137.000	3	Ericsson RRUS-32
135.000	137.000	3	Ericsson RRUS 11 w/ RRUS A2
135.000	135.000	2	Raycap DC6-48-60-18-8F
135.000	137.000	3	Ericsson RRUS 11 (Band 12) (55
135.000	137.000	1	Andrew SBNH-1D6565C
135.000	137.000	2	KMW AM-X-CD-16-65-00T-RET
135.000	135.000	6	CCI TPX-070821
135.000	137.000	6	Powerwave LGP21401
135.000	135.000	1	Flat Platform w/ Handrails
135.000	137.000	3	Powerwave 7750.00
123.000	123.000	3	Ericsson AIR 32 B4A-B2P
123.000	123.000	3	Andrew LNX-6515DS-VTM
123.000	123.000	3	RFS APX16DWV-16DWVS-E-A20
123.000	123.000	3	Ericsson KRY 112 489/1
123.000	123.000	3	Ericsson KRY 112 144/1
123.000	123.000	3	Kathrein Scala Smart Bias Tee
123.000	123.000	3	Round T-Arms
113.000	113.000	3	RFS APXV18-206517
98.000	98.000	3	RFS APXVTM14-C-I20
98.000	98.000	3	Alcatel-Lucent TD-RRH8x20-25
98.000	98.000	3	RFS IBC1900HG-2A
98.000	98.000	3	RFS IBC1900BB-1
98.000	98.000	3	Alcatel-Lucent 800 MHz 2X50W
98.000	98.000	3	Alcatel-Lucent 4x40W RRH (88 I
98.000	98.000	3	RFS APXVSPP18-C-A20
98.000	98.000	1	Round Low Profile Platform
89.000	89.000	1	DragonWave A-ANT-11G-2.5-C
89.000	89.000	1	Side Arms
89.000	89.000	3	NextNet BTS-2500
89.000	89.000	3	Argus LLPX310R
89.000	89.000	3	DragonWave Horizon Compact
89.000	89.000	2	DragonWave A-ANT-18G-2-C
79.000	79.000	1	Flat Low Profile Platform
79.000	79.000	12	Commscope SBNHH-1D65B
79.000	79.000	2	RFS DB-T1-6Z-8AB-0Z
79.000	79.000	3	Alcatel-Lucent RRH2x60
79.000	79.000	3	Alcatel-Lucent RRH2X60-AWS
79.000	79.000	3	Alcatel-Lucent RRH2x60 700
20.000	20.000	1	Lucent KS-24019

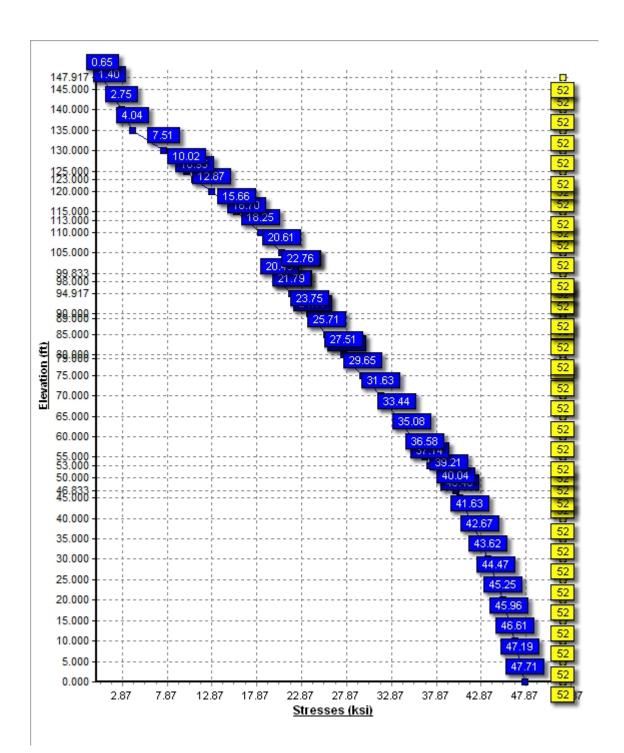


	Linear Appurtenance										
Elev	(ft)		Exposed								
From	То	Description	To Wind								
5.000	20.000	1/2" Coax	No								
5.000	79.000	1 5/8" Hybriflex	Yes								
5.000	89.000	1/2" Coax	Yes								
5.000	89.000	2" Conduit	Yes								
5.000	89.000	5/16" Coax	No								
5.000	98.000	1 1/4" Hybriflex	No								
5.000	113.0	1 5/8" Coax	No								
5.000	123.0	1 5/8" Coax	No								
5.000	123.0	1 5/8" Coax	Yes								
5.000	123.0	1 5/8" Fiber	Yes								
5.000	135.0	0.39" Cable	No								
5.000	135.0	0.78" 8 AWG 6	No								
5.000	135.0	1 5/8" Coax	No								
5.000	135.0	3" Conduit	No								
5.000	149.0	1 5/8" Coax	No								
5.000	149.0	1/2" Coax	No								

	Load Cases
No Ice	80.00 mph Wind with No Ice
Ice	69.28 mph Wind with Ice
Twist/Sway	50.00 mph Wind with No Ice

Reactions										
Moment Shear Axial Load Case (kip-ft) (kip) (kip)										
No Ice	3640.31	35.31	45.21							
Ice	2690.75	25.73	52.68							
Twist/Sway	1423.08	13.79	45.26							

Dish Deflections										
Attach Deflection Rotat Load Case Elev (ft) (in) (dee Twist/Sway 89.00 12.258 1.25										
Twist/Sway	89.00	12.258	1.257							
Twist/Sway	89.00	12.258	1.257							



Site Number: 302468 Code: TIA/EIA-222-F © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:12:59 AM

Customer: T-MOBILE

**Analysis Parameters** 

Location: Hartford County, CT

Height (ft): Code: TIA/EIA-222-F 147. Shape: 18 Sides Base Diameter (in): 56.58 Pole Type: Taper Top Diameter (in): 26.22 Pole Manfacturer: **FWT Inc** Taper (in/ft): 0.215

**Load Cases** 

No Ice 80.00 mph Wind with No Ice Ice 69.28 mph Wind with Ice Twist/Sway 50.00 mph Wind with No Ice

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:12:59 AM

Customer: T-MOBILE

<u>Sha</u>	ft Sec	tion l	Prop	<u>ertie</u>	<u>es</u>				— Bottom ———			Тор							
	Slip						Bottom					. ——— тор ———							
Sect Info	Length (ft)		•		Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in²)	lx (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in²)	lx (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)
1-18	53.000	0.3750	65		0.00	10,844	56.58	0.00	66.90	26698.9	24.84	150.88	45.20	53.00	53.36	13550.6	19.49	120.55	0.214568
2-18	53.000	0.3750	65	Slip	74.00	8,848	47.28	46.83	55.83	15518.7	20.47	126.08	35.90	99.83	42.29	6746.8	15.12	95.76	0.214568
3-18	53.000	0.3125	65	Slip	59.00	5,651	37.58	94.92	36.97	6490.6	19.45	120.28	26.21	147.92	25.69	2178.2	13.03	83.89	0.214568
			Sł	naft W	eight	25,342													

### **Discrete Appurtenance Properties**

Attach			-	— No Ice	. ———		- Ice		Distance	Vert
Elev			Weight	EPAa	Orientation	Weight	EPAa	Orientation	From Face	Ecc
(ft)	Description	Qty	(lb)	(sf)	Factor	(lb)	(sf)	Factor	(ft)	(ft)
	•				0.04			0.04		
149.00	Andrew 844G65VTZASX	8	16.00	5.890	0.84	54.72			0.000	0.000
149.00	Decibel DB844H90E-XY	4	14.00		0.91	40.30			0.000	0.000
149.00		1	2000.00		1.00	2,450.00			0.000	0.000
	Andrew SBNH-1D6565C	1		11.440	1.00	132.00			0.000	2.000
	CCI TPA-65R-LCUUUU-H8	1		13.440	1.00	141.77			0.000	2.000
	CCI TPX-070821	6		0.550	0.50	7.90			0.000	0.000
	Ericsson RRUS 11 (Band 12)	3	55.00		0.67	74.30	3.290		0.000	2.000
	Ericsson RRUS 11 w/ RRUS	3	72.00		0.67	0.00	0.000		0.000	2.000
	Ericsson RRUS-32	3	77.00		0.67	104.90	4.300		0.000	2.000
	Flat Platform w/ Handrails	1	2000.00		1.00	2,450.00			0.000	0.000
135.00	KMW AM-X-CD-16-65-00T-	2		8.260	0.84	95.00	9.080		0.000	2.000
135.00		3	27.00		0.76	65.67	6.540		0.000	2.000
135.00		6	14.10		0.50	21.26	1.530		0.000	2.000
135.00	Quintel QS66512-3 (112 lbs.)	2	112.00		0.93	0.00	0.000		0.000	2.000
135.00	Raycap DC6-48-60-18-8F	2	20.00		1.00	35.10	1.460		0.000	0.000
123.00		3		11.430	0.84	117.10			0.000	0.000
123.00		3	105.80		0.86	0.00			0.000	0.000
123.00	Ericsson KRY 112 144/1	3	11.00		0.50	14.10	0.550		0.000	0.000
123.00	Ericsson KRY 112 489/1	3	15.40	0.650	0.50	20.40	0.830		0.000	0.000
123.00	Kathrein Scala Smart Bias	3	3.30	0.090	0.50	0.00	0.000	0.50	0.000	0.000
123.00	RFS APX16DWV-16DWVS-E-	3	40.70	7.220	0.66	75.00	7.910	0.66	0.000	0.000
123.00	Round T-Arms	3	250.00	9.700	0.75	314.00	12.100	0.75	0.000	0.000
113.00	RFS APXV18-206517	3	26.40	5.050	0.80	48.13	5.700	0.80	0.000	0.000
98.00	Alcatel-Lucent 4x40W RRH	3	88.00	2.910	0.67	122.40	4.230	0.67	0.000	0.000
98.00	Alcatel-Lucent 800 MHz	3	64.00	2.400	0.67	86.10	2.720	0.67	0.000	0.000
98.00	Alcatel-Lucent TD-RRH8x20-	3	70.00	4.720	0.67	122.40	4.230	0.67	0.000	0.000
98.00	RFS APXVSPP18-C-A20	3	57.00	8.260	0.82	106.50	9.080	0.82	0.000	0.000
98.00	RFS APXVTM14-C-I20	3	52.90	6.900	0.76	73.60	7.740	0.76	0.000	0.000
98.00	RFS IBC1900BB-1	3	22.00	1.130	0.50	59.80	1.360		0.000	0.000
98.00	RFS IBC1900HG-2A	3	22.00	1.130	0.50	59.80	1.360		0.000	0.000
98.00	Round Low Profile Platform	1	1500.00	21.700	1.00	1,700.00	27.200	1.00	0.000	0.000
89.00	Argus LLPX310R	3	28.60	4.830	0.70	54.50	5.360	0.70	0.000	0.000
89.00	DragonWave A-ANT-11G-2.5-	1	47.60	8.670	0.95	117.00			0.000	0.000
89.00	DragonWave A-ANT-18G-2-C	2	27.10	4.690	0.85	55.10	5.050		0.000	0.000
89.00	DragonWave Horizon	3	10.60		0.50	17.00	0.580		0.000	0.000
89.00	NextNet BTS-2500	3	35.00	2.120	0.67	48.30	2.430		0.000	0.000
89.00	Side Arms	1	560.00	8.500	1.00	680.00	10.500	1.00	0.000	0.000
79.00	Alcatel-Lucent RRH2x60	3	60.00	3.960	0.67	82.70	4.430		0.000	0.000
79.00	Alcatel-Lucent RRH2x60 700	3	56.70		0.67	71.08	2.810		0.000	0.000
79.00	Alcatel-Lucent RRH2X60-	3	44.00		0.67	61.40	2.870		0.000	0.000
79.00	Commscope SBNHH-1D65B	12		8.380	0.69	0.00	0.000		0.000	0.000
79.00	Flat Low Profile Platform	1	1500.00		1.00	1.700.00			0.000	0.000
79.00	RFS DB-T1-6Z-8AB-0Z	2	44.00		0.67	44.30	3.280		0.000	0.000
20.00	Lucent KS-24019	1	4.00		1.00	15.00	1.300		0.000	0.000
	Totals	=								44
	101815	130	13222.10		16,01	0.22		numbei	of Loadings:	44

Totals 130 13222.10 16,016.22 Number of Loadings: 44

Site Number: 302468 Code: TIA/EIA-222-F © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:12:59 AM

Customer: T-MOBILE

## **Linear Appurtenance Properties**

Elev	Elev			— No le	ce —	— Ice			
From	To			Weight	CaAa	Weight	CaAa	Exposed	
(ft)	(1t)	Qty	Description	(lb/ft)	(sf/ft)	(lb/ft)	(sf/ft)	To Wind	
5.00	149.00	12	1 5/8" Coax	9.84	0.00	0.00	0.00	N	
5.00	149.00	1	1/2" Coax	0.15	0.00	0.00	0.00	N	
5.00	135.00	1	0.39" Cable	0.07	0.00	0.00	0.00	N	
5.00	135.00	2	0.78" 8 AWG 6	1.18	0.00	0.00	0.00	N	
5.00	135.00	12	1 5/8" Coax	9.84	0.00	0.00	0.00	N	
5.00	135.00	1	3" Conduit	7.58	0.00	0.00	0.00	N	
5.00	123.00	6	1 5/8" Coax	4.92	0.00	0.00	0.00	N	
5.00	123.00	6	1 5/8" Coax	4.92	0.20	9.46	0.25	Υ	
5.00	123.00	1	1 5/8" Fiber	1.61	0.00	3.10	0.00	Υ	
5.00	113.00	6	1 5/8" Coax	4.92	0.00	0.00	0.00	N	
5.00	98.00	4	1 1/4" Hybriflex Cable	5.20	0.00	0.00	0.00	N	
5.00	89.00	3	1/2" Coax	0.45	0.00	0.00	0.00	Υ	
5.00	89.00	1	2" Conduit	3.65	0.24	4.53	0.29	Υ	
5.00	89.00	6	5/16" Coax	0.24	0.00	0.00	0.00	N	
5.00	79.00	2	1 5/8" Hybriflex	1.64	0.20	3.15	0.25	Υ	
5.00	20.00	1	1/2" Coax	0.15	0.00	0.00	0.00	N	
			Total Weight	6,719.89 (	lb)	2,095.70(I	b)		

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Engineering Number: 663406KK2 5/17/2016 9:12:59 AM

Code: TIA/EIA-222-F

Petro Lock, CT T-MOBILE **Customer:** 

Site Number: 302468

Site Name:

Segment Properties	(Max Lei	<b>1</b> :	5.ft)
Seg Top	Thick	Fla	

Seg To	ор	Thick	Flat	<b>A</b>	<b>L.</b> .	14/6	D#	<b>.</b>	-	<b>-</b> -	<b>M</b> / = ! = ! - (	
(ft)	Description	(in)	Dia (in)	Area (in²)	lx (in⁴)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Fa (ksi)	Weight (lb)	
0.00		0.3750	56.580	66.895	26,698.9	24.84	150.88	65	52	0	0.0	
5.00		0.3750			25,199.0	24.34	148.02	65	52		1,127.3	
10.00		0.3750			23,756.4	23.83	145.16	65	52		1,105.6	
15.00		0.3750			22,369.9	23.33	142.30	65	52		1,083.8	
20.00		0.3750			21,038.4	22.82	139.44	65	52		1,062.1	
25.00		0.3750			19,760.8	22.32	136.57	65	52		1,040.4	
30.00		0.3750			18,536.1	21.81	133.71	65	52		1,018.7	
35.00		0.3750			17,363.0	21.31	130.85	65	52	0	996.9	
40.00		0.3750			16,240.5	20.81	127.99	65	52	0	975.2	
45.00	Dat Castian 0	0.3750			15,167.4	20.30	125.13	65 65	52	0	953.5	
46.83	Bot - Section 2	0.3750			14,786.1	20.12	124.08	65 65	52 52	0	344.2	
50.00	Ton Coation 1	0.3750			14,142.7	19.80	122.27	65 65	52		1,184.8	
53.00 55.00	Top - Section 1	0.3750 0.3750			14,242.1 13,843.6	19.85 19.64	122.55 121.41	65 65	52 52	0	1,106.4 367.5	
60.00		0.3750			12,880.1	19.04	118.55	65	52	0	903.5	
65.00		0.3750			11,962.4	18.64	115.69	65	52	0	881.8	
70.00		0.3750			11,089.3	18.13	112.83	65	52	0	860.0	
75.00		0.3750			10,259.8	17.63	109.97	65	52	ŏ	838.3	
79.00		0.3750		47.613	9,626.8	17.22	107.68	65	52	ŏ	655.0	
80.00		0.3750		47.357	9,472.7	17.12	107.10	65	52	Ŏ	161.6	
85.00		0.3750		46.081	8,726.9	16.62	104.24	65	52	Ŏ	794.9	
89.00		0.3750		45.059	8,159.3	16.21	101.96	65	52	Ö	620.3	
90.00		0.3750		44.804	8,021.4	16.11	101.38	65	52	Ö	152.9	
94.92	Bot - Section 3	0.3750		43.548	7,365.7	15.62	98.57	65	52	Ö	739.1	
95.00		0.3750		43.527	7,354.9	15.61	98.52	65	52	0	22.8	
98.00		0.3750		42.761	6,973.3	15.31	96.81	65	52	0	814.4	
99.83	Top - Section 2	0.3125	36.534	35.926	5,955.0	18.85	116.91	65	52	0	490.6	
100.0		0.3125		35.890	5,937.4	18.83	116.79	65	52	0	20.4	
105.0		0.3125		34.826	5,424.8	18.23	113.36	65	52	0	601.6	
110.0		0.3125		33.762	4,942.6	17.62	109.93	65	52	0	583.5	
113.0		0.3125		33.124	4,667.5	17.26	107.87	65	52	0	341.4	
115.0		0.3125		32.698	4,489.8	17.01	106.49	65	52	0	224.0	
120.0		0.3125		31.634	4,065.6	16.41	103.06	65	52	0	547.3	
123.0		0.3125		30.995	3,824.4	16.05	101.00	65	52	0	319.7	
125.0		0.3125		30.570	3,669.0	15.80	99.63	65	52	0	209.5	
130.0		0.3125		29.506	3,299.0	15.20	96.19	65	52	0	511.1	
135.0		0.3125		28.442	2,954.8	14.59	92.76	65 65	52	0	493.0	
140.0		0.3125		27.377	2,635.4	13.99	89.33	65 65	52 52	0	474.8	
145.0		0.3125		26.313	2,339.9	13.38	85.90	65 65	52 52	0	456.7 258 1	
147.9		0.3125	20.210	25.693	2,178.2	13.03	83.89	69	52	-	258.1	
										2	5,342.4	

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:12:59 AM

Customer: T-MOBILE

Load Case: No Ice 80.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Applied Segment Forces Summary**

	Shaft Forces				Discret	e Forces		Linear F	orces	Sum of Forces			
Seg			Dead			Moment	Dead		Dead				Moment
Elev		Wind FX	Load	Wind FX		MZ	Load	Wind FX		Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		210.1	0.0					0.0	0.0	210.1	0.0	0.0	
5.00		416.3	1,127.3					0.0	0.0	416.3	1,127.3	0.0	0.0
10.00		408.2	1,105.6					88.6	281.8	496.8	1,387.4	0.0	
15.00		400.2	1,083.8					88.6	281.8	488.8	1,365.6	0.0	0.0
20.00	Appertunance(s)	392.1	1,062.1	25.2	0.0	0.0	4.0	88.6	281.8	505.9	1,347.9	0.0	0.0
25.00		384.1	1,040.4					88.6	281.1	472.7	1,321.4	0.0	0.0
30.00		376.0	1,018.7					88.6	281.1	464.6	1,299.7	0.0	0.0
35.00		374.7	996.9					88.6	281.1	463.4	1,278.0	0.0	0.0
40.00		380.0	975.2					91.9	281.1	471.9	1,256.3	0.0	0.0
45.00		261.9	953.5					95.2	281.1	357.1	1,234.5	0.0	
46.83	Bot - Section 2	195.0	344.2					35.7	103.1	230.7	447.2	0.0	
50.00		242.6	1,184.8					62.6	178.0	305.2	1,362.8	0.0	
53.00	Top - Section 1	197.2	1,106.4					60.4	168.6	257.6	1,275.0	0.0	
55.00		276.7	367.5					40.8	112.4	317.5	479.9	0.0	
60.00		395.3	903.5					103.8	281.1	499.2	1,184.5	0.0	
65.00		394.7	881.8					106.3	281.1	501.1	1,162.8	0.0	
70.00		393.2	860.0					108.7	281.1	501.9	1,141.1	0.0	
75.00	A	352.1	838.3	4.070.0				110.9	281.1	463.0	1,119.4	0.0	
79.00	Appertunance(s)	194.8	655.0	4,278.0	0.0	0.0	2,678.5	90.3	224.8	4,563.1	3,558.4	0.0	
80.00		231.9	161.6					15.7	54.6	247.5	216.2	0.0	
85.00	A n n o r t u n o n o o ( o )	346.0	794.9	4 404 7			0044	79.1	272.9	425.2	1,067.7	0.0	
89.00	Appertunance(s)	191.0	620.3	1,461.7	0.0	0.0	884.4	64.3	218.3	1,716.9	1,722.9	0.0	
90.00 94.92	Bot - Section 3	223.6 188.7	152.9					7.4 26 5	50.2	230.9	203.1	0.0	0.0
95.00	Bot - Section 5	117.0	739.1 22.8					36.5 0.6	247.0 4.2	225.3 117.7	986.0 27.0	0.0 0.0	
98.00	Appertunance(s)	183.0	814.4	3,072.3	0.0	0.0	2,627.7	22.6	150.7	3,277.9	3,592.8	0.0	
99.83	Top - Section 2	75.4	490.6	3,072.3	0.0	0.0	2,021.1	13.9	82.6	89.3	573.2	0.0	
100.00	Top Oction 2	192.7	20.4					1.3	7.5	193.9	27.9	0.0	
105.00		369.7	601.6					38.3	225.2	408.0	826.7	0.0	
110.00		291.7	583.5					38.8	225.2	330.5	808.6	0.0	0.0
113.00	Appertunance(s)	180.0	341.4	477.0	0.0	0.0	79.2	23.5	135.1	680.5	555.7	0.0	
115.00		248.1	224.0		• • • • • • • • • • • • • • • • • • • •			15.8	80.2	263.8	304.2	0.0	
120.00		280.6	547.3					39.8	200.6	320.4	747.8	0.0	
123.00	Appertunance(s)	172.7	319.7	3,365.8	0.0	0.0	1,432.5	24.1	120.3	3,562.7	1,872.5	0.0	
125.00	.,	237.4	209.5	-,	-		.,	0.0	57.3	237.4	266.8	0.0	
130.00		333.5	511.1					0.0	143.3	333.5	654.4	0.0	
135.00	Appertunance(s)	325.1	493.0	5,753.9	0.0	7,650.7	3,331.8	0.0	143.3	6,078.9	3,968.1	0.0	0.0
140.00	` ,	316.3	474.8	•		•	•	0.0	50.0	316.3	524.8	0.0	0.0
145.00		244.8	456.7					0.0	50.0	244.8	506.7	0.0	0.0
147.92		88.8	258.1					0.0	29.1	88.8	287.2	0.0	0.0
								То	tals:	31,377.1	43,089.5	0.00	0.00

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:01 AM

Customer: T-MOBILE

Load Case: No Ice 80.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Calculated Shaft Forces and Deflections**

Seg Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	X Deflect (in)	Z Deflect (in)	Total Deflect (in)	Rotation (deg)
0.00	-35.313	-45.214	0.000	0.000	0.000	-3,640.313	0.000	0.000	0.000	0.000
5.00	-35.041	-43.971	0.000	0.000	0.000	-3,463.751	-0.102	0.000	0.102	-0.189
10.00	-34.679	-42.471	0.000	0.000	0.000	-3,288.549	-0.403	0.000	0.102	-0.380
15.00	-34.317	-40.994	0.000	0.000	0.000	-3,115.156	-0.904	0.000	0.904	-0.572
20.00	-33.929	-39.538	0.000	0.000	0.000	-2,943.575	-1.607	0.000	1.607	-0.764
25.00	-33.565	-38.111	0.000	0.000	0.000	-2,773.935	-2.512	0.000	2.512	-0.957
30.00	-33.201	-36.708	0.000	0.000	0.000	-2,606.113	-3.619	0.000	3.619	-1.151
35.00	-32.829	-35.330	0.000	0.000	0.000	-2,440.113	-4.929	0.000	4.929	-1.345
40.00	-32.440	-33.977	0.000	0.000	0.000	-2,275.970	-6.442	0.000	6.442	-1.538
45.00	-32.123	-32.680	0.000	0.000	0.000	-2,113.772	-8.156	0.000	8.156	-1.730
46.83	-31.933	-32.186	0.000	0.000	0.000	-2,054.881	-8.835	0.000	8.835	-1.802
50.00	-31.647	-30.768	0.000	0.000	0.000	-1,953.762	-10.073	0.000	10.073	-1.924
53.00	-31.395	-29.450	0.000	0.000	0.000	-1,858.822	-11.319	0.000	11.319	-2.039
55.00	-31.125	-28.913	0.000	0.000	0.000	-1.796.033	-12.190	0.000	12.190	-2.116
60.00	-30.665	-27.655	0.000	0.000	0.000	-1,640.411	-14.501	0.000	14.501	-2.292
65.00	-30.195	-26.425	0.000	0.000	0.000	-1,487.089	-16.996	0.000	16.996	-2.465
70.00	-29.715	-25.222	0.000	0.000	0.000	-1,336.118	-19.668	0.000	19.668	-2.633
75.00	-29.260	-24.052	0.000	0.000	0.000	-1,187.544	-22.513	0.000	22.513	-2.795
79.00	-24.553	-20.693	0.000	0.000	0.000	-1,070.507	-24.909	0.000	24.909	-2.920
80.00	-24.327	-20.451	0.000	0.000	0.000	-1,045.954	-25.524	0.000	25.524	-2.951
85.00	-23.890	-19.353	0.000	0.000	0.000	-924.322	-28.694	0.000	28.694	-3.099
89.00	-22.103	-17.700	0.000	0.000	0.000	-828.762	-31.339	0.000	31.339	-3.214
90.00	-21.886	-17.480	0.000	0.000	0.000	-806.660	-32.015	0.000	32.015	-3.242
94.92	-21.623	-16.484	0.000	0.000	0.000	-699.057	-35.423	0.000	35.423	-3.373
95.00	-21.515	-16.448	0.000	0.000	0.000	-697.256	-35.482	0.000	35.482	-3.376
98.00	-18.043	-13.038	0.000	0.000	0.000	-632.711	-37.628	0.000	37.628	-3.453
99.83	-17.924	-12.464	0.000	0.000	0.000	-599.633	-38.962	0.000	38.962	-3.499
100.0	-17.744	-12.426	0.000	0.000	0.000	-596.646	-39.084	0.000	39.084	-3.503
105.0	-17.312	-11.588	0.000	0.000	0.000	-507.924	-42.823	0.000	42.823	-3.635
110.0	-16.947	-10.774	0.000	0.000	0.000	-421.368	-46.695	0.000	46.695	-3.757
113.0	-16.241	-10.249	0.000	0.000	0.000	-370.526	-49.077	0.000	49.077	-3.826
115.0	-15.970	-9.944	0.000	0.000	0.000	-338.044	-50.689	0.000	50.689	-3.869
120.0	-15.611	-9.200	0.000	0.000	0.000	-258.194	-54.791	0.000	54.791	-3.963
123.0	-11.932	-7.572	0.000	0.000	0.000	-211.362	-57.296	0.000	57.296	-4.013
125.0	-11.682	-7.313	0.000	0.000	0.000	-187.500	-58.982	0.000	58.982	-4.042
130.0	-11.309	-6.674	0.000	0.000	0.000	-129.090	-63.247	0.000	63.247	-4.104
135.0	-4.962	-3.151	0.000	0.000	0.000	-64.894	-67.567	0.000	67.567	-4.147
140.0	-4.610	-2.649	0.000	0.000	0.000	-40.084	-71.921	0.000	71.921	-4.172
145.0	-4.329	-2.161	0.000	0.000	0.000	-17.036	-76.296	0.000	76.296	-4.188
147.9	-4.159	0.000	0.000	0.000	0.000	-4.409	-78.854	0.000	78.854	-4.192

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:01 AM

Customer: T-MOBILE

Load Case: No Ice 80.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Calculated Stresses**

Seg				Applied St	resses ——			Allowable	Allowable	
Elev	Axial (Y)	Shear (X)	Shear (Z)	Torsion	Bending (X)	Bending (Z)	Combined	Stress (Fb)	Stress (Fa)	Stress
(ft)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Ratio
0.00	0.68	1.06	0.00	0.00	0.00	47.00	47.71	52.0	0.0	0.918
5.00	0.67	1.08	0.00	0.00	0.00	46.48	47.19	52.0	0.0	0.908
10.00	0.66	1.09	0.00	0.00	0.00	45.91	46.61	52.0	0.0	0.897
15.00	0.65	1.10	0.00	0.00	0.00	45.27	45.96	52.0	0.0	0.884
20.00	0.64	1.11	0.00	0.00	0.00	44.57	45.25	52.0	0.0	0.871
25.00	0.63	1.12	0.00	0.00	0.00	43.80	44.47	52.0	0.0	0.856
30.00	0.62	1.13	0.00	0.00	0.00	42.95	43.62	52.0	0.0	0.839
35.00	0.61	1.14	0.00	0.00	0.00	42.01	42.67	52.0	0.0	0.821
40.00	0.60	1.15	0.00	0.00	0.00	40.98	41.63	52.0	0.0	0.801
45.00	0.59	1.17	0.00	0.00	0.00	39.84	40.48	52.0	0.0	0.779
46.83	0.59	1.17	0.00	0.00	0.00	39.40	40.04	52.0	0.0	0.770
50.00	0.57	1.18	0.00	0.00	0.00	38.59	39.21	52.0	0.0	0.754
53.00	0.54	1.17	0.00	0.00	0.00	36.54	37.14	52.0	0.0	0.715
55.00	0.54	1.17	0.00	0.00	0.00	35.99	36.58	52.0	0.0	0.704
60.00	0.53	1.18	0.00	0.00	0.00	34.50	35.08	52.0	0.0	0.675
65.00	0.52	1.19	0.00	0.00	0.00	32.86	33.44	52.0	0.0	0.643
70.00	0.51	1.20	0.00	0.00	0.00	31.06	31.63	52.0	0.0	0.609
75.00	0.49	1.21	0.00	0.00	0.00	29.08	29.65	52.0	0.0	0.570
79.00	0.43	1.04	0.00	0.00	0.00	27.36	27.85	52.0	0.0	0.536
80.00	0.43	1.04	0.00	0.00	0.00	27.02	27.51	52.0	0.0	0.529
85.00	0.42	1.04	0.00	0.00	0.00	25.23	25.71	52.0	0.0	0.495
89.00	0.39	0.99	0.00	0.00	0.00	23.66	24.11	52.0	0.0	0.464
90.00	0.39	0.98	0.00	0.00	0.00	23.29	23.75	52.0	0.0	0.457
94.92	0.38	1.00	0.00	0.00	0.00	21.37	21.82	52.0	0.0	0.420
95.00	0.38	1.00	0.00	0.00	0.00	21.34	21.79	52.0	0.0	0.419
98.00	0.30	0.85	0.00	0.00	0.00	20.07	20.43	52.0	0.0	0.393
99.83	0.35	1.01	0.00	0.00	0.00	22.41	22.83	52.0	0.0	0.439
100.00	0.35	1.00	0.00	0.00	0.00	22.35	22.76	52.0	0.0	0.438
105.00	0.33	1.00	0.00	0.00	0.00	20.21	20.61	52.0	0.0	0.397
110.00	0.32	1.01	0.00	0.00	0.00	17.84	18.25	52.0	0.0	0.351
113.00	0.31	0.99	0.00	0.00	0.00	16.30	16.70	52.0	0.0	0.321
115.00	0.30	0.98	0.00	0.00	0.00	15.27	15.66	52.0	0.0	0.301
120.00	0.29	0.99	0.00	0.00	0.00	12.46	12.87	52.0	0.0	0.248
123.00	0.24	0.78	0.00	0.00	0.00	10.63	10.95	52.0	0.0	0.211
125.00	0.24	0.77	0.00	0.00	0.00	9.69	10.02	52.0	0.0	0.193
130.00	0.23	0.77	0.00	0.00	0.00	7.17	7.51	52.0	0.0	0.145
135.00	0.11	0.35	0.00	0.00	0.00	3.88	4.04	52.0	0.0	0.078
140.00	0.10	0.34	0.00	0.00	0.00	2.59	2.75	52.0	0.0	0.053
145.00	80.0	0.33	0.00	0.00	0.00	1.19	1.40	52.0	0.0	0.027
147.92	0.00	0.33	0.00	0.00	0.00	0.32	0.65	52.0	0.0	0.013

 Site Number:
 302468

 Code:
 TIA/EIA-222-F

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Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:02 AM

Customer: T-MOBILE

Load Case: Ice 69.28 mph Wind with Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Applied Segment Forces Summary**

		Shaft F	Forces		Discret	e Forces		Linear F	orces	- Sum of Forces			
Seg			Dead	-		Moment	Dead		Dead				Moment
Elev		Wind FX	Load			MZ	Load	Wind FX		Wind FX	Load	MY	MZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		160.4	0.0					0.0	0.0	160.4	0.0	0.0	0.0
5.00		317.8	1,300.1					0.0	0.0	317.8	1,300.1	0.0	0.0
10.00		311.8	1,275.1					82.0	321.7	393.8	1,596.7	0.0	0.0
15.00		305.7	1,250.0					82.0	321.7	387.8	1,571.7	0.0	0.0
20.00	Appertunance(s)	299.7	1,225.0	27.0	0.0	0.0	15.0	82.0	321.7	408.7	1,561.7	0.0	0.0
25.00		293.7	1,200.0					82.0	320.9	375.7	1,520.9	0.0	0.0
30.00		287.6	1,174.9					82.0	320.9	369.6	1,495.8	0.0	0.0
35.00		286.8	1,149.9					82.0	320.9	368.8	1,470.8	0.0	0.0
40.00		291.0	1,124.9					85.1	320.9	376.0	1,445.8	0.0	0.0
45.00		200.6	1,099.8					88.2	320.9	288.7	1,420.7	0.0	0.0
46.83	Bot - Section 2	149.3	397.4					33.1	117.7	182.4	515.0	0.0	0.0
50.00		185.8	1,276.9					58.0	203.2	243.8	1,480.1	0.0	0.0
53.00	Top - Section 1	151.1	1,192.4					55.9	192.5	207.0	1,384.9	0.0	0.0
55.00		212.1	424.3					37.8	128.4	249.9	552.7	0.0	0.0
60.00		303.2	1,042.2					96.1	320.9	399.3	1,363.1	0.0	0.0
65.00		302.9	1,017.2					98.4	320.9	401.3	1,338.1	0.0	0.0
70.00		301.9	992.1					100.6	320.9	402.5	1,313.0	0.0	0.0
75.00	A	270.4	967.1	4 500 5			0.404.4	102.7	320.9	373.1	1,288.0	0.0	0.0
79.00	Appertunance(s)	149.7	755.9	1,500.7	0.0	0.0	2,434.1	83.6	256.7	1,733.9	3,446.8	0.0	0.0
80.00		178.3	186.7					14.4	61.0	192.7	247.7	0.0	0.0
85.00	A n n o r t u n o n o o ( o )	266.1	917.0	4 005 4			4 000 0	72.8	305.2	339.0	1,222.2	0.0	0.0
89.00	Appertunance(s)	147.0	715.9	1,235.4	0.0	0.0	1,266.6	59.2	244.1	1,441.5	2,226.6	0.0	0.0
90.00 94.92	Bot - Section 3	172.1 145.3	176.7 852.8					6.9	56.3	179.0	232.9	0.0	0.0
95.00	Dot - Section 5	90.1	24.8					34.3 0.6	276.6 4.7	179.6 90.7	1,129.4 29.5	0.0 0.0	0.0 0.0
98.00	Appertunance(s)	140.9	883.7	2,656.5	0.0	0.0	3,591.8	21.2	4.7 168.8	2,818.6	4,644.3	0.0	0.0
99.83	Top - Section 2	58.1	532.5	2,030.3	0.0	0.0	3,391.0	13.0	93.6	71.1	626.1	0.0	0.0
100.00	rop - occilon z	148.5	24.2					1.2	8.5	149.7	32.7	0.0	0.0
105.00		285.1	712.4					35.9	255.3	321.0	967.7	0.0	0.0
110.00		225.1	691.0					36.4	255.3	261.5	946.3	0.0	0.0
113.00	Appertunance(s)	139.0	404.7	403.8	0.0	0.0	144.4	22.1	153.2	564.8	702.3	0.0	0.0
115.00		191.7	265.7	10010	0.0	0.0		14.8	92.3	206.5	357.9	0.0	0.0
120.00		216.9	648.2					37.3	230.7	254.2	878.9	0.0	0.0
123.00	Appertunance(s)	133.6	379.0	2,301.5	0.0	0.0	1,621.8	22.6	138.4	2,457.7	2,139.3	0.0	0.0
125.00	11: (*/	183.8	248.5	_,,	0.0		.,	0.0	57.3	183.8	305.9	0.0	0.0
130.00		258.4	605.4					0.0	143.3	258.4	748.7	0.0	0.0
135.00	Appertunance(s)	252.2	583.9	4,022.2	0.0	4,786.0	3,893.5	0.0	143.3	4,274.4	4,620.8	0.0	0.0
140.00	, ,	245.7	562.5	. –		,	, = = =	0.0	50.0	245.7	612.5	0.0	0.0
145.00		190.3	541.1					0.0	50.0	190.3	591.1	0.0	0.0
147.92		69.1	306.2					0.0	29.1	69.1	335.3	0.0	0.0
								То	tals:	22,389.9	49,663.8	0.00	0.00

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:04 AM

Customer: T-MOBILE

Load Case: Ice 69.28 mph Wind with Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Calculated Shaft Forces and Deflections**

Seg Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	X Deflect (in)	Z Deflect (in)	Total Deflect (in)	Rotation (deg)
0.00	-25.735	-52.680	0.000	0.000	0.000	-2,690.751	0.000	0.000	0.000	0.000
5.00	-25.541	-51.318	0.000	0.000	0.000	-2,562.081	-0.075	0.000	0.075	-0.140
10.00	-25.264	-49.661	0.000	0.000	0.000	-2,434.378	-0.298	0.000	0.298	-0.281
15.00	-24.986	-48.030	0.000	0.000	0.000	-2,308.059	-0.669	0.000	0.669	-0.423
20.00	-24.680	-46.410	0.000	0.000	0.000	-2,183.131	-1.189	0.000	1.189	-0.566
25.00	-24.400	-44.832	0.000	0.000	0.000	-2,059.733	-1.859	0.000	1.859	-0.709
30.00	-24.119	-43.281	0.000	0.000	0.000	-1,937.736	-2.679	0.000	2.679	-0.853
35.00	-23.831	-41.757	0.000	0.000	0.000	-1,817.144	-3.650	0.000	3.650	-0.997
40.00	-23.530	-40.259	0.000	0.000	0.000	-1,697.990	-4.772	0.000	4.772	-1.141
45.00	-23.277	-38.805	0.000	0.000	0.000	-1,580.345	-6.045	0.000	6.045	-1.285
46.83	-23.132	-38.265	0.000	0.000	0.000	-1,537.671	-6.549	0.000	6.549	-1.338
50.00	-22.909	-36.756	0.000	0.000	0.000	-1,464.423	-7.469	0.000	7.469	-1.430
53.00	-22.711	-35.349	0.000	0.000	0.000	-1,395.697	-8.395	0.000	8.395	-1.516
55.00	-22.505	-34.765	0.000	0.000	0.000	-1,350.276	-9.043	0.000	9.043	-1.574
60.00	-22.143	-33.363	0.000	0.000	0.000	-1,237.756	-10.763	0.000	10.763	-1.707
65.00	-21.773	-31.989	0.000	0.000	0.000	-1,127.043	-12.621	0.000	12.621	-1.837
70.00	-21.394	-30.643	0.000	0.000	0.000	-1,018.181	-14.615	0.000	14.615	-1.965
75.00	-21.032	-29.329	0.000	0.000	0.000	-911.213	-16.739	0.000	16.739	-2.089
79.00	-19.197	-25.930	0.000	0.000	0.000	-827.087	-18.531	0.000	18.531	-2.185
80.00	-19.027	-25.666	0.000	0.000	0.000	-807.890	-18.992	0.000	18.992	-2.209
85.00	-18.683	-24.425	0.000	0.000	0.000	-712.757	-21.367	0.000	21.367	-2.323
89.00	-17.172	-22.244	0.000	0.000	0.000	-638.027	-23.352	0.000	23.352	-2.411
90.00	-17.007	-22.000	0.000	0.000	0.000	-620.856	-23.859	0.000	23.859	-2.433
94.92	-16.797	-20.865	0.000	0.000	0.000	-537.240	-26.419	0.000	26.419	-2.534
95.00	-16.716	-20.831	0.000	0.000	0.000	-535.840	-26.463	0.000	26.463	-2.536
98.00	-13.706	-16.306	0.000	0.000	0.000	-485.693	-28.076	0.000	28.076	-2.595
99.83	-13.611	-15.679	0.000	0.000	0.000	-460.566	-29.079	0.000	29.079	-2.631
100.0	-13.475	-15.641	0.000	0.000	0.000	-458.297	-29.171	0.000	29.171	-2.634
105.0	-13.134	-14.667	0.000	0.000	0.000	-390.922	-31.985	0.000	31.985	-2.736
110.0	-12.845	-13.718	0.000	0.000	0.000	-325.252	-34.901	0.000	34.901	-2.830
113.0	-12.255	-13.036	0.000	0.000	0.000	-286.719	-36.696	0.000	36.696	-2.882
115.0	-12.043	-12.677	0.000	0.000	0.000	-262.209	-37.910	0.000	37.910	-2.916
120.0	-11.755	-11.801	0.000	0.000	0.000	-201.994	-41.004	0.000	41.004	-2.989
123.0	-9.194	-9.789	0.000	0.000	0.000	-166.729	-42.895	0.000	42.895	-3.028
125.0	-9.000	-9.488	0.000	0.000	0.000	-148.342	-44.168	0.000	44.168	-3.052
130.0	-8.709	-8.748	0.000	0.000	0.000	-103.341	-47.391	0.000	47.391	-3.100
135.0	-4.191	-4.364	0.000	0.000	0.000	-55.013	-50.657	0.000	50.657	-3.136
140.0	-3.913	-3.765	0.000	0.000	0.000	-34.058	-53.951	0.000	53.951	-3.157
145.0	-3.691	-3.185	0.000	0.000	0.000	-14.492	-57.264	0.000	57.264	-3.170
147.9	-3.509	0.000	0.000	0.000	0.000	-3.725	-59.201	0.000	59.201	-3.173

Site Number: 302468 Code: TIA/EIA-222-F © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:04 AM

Customer: T-MOBILE

Load Case: Ice 69.28 mph Wind with Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Calculated Stresses**

Seg				Applied St	resses ——			Allowable	Allowable	
Elev	Axial (Y)	Shear (X)	Shear (Z)	Torsion	Bending (X)	Bending (Z)	Combined	Stress (Fb)	Stress (Fa)	Stress
(ft)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi) ´	Ratio
0.00	0.79	0.78	0.00	0.00	0.00	34.74	35.55	52.0	0.0	0.684
5.00	0.79	0.78 0.78	0.00	0.00	0.00	34.74 34.38		52.0 52.0	0.0	0.667
							35.19			
10.00	0.77 0.76	0.79 0.80	0.00	0.00	0.00	33.98 33.54	34.78 34.33	52.0 52.0	0.0	0.669 0.660
15.00			0.00	0.00	0.00				0.0	
20.00	0.75	0.81	0.00	0.00	0.00	33.06	33.84	52.0	0.0	0.651
25.00	0.74	0.81	0.00	0.00	0.00	32.52	33.29	52.0	0.0	0.641
30.00	0.73	0.82	0.00	0.00	0.00	31.94	32.70	52.0	0.0	0.629
35.00	0.72	0.83	0.00	0.00	0.00	31.29	32.04	52.0	0.0	0.616
40.00	0.71	0.84	0.00	0.00	0.00	30.57	31.32	52.0	0.0	0.602
45.00	0.70	0.85	0.00	0.00	0.00	29.79	30.52	52.0	0.0	0.587
46.83	0.70	0.85	0.00	0.00	0.00	29.48	30.21	52.0	0.0	0.581
50.00	0.68	0.85	0.00	0.00	0.00	28.93	29.64	52.0	0.0	0.570
53.00	0.65	0.84	0.00	0.00	0.00	27.44	28.13	52.0	0.0	0.541
55.00	0.65	0.84	0.00	0.00	0.00	27.06	27.74	52.0	0.0	0.534
60.00	0.64	0.85	0.00	0.00	0.00	26.03	26.70	52.0	0.0	0.514
65.00	0.62	0.86	0.00	0.00	0.00	24.90	25.57	52.0	0.0	0.492
70.00	0.61	0.86	0.00	0.00	0.00	23.67	24.33	52.0	0.0	0.468
75.00	0.60	0.87	0.00	0.00	0.00	22.31	22.97	52.0	0.0	0.442
79.00	0.54	0.81	0.00	0.00	0.00	21.14	21.73	52.0	0.0	0.418
80.00	0.54	0.81	0.00	0.00	0.00	20.87	21.46	52.0	0.0	0.413
85.00	0.53	0.82	0.00	0.00	0.00	19.45	20.03	52.0	0.0	0.385
89.00	0.49	0.77	0.00	0.00	0.00	18.21	18.76	52.0	0.0	0.361
90.00	0.49	0.77	0.00	0.00	0.00	17.93	18.47	52.0	0.0	0.355
94.92	0.48	0.78	0.00	0.00	0.00	16.43	16.96	52.0	0.0	0.326
95.00	0.48	0.77	0.00	0.00	0.00	16.40	16.93	52.0	0.0	0.326
98.00	0.38	0.65	0.00	0.00	0.00	15.40	15.83	52.0	0.0	0.304
99.83	0.44	0.76	0.00	0.00	0.00	17.21	17.70	52.0	0.0	0.341
100.00	0.44	0.76	0.00	0.00	0.00	17.16	17.65	52.0	0.0	0.340
105.00	0.42	0.76	0.00	0.00	0.00	15.55	16.03	52.0	0.0	0.308
110.00	0.41	0.77	0.00	0.00	0.00	13.77	14.24	52.0	0.0	0.274
113.00	0.39	0.75	0.00	0.00	0.00	12.62	13.07	52.0	0.0	0.252
115.00	0.39	0.74	0.00	0.00	0.00	11.84	12.30	52.0	0.0	0.237
120.00	0.37	0.75	0.00	0.00	0.00	9.75	10.20	52.0	0.0	0.196
123.00	0.32	0.60	0.00	0.00	0.00	8.38	8.76	52.0	0.0	0.169
125.00	0.31	0.59	0.00	0.00	0.00	7.67	8.05	52.0	0.0	0.155
130.00	0.30	0.59	0.00	0.00	0.00	5.74	6.12	52.0	0.0	0.118
135.00	0.15	0.30	0.00	0.00	0.00	3.29	3.48	52.0	0.0	0.067
140.00	0.14	0.29	0.00	0.00	0.00	2.20	2.39	52.0	0.0	0.046
145.00	0.12	0.28	0.00	0.00	0.00	1.01	1.24	52.0	0.0	0.024
147.92	0.00	0.28	0.00	0.00	0.00	0.27	0.55	52.0	0.0	0.011
147.02	0.00	0.20	0.00	0.00	0.00	V.=.	0.00	02.0	0.0	3.0

 Site Number:
 302468

 Code:
 TIA/EIA-222-F

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Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:04 AM

Customer: T-MOBILE

Load Case: Twist/Sway 50.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Applied Segment Forces Summary**

		Shaft	Forces		Discrete	Forces		Linear Forces		Sum of Forces			
Seg			Dead			Moment	Dead		Dead				Moment
Elev		Wind FX	Load	Wind FX	ΜY	ΜZ	Load	Wind FX	Load	Wind FX	Load	MY	ΜZ
(ft)	Description	(lb)	(lb)	(lb)	(lb-ft)	(lb-ft)	(lb)	(lb)	(lb)	(lb)	(lb)	(lb-ft)	(lb)
0.00		82.1	0.0					0.0	0.0	82.1	0.0	0.0	0.0
5.00		162.6	1,127.3					0.0	0.0	162.6	1,127.3	0.0	0.0
10.00		159.5	1,105.6					34.6	281.8	194.1	1,387.4	0.0	
15.00		156.3	1,083.8					34.6	281.8	190.9	1,365.6	0.0	
20.00	Appertunance(s)	153.2	1,062.1	9.8	0.0	0.0	4.0	34.6	281.8	197.6	1,347.9	0.0	0.0
25.00		150.0	1,040.4					34.6	281.1	184.6	1,321.4	0.0	0.0
30.00		146.9	1,018.7					34.6	281.1	181.5	1,299.7	0.0	0.0
35.00		146.4	996.9					34.6	281.1	181.0	1,278.0	0.0	0.0
40.00		148.5	975.2					35.9	281.1	184.4	1,256.3	0.0	0.0
45.00		102.3	953.5					37.2	281.1	139.5	1,234.5	0.0	0.0
46.83	Bot - Section 2	76.2	344.2					13.9	103.1	90.1	447.2	0.0	0.0
50.00		94.8	1,184.8					24.5	178.0	119.2	1,362.8	0.0	0.0
53.00	Top - Section 1	77.0	1,106.4					23.6	168.6	100.6	1,275.0	0.0	0.0
55.00		108.1	367.5					15.9	112.4	124.0	479.9	0.0	0.0
60.00		154.4	903.5					40.6	281.1	195.0	1,184.5	0.0	0.0
65.00		154.2	881.8					41.5	281.1	195.7	1,162.8	0.0	0.0
70.00		153.6	860.0					42.5	281.1	196.1	1,141.1	0.0	0.0
75.00		137.5	838.3					43.3	281.1	180.9	1,119.4	0.0	0.0
79.00	Appertunance(s)	76.1	655.0	1,671.1	0.0	0.0	2,678.5	35.3	224.8	1,782.4	3,558.4	0.0	0.0
80.00		90.6	161.6					6.1	54.6	96.7	216.2	0.0	0.0
85.00		135.2	794.9					30.9	272.9	166.1	1,067.7	0.0	0.0
89.00	Appertunance(s)	74.6	620.3	571.0	0.0	0.0	884.4	25.1	218.3	670.7	1,722.9	0.0	0.0
90.00		87.3	152.9					2.9	50.2	90.2	203.1	0.0	0.0
94.92	Bot - Section 3	73.7	739.1					14.3	247.0	88.0	986.0	0.0	0.0
95.00		45.7	22.8					0.2	4.2	46.0	27.0	0.0	0.0
98.00	Appertunance(s)	71.5	814.4	1,200.1	0.0	0.0	2,627.7	8.8	150.7	1,280.4	3,592.8	0.0	0.0
99.83	Top - Section 2	29.4	490.6					5.4	82.6	34.9	573.2	0.0	0.0
100.00		75.3	20.4					0.5	7.5	75.8	27.9	0.0	0.0
105.00		144.4	601.6					15.0	225.2	159.4	826.7	0.0	0.0
110.00		114.0	583.5					15.2	225.2	129.1	808.6	0.0	0.0
113.00	Appertunance(s)	70.3	341.4	186.3	0.0	0.0	79.2	9.2	135.1	265.8	555.7	0.0	0.0
115.00		96.9	224.0					6.2	80.2	103.1	304.2	0.0	0.0
120.00		109.6	547.3					15.5	200.6	125.1	747.8	0.0	0.0
123.00	Appertunance(s)	67.5	319.7	1,314.8	0.0	0.0	1,432.5	9.4	120.3	1,391.7	1,872.5	0.0	
125.00	,	92.7	209.5	,			,	0.0	57.3	92.7	266.8	0.0	
130.00		130.3	511.1					0.0	143.3	130.3	654.4	0.0	
135.00	Appertunance(s)	127.0	493.0	2,247.6	0.0	2,988.6	3,331.8	0.0	143.3	2,374.6	3,968.1	0.0	
140.00	(-/	123.6	474.8	,		,	-,	0.0	50.0	123.6	524.8	0.0	
145.00		95.6	456.7					0.0	50.0	95.6	506.7	0.0	
147.92		34.7	258.1					0.0	29.1	34.7	287.2	0.0	
									tals:		43,089.5		

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:06 AM

Customer: T-MOBILE

Load Case: Twist/Sway 50.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

## **Calculated Shaft Forces and Deflections**

Seg	Lateral	Axial	Lateral	Moment	Torsion	Moment MZ	X Deflect	Z Deflect	Total Deflect	Detetion
Elev	FX (-)	FY (-)	FZ .	MX	MY					Rotation
(ft)	(kips)	(kips)	(kips)	(ft-kips)	(ft-kips)	(ft-kips)	(in)	(in)	(in)	(deg)
0.00	-13.794	-45.264	0.000	0.000	0.000	-1,423.084	0.000	0.000	0.000	0.000
5.00	-13.688	-44.120	0.000	0.000	0.000	-1,354.114	-0.040	0.000	0.040	-0.074
10.00	-13.547	-42.715	0.000	0.000	0.000	-1,285.674	-0.158	0.000	0.158	-0.148
15.00	-13.406	-41.332	0.000	0.000	0.000	-1,217.940	-0.354	0.000	0.354	-0.223
20.00	-13.255	-39.968	0.000	0.000	0.000	-1,150.912	-0.628	0.000	0.628	-0.299
25.00	-13.114	-38.630	0.000	0.000	0.000	-1,084.639	-0.982	0.000	0.982	-0.374
30.00	-12.972	-37.315	0.000	0.000	0.000	-1,019.073	-1.415	0.000	1.415	-0.450
35.00	-12.828	-36.022	0.000	0.000	0.000	-954.214	-1.927	0.000	1.927	-0.526
40.00	-12.677	-34.751	0.000	0.000	0.000	-890.077	-2.519	0.000	2.519	-0.601
45.00	-12.553	-33.506	0.000	0.000	0.000	-826.695	-3.189	0.000	3.189	-0.677
46.83	-12.480	-33.052	0.000	0.000	0.000	-803.681	-3.455	0.000	3.455	-0.705
50.00	-12.369	-31.681	0.000	0.000	0.000	-764.163	-3.939	0.000	3.939	-0.752
53.00	-12.271	-30.399	0.000	0.000	0.000	-727.057	-4.426	0.000	4.426	-0.797
55.00	-12.166	-29.911	0.000	0.000	0.000	-702.516	-4.767	0.000	4.767	-0.827
60.00	-11.988	-28.715	0.000	0.000	0.000	-641.687	-5.671	0.000	5.671	-0.896
65.00	-11.805	-27.542	0.000	0.000	0.000	-581.750	-6.646	0.000	6.646	-0.964
70.00	-11.619	-26.391	0.000	0.000	0.000	-522.726	-7.692	0.000	7.692	-1.030
75.00	-11.442	-25.264	0.000	0.000	0.000	-464.633	-8.804	0.000	8.804	-1.093
79.00	-9.602	-21.736	0.000	0.000	0.000	-418.866	-9.742	0.000	9.742	-1.142
80.00	-9.514	-21.516	0.000	0.000	0.000	-409.264	-9.982	0.000	9.982	-1.154
85.00	-9.344	-20.444	0.000	0.000	0.000	-361.694	-11.223	0.000	11.223	-1.212
89.00	-8.646	-18.732	0.000	0.000	0.000	-324.318	-12.258	0.000	12.258	-1.257
90.00	-8.561	-18.526	0.000	0.000	0.000	-315.672	-12.522	0.000	12.522	-1.268
94.92	-8.459	-17.538	0.000	0.000	0.000	-273.580	-13.856	0.000	13.856	-1.319
95.00	-8.417	-17.510	0.000	0.000	0.000	-272.875	-13.879	0.000	13.879	-1.320
98.00	-7.059	-13.945	0.000	0.000	0.000	-247.624	-14.718	0.000	14.718	-1.350
99.83	-7.013	-13.372	0.000	0.000	0.000	-234.682	-15.240	0.000	15.240	-1.368
100.0	-6.943	-13.342	0.000	0.000	0.000	-233.514	-15.288	0.000	15.288	-1.370
105.0	-6.774	-12.514	0.000	0.000	0.000	-198.799	-16.751	0.000	16.751	-1.422
110.0	-6.632	-11.704	0.000	0.000	0.000	-164.928	-18.267	0.000	18.267	-1.470
113.0	-6.356	-11.153	0.000	0.000	0.000	-145.031	-19.199	0.000	19.199	-1.496
115.0	-6.251	-10.849	0.000	0.000	0.000	-132.318	-19.830	0.000	19.830	-1.513
120.0	-6.111	-10.102	0.000	0.000	0.000	-101.065	-21.435	0.000	21.435	-1.550
123.0	-4.671	-8.267	0.000	0.000	0.000	-82.734	-22.416	0.000	22.416	-1.570
125.0	-4.573	-8.001	0.000	0.000	0.000	-73.393	-23.076	0.000	23.076	-1.581
130.0	-4.427	-7.349	0.000	0.000	0.000	-50.528	-24.745	0.000	24.745	-1.605
135.0	-1.943	-3.449	0.000	0.000	0.000	-25.403	-26.437	0.000	26.437	-1.622
140.0	-1.805	-2.928	0.000	0.000	0.000	-15.689	-28.141	0.000	28.141	-1.632
145.0	-1.695	-2.424	0.000	0.000	0.000	-6.666	-29.854	0.000	29.854	-1.638
147.9	-1.625	0.000	0.000	0.000	0.000	-1.722	-30.855	0.000	30.855	-1.640

Site Number: 302468 Code: TIA/EIA-222-F © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:06 AM

Customer: T-MOBILE

Load Case: Twist/Sway 50.00 mph Wind with No Ice 22 Iterations

Gust Response Factor: 1.69
Dead Load Factor: 1.00
Wind Load Factor: 1.00

# **Calculated Stresses**

Seg				Applied St	resses ——			Allowable	Allowable	
Elev	Axial (Y)	Shear (X)	Shear (Z)	Torsion	Bending (X)	Bending (Z)	Combined	Stress (Fb)	Stress (Fa)	Stress
(ft)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	(ksi)	Ratio
0.00	0.68	0.42	0.00	0.00	0.00	18.37	19.06	52.0	0.0	0.367
5.00	0.67	0.42	0.00	0.00	0.00	18.17	18.86	52.0	0.0	0.363
10.00	0.66	0.42	0.00	0.00	0.00	17.95	18.63	52.0	0.0	0.358
15.00	0.66	0.43	0.00	0.00	0.00	17.70	18.37	52.0	0.0	0.353
20.00	0.65	0.43	0.00	0.00	0.00	17.43	18.09	52.0	0.0	0.348
25.00	0.64	0.44	0.00	0.00	0.00	17.13	17.78	52.0	0.0	0.342
30.00	0.63	0.44	0.00	0.00	0.00	16.80	17.44	52.0	0.0	0.336
35.00	0.62	0.45	0.00	0.00	0.00	16.43	17.07	52.0	0.0	0.328
40.00	0.61	0.45	0.00	0.00	0.00	16.03	16.66	52.0	0.0	0.320
45.00	0.60	0.46	0.00	0.00	0.00	15.58	16.21	52.0	0.0	0.312
46.83	0.60	0.46	0.00	0.00	0.00	15.41	16.03	52.0	0.0	0.308
50.00	0.59	0.46	0.00	0.00	0.00	15.09	15.70	52.0	0.0	0.302
53.00	0.56	0.46	0.00	0.00	0.00	14.29	14.88	52.0	0.0	0.286
55.00	0.56	0.46	0.00	0.00	0.00	14.08	14.65	52.0	0.0	0.282
60.00	0.55	0.46	0.00	0.00	0.00	13.49	14.06	52.0	0.0	0.271
65.00	0.54	0.46	0.00	0.00	0.00	12.85	13.42	52.0	0.0	0.258
70.00	0.53	0.47	0.00	0.00	0.00	12.15	12.71	52.0	0.0	0.244
75.00	0.52	0.47	0.00	0.00	0.00	11.38	11.93	52.0	0.0	0.229
79.00	0.46	0.41	0.00	0.00	0.00	10.70	11.18	52.0	0.0	0.215
80.00	0.45	0.40	0.00	0.00	0.00	10.57	11.05	52.0	0.0	0.213
85.00	0.44	0.41	0.00	0.00	0.00	9.87	10.34	52.0	0.0	0.199
89.00	0.42	0.39	0.00	0.00	0.00	9.26	9.70	52.0	0.0	0.187
90.00	0.41	0.39	0.00	0.00	0.00	9.12	9.55	52.0	0.0	0.184
94.92	0.40	0.39	0.00	0.00	0.00	8.36	8.79	52.0	0.0	0.169
95.00	0.40	0.39	0.00	0.00	0.00	8.35	8.78	52.0	0.0	0.169
98.00	0.33	0.33	0.00	0.00	0.00	7.85	8.20	52.0	0.0	0.158
99.83	0.37	0.39	0.00	0.00	0.00	8.77	9.17	52.0	0.0	0.176
100.00	0.37	0.39	0.00	0.00	0.00	8.75	9.14	52.0	0.0	0.176
105.00	0.36	0.39	0.00	0.00	0.00	7.91	8.30	52.0	0.0	0.160
110.00	0.35	0.40	0.00	0.00	0.00	6.98	7.36	52.0	0.0	0.142
113.00	0.34	0.39	0.00	0.00	0.00	6.38	6.75	52.0	0.0	0.130
115.00	0.33	0.39	0.00	0.00	0.00	5.98	6.34	52.0	0.0	0.122
120.00	0.32	0.39	0.00	0.00	0.00	4.88	5.24	52.0	0.0	0.101
123.00	0.27	0.30	0.00	0.00	0.00	4.16	4.46	52.0	0.0	0.086
125.00	0.26	0.30	0.00	0.00	0.00	3.79	4.09	52.0	0.0	0.079
130.00	0.25	0.30	0.00	0.00	0.00	2.81	3.10	52.0	0.0	0.060
135.00	0.12	0.14	0.00	0.00	0.00	1.52	1.66	52.0	0.0	0.032
140.00	0.11	0.13	0.00	0.00	0.00	1.01	1.14	52.0	0.0	0.022
145.00	0.09	0.13	0.00	0.00	0.00	0.47	0.60	52.0	0.0	0.012
147.92	0.00	0.13	0.00	0.00	0.00	0.13	0.25	52.0	0.0	0.005

Site Number: 302468 Code: TIA/EIA-222-F © 2007 - 2016 by ATC IP LLC. All rights reserved.

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:06 AM

Customer: T-MOBILE

# **Analysis Summary**

	Reactions ————									
Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
No Ice	35.3	0.00	45.21	0.00	0.00	3640.31	47.71	52.0	0.00	0.918
lce	25.7	0.00	52.68	0.00	0.00	2690.75	35.55	52.0	0.00	0.684
Twist/Sway	13.8	0.00	45.26	0.00	0.00	1423.08	19.06	52.0	0.00	0.367

Site Name: Petro Lock, CT Engineering Number: 663406KK2 5/17/2016 9:13:06 AM

Customer: T-MOBILE

# **Base Summary**

### Reactions

Orig	ginal Desigi	n —		<b>Analysis</b>		
Moment	Axial	Shear	Moment	Axial	Shear	Moment
(kip-ft)	(kip)	(kip)	(kip-ft)	(kip)	(kip)	Design %
2,489.00	36.10	23.90	3,640.31	52.68	35.31	146.26

### **Base Plate**

								Allow	Applied	
Yield	Thick	Width		Poly	Clip Ler	Effective	Moment	Stress	Stress	Stress
(ksi)	(in)	(in)	Style	Sides	(in)	Len (in)	(kip-in)	(ksi)	(ksi)	Ratio
60.0	2.500	69 000	Round	0	0.00	11.224	340 23	60.00	29 10	0.49

### **Anchor Bolts**

								Start	<u> —</u> со	mpressi	on —		Tension	
Bolt	Num		Bolt	Yield	Ultim ate		Cluster	Angle	Force	Allow		Force	Allow	
Circle	Bolts	Bolt Type	Dia (in)	(ksi)	(ksi)	Arrange	Dist (in)	(deg)	(kip)	(kip)	Ratio	(kip)	(kip)	Ratio
63.00	16	2.25" 18J	2.25	75.00	100.00	Radial	0.00	0.0	176.64	195.00	0.91	170.06	195.00	0.87

Site Name: Petro Lock, CT *Program Last Updated:* 5/13/2014
Site Number: 302468 *American Tower Corporation* 

0.0 k

MP

Engineer: AT
Engineering Number: 663406KK2
Date: 05/17/16

### Design Base Loads (Unfactored) - Analysis per TIA-222-F Standards

Analyze or Design a Foundation?

Foundation Mapped:

Moment (M):

Shear/Leg (V):

Axial Load (P):

Analyze

N

3640.3 k-ft

35.3 k

45.2 k

Tower Type (GT / SST / MP): Diameter of Caisson (d):

Caisson Embedment (L-h): Caisson Height Above Ground (h):

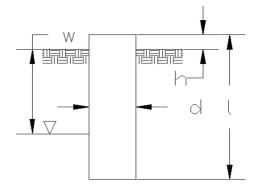
Depth Below Ground Surface to Water Table (w):

Unit Weight of Concrete: Unit Weight of Water:

Tension Skin Friction/Compression Skin Friction:

Pullout Angle:

Uplift/Leg (U):



7.0	ft
33.5	ft
0.5	ft
7.0	ft
150.0	pcf
62.4	pcf
1.00	
30.0	degrees

# Engineer Notes

#### **Soil Mechanical Properties**

Dept	th (ft)	$\gamma_{Soil}$	Cohesion	ф	Allowable Skin	Allowable Bearing
Тор	Bottom	(pcf)	(psf)	(degree)	Friction (psf)	Pressure (psf)
0.0	4.0	100	0	0	0	0
4.0	26.0	110	2880		1440	
26.0	33.5	120	10080		5040	40000

Required Embedment: 20.1 ft - OK, Caisson Embedment Satisfactory

Volume of Concrete:  $1308.5 \text{ ft}^3 = 48.5 \text{ yd}^3$ 

Weight of Concrete (Buoyancy Effect Considered): 132.6 k

Average Soil Unit Weight: 61.7 pcf Skin Friction Resistance: 1527.9 k

Compressive Bearing Resistance: 1539.4 k

Pullout Weight (Minus Concrete Weight): 1248.9 k Allowable Uplift Capacity ( $U_{Allow}$ ): 730.6 k Allowable Compressive Capacity ( $P_{Allow}$ ): 3067.3 k

Allowable Compressive Capacity (P<sub>Allow</sub>): 3067.3 k Compressive Design Load (P): 95.4 k

U / U<sub>Allow</sub>: 0.00 Result: OK

P / P<sub>Allow</sub>: 0.03 Result: OK

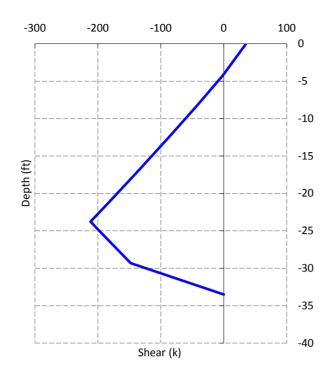
Total Lateral Resistance: 5818.2 k

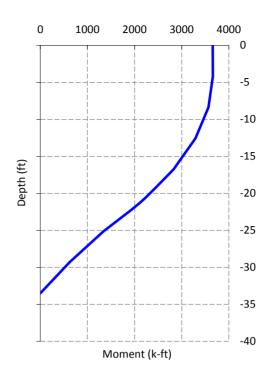
Inflection Point (Below Ground Surface): 23.8 ft Design Overturning Moment At Inflection Point ( $M_D$ ): 4496.7 k-ft Nominal Moment Capacity ( $M_{Allow}$ ): 46061.8 k-ft

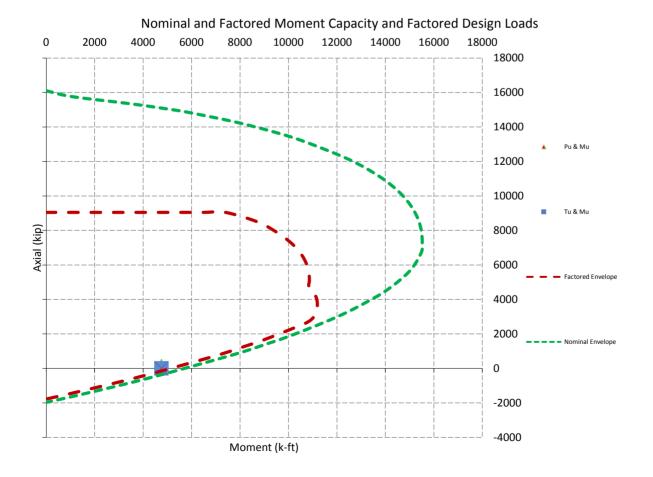
 $M_{Allow}$  /  $M_{D}$  Factor of Safety: 10.24 Result: OK

### **Caisson Strength Capacity**

Caissoil Strength Capacity		
Concrete Compressive Strength (f'c):	3000 psi	
Vertical Steel Rebar Size #:	11	
Vertical Steel Rebar Area:	1.56 in <sup>2</sup>	
Design # of Vertical Steel Rebars:	21	
Vertical Steel Rebar Yield Strength (F <sub>y</sub> ):	60 ksi	
Horizontal Tie / Stirrup Size #:	5	
Horizontal Tie / Stirrup Area:	0.31_ in <sup>2</sup>	
Design Horizontal Tie / Stirrup Spacing:	18.0 in	
Horizontal Tie / Stirrup Steel Yield Strength (F <sub>y</sub> ):	60 ksi	
Rebar Cage Diameter:	76.0 in	
Strength Bending/Tension Reduction Factor ( $\phi_B$ ):	0.90 ACI318-05 - 9.3.2.1	
Strength Shear Reduction Factor ( $\phi_V$ ):	0.75 ACI318-05 - 9.3.2.3	
Strength Compression Reduction Factor ( $\phi_V$ ):	0.65 ACI318-05 - 9.3.2.2	
Wind Design Factor:	1.30 ACI318-05 - 9.2.1	
Steel Elastic Modulus:	29000 ksi	
Design Moment (M <sub>u</sub> ):	4759.4 k-ft	
Nominal Moment Capacity $(\phi_B M_n)$ :	4963.4 k-ft - ACI318-005 - 10.2	
$M_u/\phi_BM_n$ :	0.96 Result: OK	
Design Shear (V <sub>u</sub> ):	275.3 k	
Nominal Shear Capacity ( $\phi_V V_n$ ):	457.2 k - ACI318-05 - 11.3.1.1 or 11.	5.7.2
$V_u/\phi_V V_n$ :	0.60 Result: OK	
Design Tension (T <sub>u</sub> ):	0.0 k	
Nominal Tension Capacity $(\phi_T T_n)$ :	1769.0 k - ACI318-05 - 10.2	
$T_{\rm u}/\phi_{\rm T}T_{\rm n}$ :	0.00 Result: OK	
Design Compression (P <sub>u</sub> ):	124.1 k	
Nominal Compression Capacity $(\phi_P P_n)$ :	7304.9 k - ACI318-05 - 10.3.6.2	
$P_u/\phi_P P_n$ :	0.02 Result: OK	
Bending Reinforcement Ratio:	0.006 ACI318-05 - 10.8.4 & 10.9.1	
$M_u/\phi_B M_n + T_u/\phi_T T_n$ :	0.96 Result: OK	







# Exhibit E



# RADIO FREQUENCY EMISSIONS ANALYSIS REPORT EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11661A

Hartford South 2/Frnkln Av. 99 Meadow Street Hartford, CT 06114

May 15, 2016

EBI Project Number: 6216002334

Site Compliance Summary								
Compliance Status:	COMPLIANT							
Site total MPE% of FCC general public allowable limit:	10.29 %							



May 15, 2016

T-Mobile USA Attn: Jason Overbey, RF Manager 35 Griffin Road South Bloomfield, CT 06002

Emissions Analysis for Site: CT11661A - Hartford South 2/Frnkln Av.

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **99 Meadow Street, Hartford, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu$ W/cm<sup>2</sup>). The number of  $\mu$ W/cm<sup>2</sup> calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) - (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ( $\mu$ W/cm<sup>2</sup>). The general population exposure limit for the 700 MHz Band is approximately 467  $\mu$ W/cm<sup>2</sup>, and the general population exposure limit for the PCS and AWS bands is 1000  $\mu$ W/cm<sup>2</sup>. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.



Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

### **CALCULATIONS**

Calculations were done for the proposed T-Mobile Wireless antenna facility located at **99 Meadow Street, Hartford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

- 1) 2 GSM channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 2) 2 UMTS channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 2 UMTS channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel
- 4) 2 LTE channels (AWS Band 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 5) 2 LTE channels (PCS Band 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel
- 6) 1 LTE channel (700 MHz Band) was considered for each sector of the proposed installation. This channel has a transmit power of 30 Watts.



- 7) Since some radios are ground mounted there are additional cabling losses accounted for the passive antennas. For each passive RF path the following losses were calculated. 0.90 dB of additional cable loss for all 700 MHz Channels, 1.66 dB of additional cable loss for all 1900 MHz channels and 1.71 dB of additional cable loss for all 2100 MHz channels. This is based on manufacturers Specifications for 161 feet of 1-5/8" coax cable on each path. The passive antennas on this site are the RFS APX16DWV-16DWVS-E-A20 and the Commscope LNX-6515DS-VTM
- 8) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 9) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 10) The antennas used in this modeling are the **Ericsson AIR32 B4A/B2A** for 1900 MHz (PCS) and 2100 MHz (AWS) channels, **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **Commscope LNX-6515DS-VTM** for 700 MHz channels. This is based on feedback from the carrier with regards to anticipated antenna selection. The **Ericsson AIR32 B4A/B2A** has a maximum gain of **15.9 dBd** at its main lobe. The **RFS APX16DWV-16DWVS-E-A20** has a maximum gain of **16.3 dBd** at its main lobe. The **Commscope LNX-6515DS-VTM** has a maximum gain of **14.6 dBd** at its main lobe. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 11) The antenna mounting height centerline of the proposed antennas is **123 feet** above ground level (AGL).
- 12) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculations were done with respect to uncontrolled / general public threshold limits.



### **T-Mobile Site Inventory and Power Data**

Sector:	A	Sector:	В	Sector:	С
Antenna #:	1	Antenna #:	1	Antenna #:	1
361 /36 11	Ericsson AIR32	261 /26 11	Ericsson AIR32	261 /26 11	Ericsson AIR32
Make / Model:	B4A/B2A	Make / Model:	B4A/B2A	Make / Model:	B4A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	123	Height (AGL):	123	Height (AGL):	123
F	1900 MHz(PCS) /	E D d.	1900 MHz(PCS) /	F D 1-	1900 MHz(PCS) /
Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)	Frequency Bands	2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX	240	Total TX	240	Total TX	240
Power(W):		Power(W):	240	Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	2.45	Antenna B1 MPE%	2.45	Antenna C1 MPE%	2.45
Antenna #:	2	Antenna #:	2	Antenna #:	2
	RFS		RFS		RFS
Make / Model:	APX16DWV-	Make / Model:	APX16DWV-	Make / Model:	APX16DWV-
	16DWV-S-E-A20		16DWV-S-E-A20		16DWV-S-E-A20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	123	Height (AGL):	123	Height (AGL):	123
Frequency Bands	1900 MHz(PCS) /	Frequency Bands	1900 MHz(PCS) /	Frequency Bands	1900 MHz(PCS) /
	2100 MHz (AWS)		2100 MHz (AWS)		2100 MHz (AWS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX	180	Total TX	180	Total TX	180
Power(W):		Power(W):		Power(W):	
ERP (W):	5,219.30	ERP (W):	5,219.30	ERP (W):	5,219.30
Antenna A2 MPE%	1.37	Antenna B2 MPE%	1.37	Antenna C2 MPE%	1.37
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Commscope LNX-	Make / Model:	Commscope LNX-	Make / Model:	Commscope LNX-
Make / Model.	6515DS-VTM	Make / Model.	6515DS-VTM	wiake / wiodei.	6515DS-VTM
Gain:	14.6 dBd	Gain:	14.6 dBd	Gain:	14.6 dBd
Height (AGL):	123	Height (AGL):	123	Height (AGL):	123
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	1	Channel Count	1	Channel Count	1
Total TX	30	Total TX	30	Total TX	30
Power(W):		Power(W):		Power(W):	
ERP (W):	703.27	ERP (W):	703.27	ERP (W):	703.27
Antenna A3 MPE%	0.40	Antenna B3 MPE%	0.40	Antenna C3 MPE%	0.40

Site Composite MPE%				
Carrier	MPE%			
T-Mobile (Per Sector Max)	4.22 %			
MetroPCS	1.06 %			
AT&T	2.38 %			
Nextel	0.26 %			
Clearwire	0.27 %			
Sprint	2.10 %			
Site Total MPE %:	10.29 %			

T-Mobile Sector 1 Total:	4.22 %
T-Mobile Sector 2 Total:	4.22 %
T-Mobile Sector 3 Total:	4.22 %
Site Total:	10.29 %

T-Mobile _per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (µW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 2100 MHz (AWS) LTE	2	2334.27	123	12.23	2100	1000	1.23 %
T-Mobile 1900 MHz (PCS) LTE	2	2334.27	123	12.26	1900	1000	1.23 %
T-Mobile 1900 MHz (PCS) UMTS / GSM	4	873.22	123	9.17	1900	1000	0.92 %
T-Mobile 2100 MHz (AWS) UMTS	2	863.22	123	4.53	2100	1000	0.45 %



T-Mobile 700 MHz LTE	1	703.27	123	1.85	700	467	0.40 %
						Total:	4.22%

# **Summary**

All calculations performed for this analysis yielded results that were **within** the allowable limits for general public exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)		
Sector 1:	4.22 %		
Sector 2:	4.22 %		
Sector 3:	4.22 %		
T-Mobile Per Sector	4.22 %		
Maximum:			
Site Total:	10.29 %		
Site Compliance Status:	COMPLIANT		

The anticipated composite MPE value for this site assuming all carriers present is **10.29%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government.