



September 8, 2017

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

Regarding: Notice of Exempt Modification – Swap of 3 Antennas and addition of radios and triplexers
Property Address: 10 Willard Road, Norwalk, CT (the “Property”)
Applicant: AT&T Mobility (“AT&T”, AT&T Site CT2132)

Dear Ms. Bachman:

AT&T currently maintains a wireless telecommunications facility on an existing 350 foot Lattice tower (“tower”) at the above-referenced address, latitude 41.12827, longitude -73.3901661. AT&T’s facility consists of nine (9) wireless telecommunications antennas at 347 feet. The tower is controlled and owned by Fuller Development, LLC. Assessor’s information is attached hereto.

AT&T desires to modify its existing telecommunications facility by swapping three (3) antennas and adding (3) remote radios and (6) triplexers. The centerline height of said antennas is and will remain at 347 feet.

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

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

1. The planned modifications will not result in an increase in the height of the existing structure. AT&T’s antennas and associated lines will be installed at 347 foot level of the 350 foot Lattice tower.
2. The proposed modifications will not involve any changes to ground-mounted equipment and, therefore will not require an extension of the site boundary.
3. The proposed modification will not increase the noise level at the facility by six decibel or more, or to levels that exceed state and local criteria.



4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. An RF emissions calculation is attached.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The tower and its foundation can support AT&T's proposed modifications. (Please see attached Structural analysis completed by Malouf Engineering Intl., Inc. dated September 7, 2017).

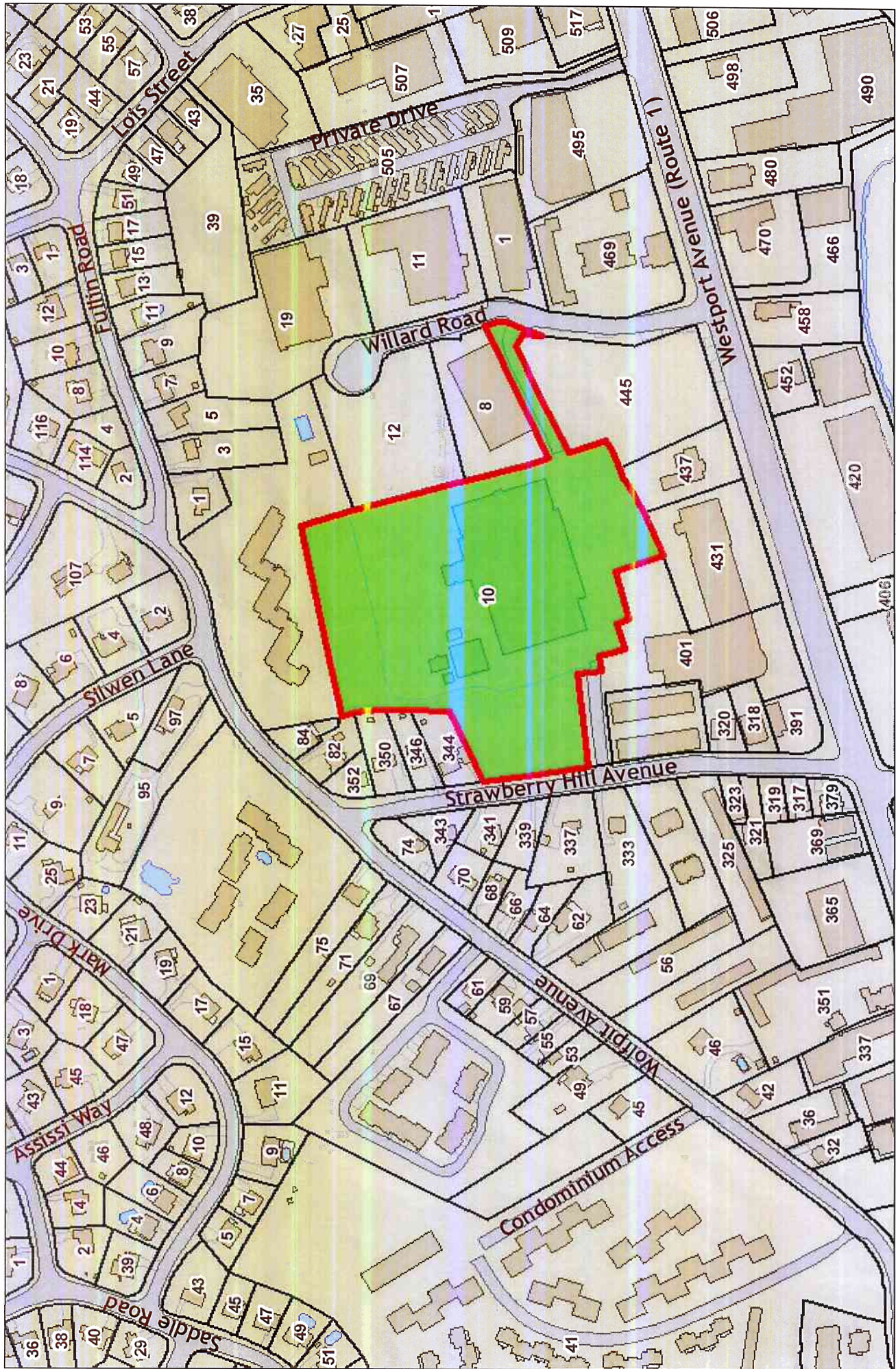
For the foregoing reasons AT&T respectfully requests that the proposed swap of 3 antennas and addition of 3 radios and 6 triplexers be allowed within the exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom

CC: The Honorable Harry Rilling, Mayor, City of Norwalk
William Ireland, Chief Building Official, City of Norwalk
Michael E. Wrinn, Director of Planning and Zoning, City of Norwalk
Fuller Development, LLC, c/o Samuel B. Fuller

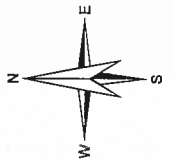
16 Esquire Road, Billerica, MA 01862 Phone 978-284-3906 Email: ncaplan@empiretelecomm.com



Norwalk, CT



1 inch = 362 feet



10 WILLARD RD

Location 10 WILLARD RD

Mblu 5/ 17/ 2/ 0/

Acct# 11273

Owner SOUTHERN NEW ENG TEL CO

Assessment \$3,967,780

Appraisal \$5,668,250

PID 11273

Building Count 3

Assessing Distr...

Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2015	\$1,175,000	\$4,493,250	\$5,668,250

Assessment			
Valuation Year	Improvements	Land	Total
2015	\$822,500	\$3,145,280	\$3,967,780

Owner of Record

Owner SOUTHERN NEW ENG TEL CO
Co-Owner PROPERTY TAX ADMIN
Address ONE SBC CENTER RM 36-M-01
 ST LOUIS, MO 63101

Sale Price \$0
Certificate
Book & Page 401/370
Sale Date 03/10/1954

Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
SOUTHERN NEW ENG TEL CO	\$0		401/370	03/10/1954

Building Information

Building 1 : Section 1

Year Built: 1956
Living Area: 46,692
Replacement Cost: \$2,157,385
Building Percent 43
Good:
Replacement Cost
Less Depreciation: \$927,680

Building Photo

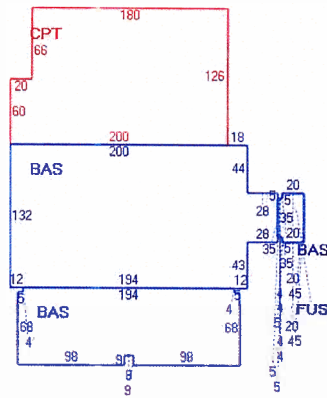
Building Attributes	
Field	Description
STYLE	Warehouse

MODEL	Industrial
Stories:	1.00
Occupancy	2.00
Exterior Wall 1	Brick Veneer
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	Minimum
Interior Floor 1	Concrete
Interior Floor 2	Vinyl
Heating Fuel	Oil
Heating Type	Forced Air
AC Percent	35
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	Heat/AC Split
Frame	Steel
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	12.00
% Sprinkler	65.00



(http://images.vgsi.com/photos/NorwalkCTPhotos//00\00\31\78.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	45,652	45,652
FUS	Finished Upper Story	1,040	1,040
CPT	Carport	23,880	0
		70,572	46,692

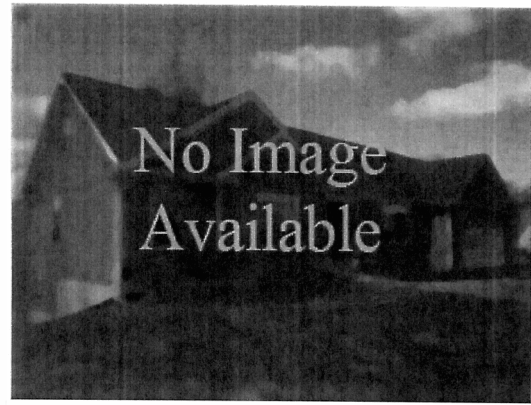
Building 2 : Section 1

Year Built: 1972
Living Area: 988
Replacement Cost: \$91,686
Building Percent Good: 47
Replacement Cost Less Depreciation: \$43,090

Building Attributes : Bldg 2 of 3	
Field	Description
STYLE	Commercial

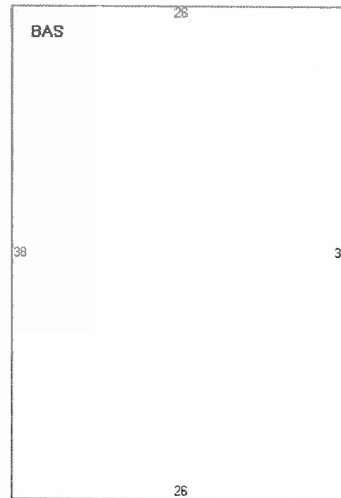
Building Photo

MODEL	Industrial
Stories:	1.00
Occupancy	1.00
Exterior Wall 1	Concrete
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Tar and Gravel
Interior Wall 1	Minimum
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Light
Wall Height	12.00
% Sprinkler	0.00



(<http://images.vgsi.com/photos/NorwalkCTPhotos//default.jpg>)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	988	988
		988	988

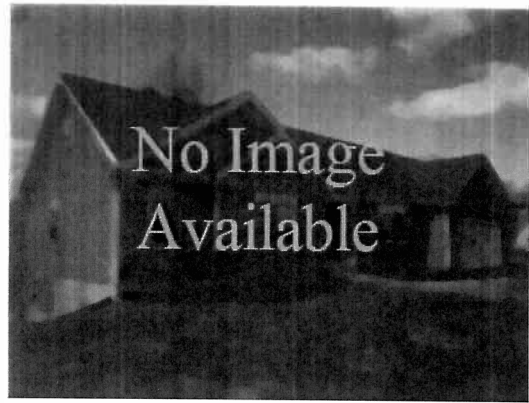
Building 3 : Section 1

Year Built: 1988
Living Area: 560
Replacement Cost: \$36,019
Building Percent Good: 55
Replacement Cost Less Depreciation: \$19,810

Building Attributes : Bldg 3 of 3	
Field	Description
STYLE	Telephone Bldg
MODEL	Industrial
Stories:	1.00
Occupancy	1.00

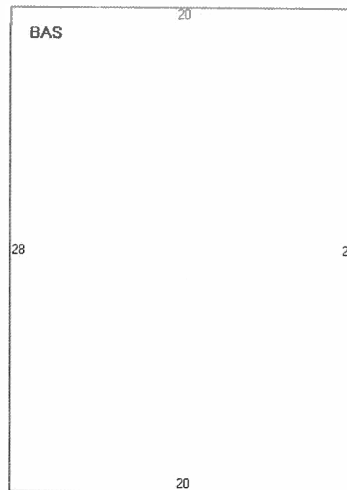
Building Photo

Exterior Wall 1	Precast Panel
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Vinyl
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Percent	100
Heat Percent	100
Bldg Use	Utility
Total Rooms	0
Bedrooms	0
FBM Area	
Heat/AC	None
Frame	Typical
Plumbing	Average
Foundation	Slab
Partitions	Average
Wall Height	
% Sprinkler	0.00



(<http://images.vgsi.com/photos/NorwalkCTPhotos//default.jpg>)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	560	560
		560	560

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 401
 Description Utility
 Zone B2
 Neighborhood C330

Land Line Valuation

Size (Acres) 8.29
 Frontage
 Depth
 Assessed Value \$3,145,280
 Appraised Value \$4,493,250

Outbuildings

Outbuildings						Legend
Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
PAV1	Paving Asph.			12000.00 S.F.	\$12,600	1
PAV1	Paving Asph.			60300.00 S.F.	\$63,320	1
FN6	Fence 6'			3000.00 L.F.	\$21,000	1
TNK1	Tank Under Grn			10000.00 GALS	\$7,500	1
CEL1	Cell Tower			1.00 UNITS	\$80,000	1

Valuation History

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$1,175,000	\$4,493,250	\$5,668,250
2013	\$1,175,000	\$4,493,250	\$5,668,250
2012	\$1,703,300	\$4,289,700	\$5,993,000

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$822,500	\$3,145,280	\$3,967,780
2013	\$822,500	\$3,145,280	\$3,967,780
2012	\$1,192,310	\$3,002,790	\$4,195,100

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PROJECT INFORMATION

SCOPE OF WORK:

- AT&T ANTENNAS: (1) NEW ANTENNAS PER SECTOR, FOR A TOTAL OF (3); (1) EXISTING ANTENNAS PER SECTOR, TO BE REMOVED FOR A TOTAL OF (3);
- AT&T RRUS: (1) NEW RRUS PER SECTOR, FOR A TOTAL OF (3); (2) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (6); (1) EXISTING RRUS PER SECTOR TO BE REMOVED, FOR A TOTAL OF (3).
- AT&T TRIPLEXERS: (2) NEW TRIPLEXERS PER SECTOR, FOR A TOTAL OF (6).
- AT&T RRUS @ EQUIPMENT: (1) NEW RRUS PER SECTOR, FOR A TOTAL OF (3); (1) EXISTING RRUS PER SECTOR TO REMAIN, FOR A TOTAL OF (3).

SITE ADDRESS: WILLARD ROAD
NORWALK, CT 06851

LATITUDE: 41.1282700 41° 07' 41.77"N
LONGITUDE: -73.3901661 73° 23' 24.59"W

USID: 60416

TOWER OWNER: TBD

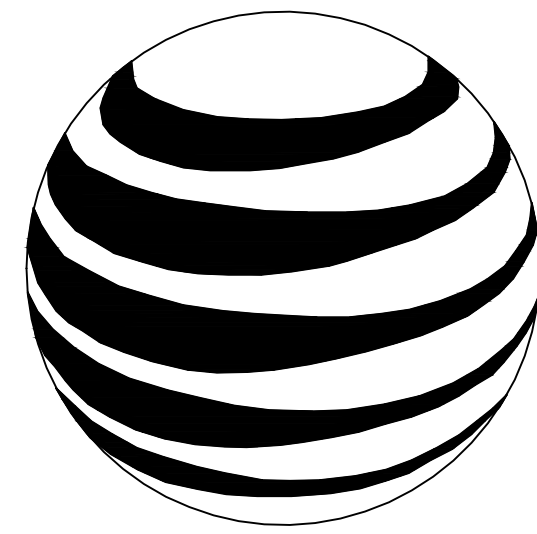
TYPE OF SITE: SELF-SUPPORT TOWER/OUTDOOR EQUIPMENT

TOWER HEIGHT: 350-0"±

RAD CENTER: 347'-0"±

CURRENT USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

PROPOSED USE: UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY



at&t
MOBILITY

FA CODE: 10034993
SITE NUMBER: CTU2132
SITE NAME: NORWALK EAST - WILLARD RD

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ZONING:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:

COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:

COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD
SUITE 550 13 & 14
FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

CONSTRUCTION MANAGEMENT:

COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD
BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

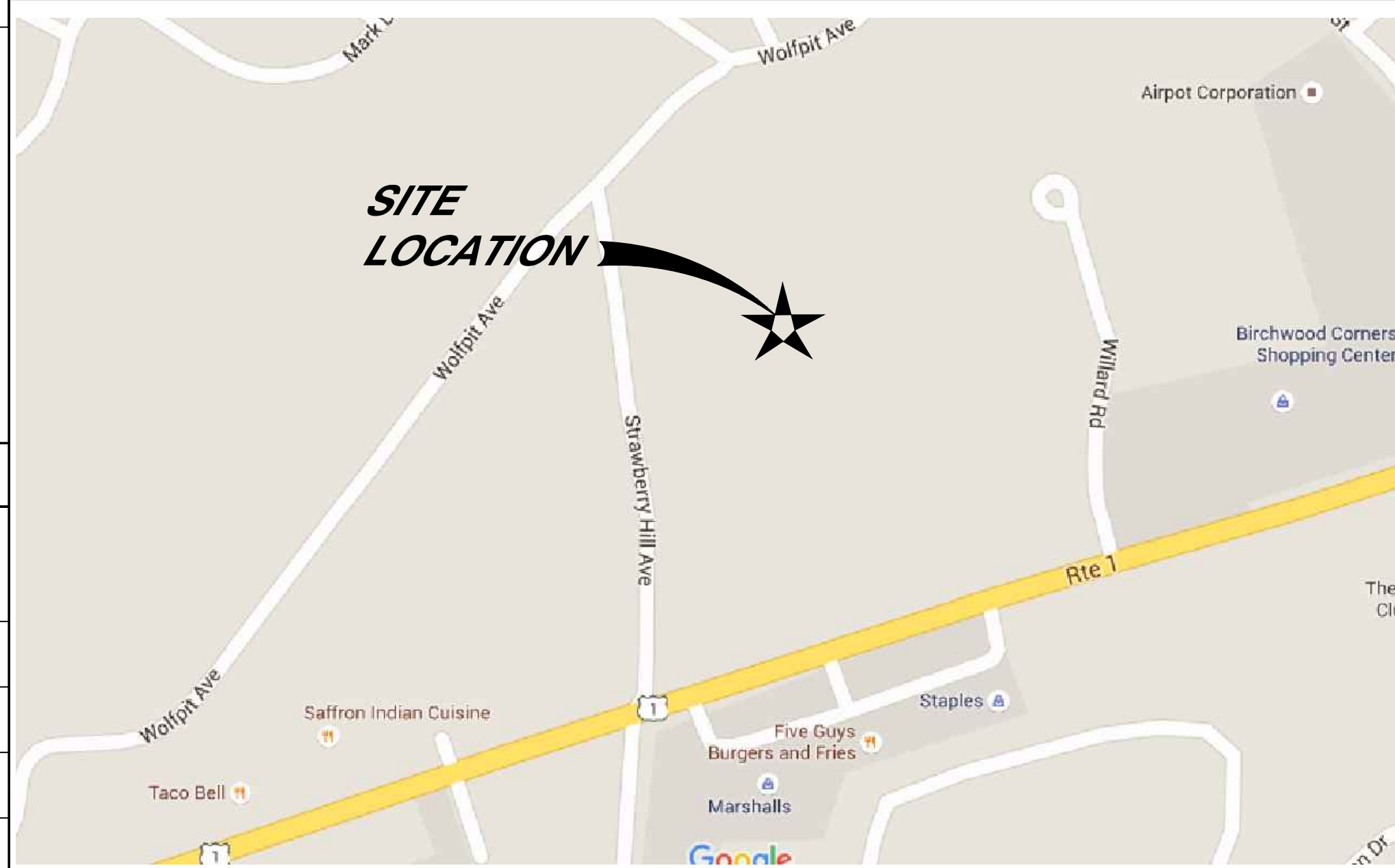
DRAWING INDEX

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VICINITY MAP

FROM ROCKY HILL, HEAD SOUTHWEST ON CONCRIB LN. TURN LEFT ONTO SOLO DR. TURN RIGHT ONTO GILBERT AVE. TURN RIGHT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 S. TAKE EXIT 17 TO MERGE ONTO CT-15 S. TAKE EXIT 42 FOR CT-57 TOWARD WESTPORT WESTON. TURN RIGHT ONTO CT-57/WESTON RD. SLIGHT RIGHT ONTO MAIN ST. TURN RIGHT CANAL ST. CONTINUE ONTO KINGS HWY N. SLIGHT RIGHT ONTO POST RD. CONTINUE ONTO WESTPORT AVE. TURN RIGHT ONTO WILLARD RD. TURN LEFT PAST CVS. DRIVE THROUGH PARKING LOT. SITE WILL BE ON RIGHT.



GENERAL NOTES

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

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN, ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR SITE MODIFICATIONS.

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		



CONNECTICUT LAW REQUIRES TWO WORKING DAYS NOTICE PRIOR TO ANY EARTH MOVING ACTIVITIES BY CALLING 800-922-4455 OR DIAL 811

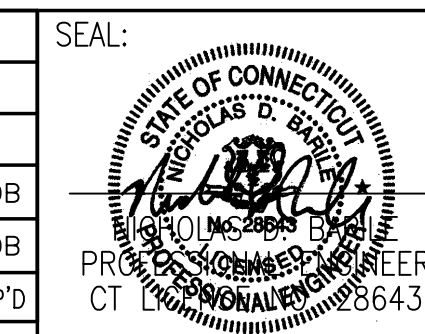


SITE NUMBER: CTL2132
SITE NAME: NORWALK EAST - WILLARD RD
88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472
NEW HAVEN COUNTY



NO.	DATE	REVISIONS	BY	CHK	APP'D
1	08/22/17	ISSUED AS FINAL	NJM	NDB	NDB
0	08/16/17	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN DESIGNED BY: NJM DRAWN BY: JW



AT&T		
DRAWING TITLE: TITLE SHEET		
JOB NUMBER 16050-EMP	DRAWING NUMBER T-1	REV 1

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').
14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE 1/2" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 CONTRACTOR – EMPIRE TELECOM
 SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
 OWNER – AT&T MOBILITY
 OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR
9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

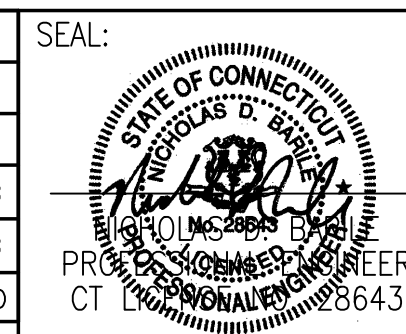
19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
 - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
 - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
 - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS
20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
 - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
 - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
 - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
 - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
 - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
 - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
 - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
 - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS
21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.
23. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY COM-EX CONSULTANTS FOR A RECENT UPGRADE DATED 06/04/2015. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.



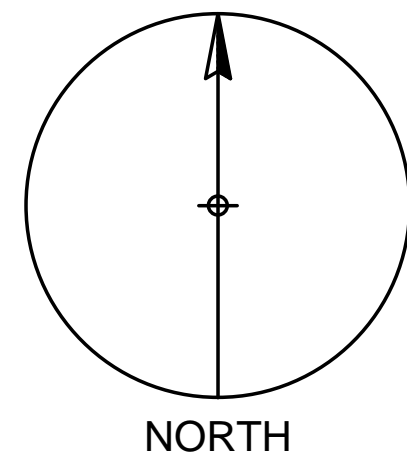
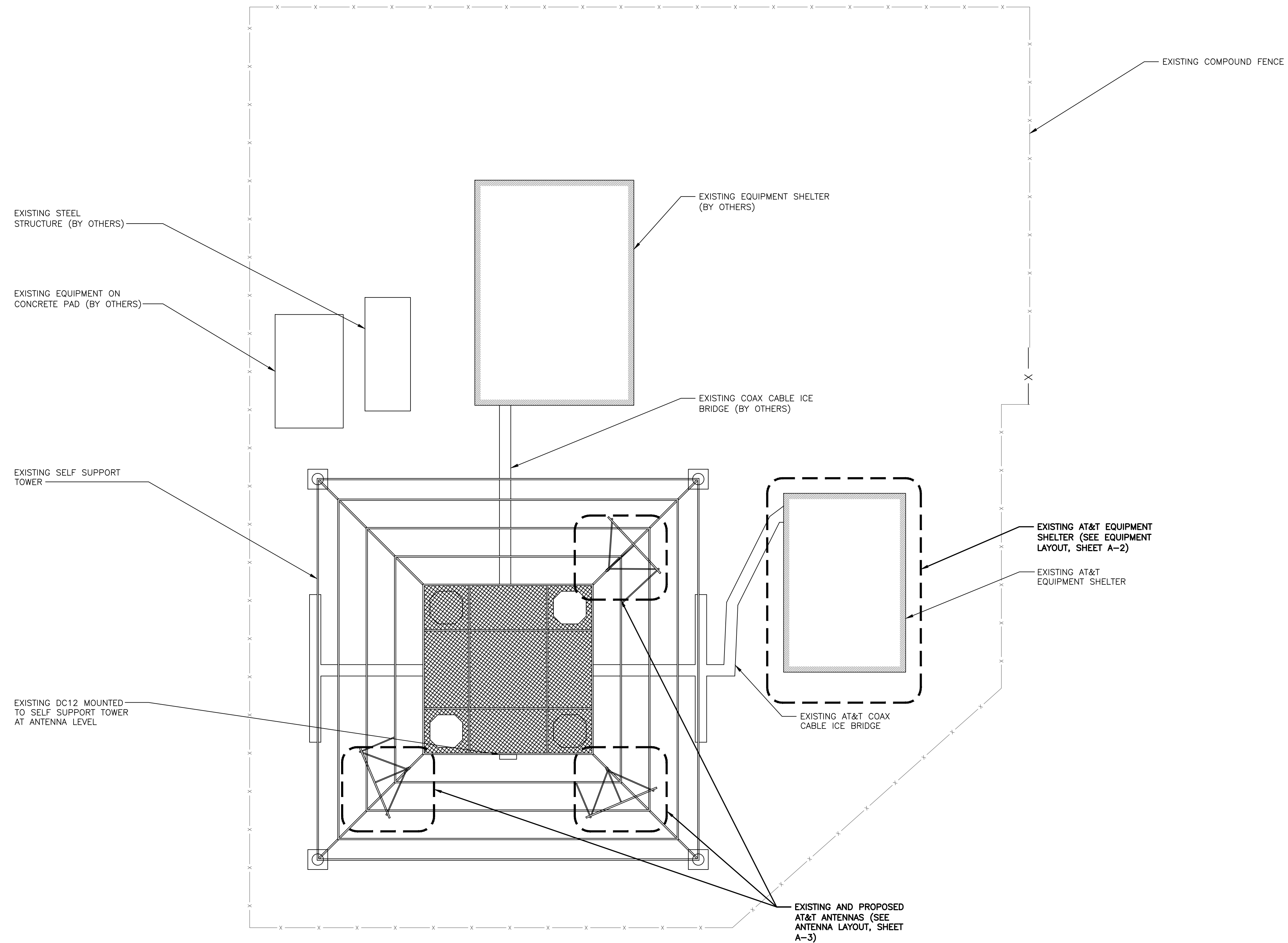
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SITE NAME: NORWALK EAST - WILLARD RD
 88 PARSONAGE HILL ROAD
 NORTHFORD, CT 06472
 NEW HAVEN COUNTY



1	08/22/17	ISSUED AS FINAL	NJM	NDB	NDB
0	08/16/17	ISSUED AS FINAL	NJM	NDB	NDB
NO.	DATE	REVISIONS	BY	CHK	APP'D
SCALE: AS SHOWN		DESIGNED BY: NJM	DRAWN BY: JW		



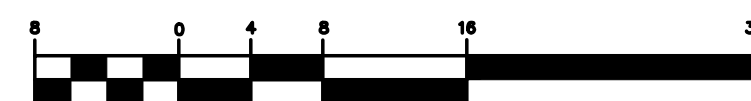
AT&T		
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JOB NUMBER 16050-EMP	DRAWING NUMBER GN-1	REV 1



COMPOUND PLAN

SCALE: 3/32" = 1'-0"

GRAPHIC SCALE



(IN FEET)
3/32 Inch = 1 Foot

COM-EX
Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

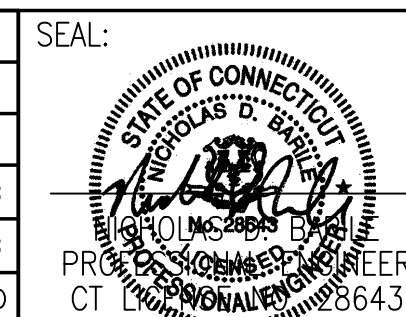
EMPIRE
telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTL2132
SITE NAME: NORWALK EAST - WILLARD RD
88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472
NEW HAVEN COUNTY

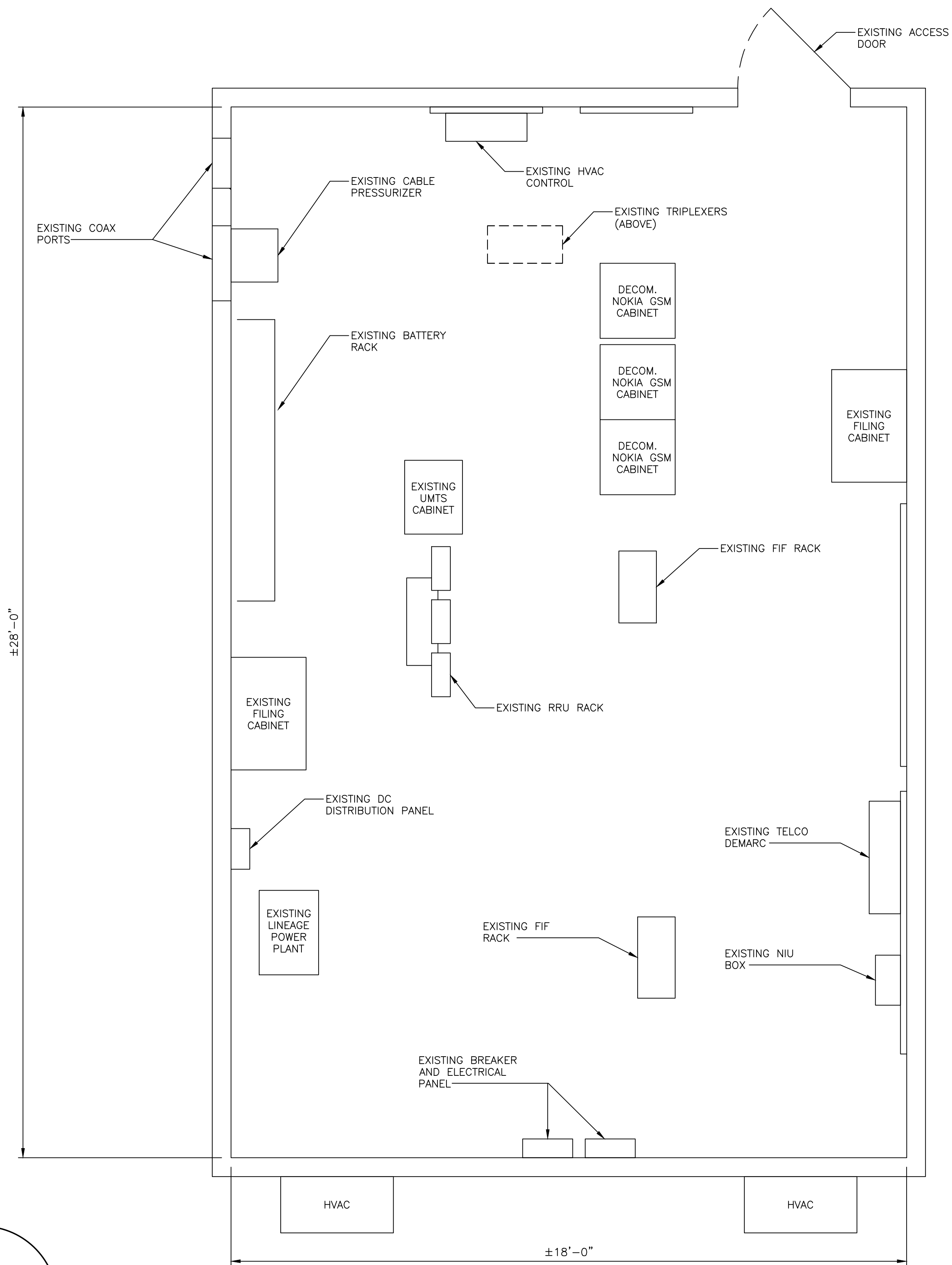
at&t
MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
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SCALE: AS SHOWN DESIGNED BY: NJM DRAWN BY: JW



AT&T		
DRAWING TITLE:		
COMPOUND LAYOUT		
JOB NUMBER	DRAWING NUMBER	REV
16050-EMP	A-1	1

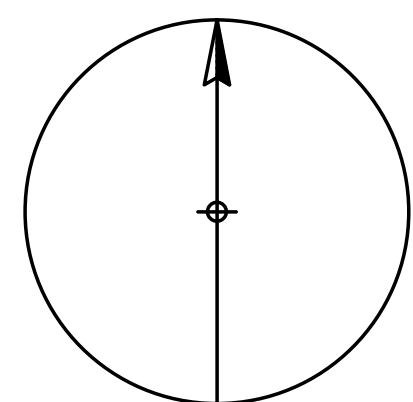


EXISTING EQUIPMENT LAYOUT

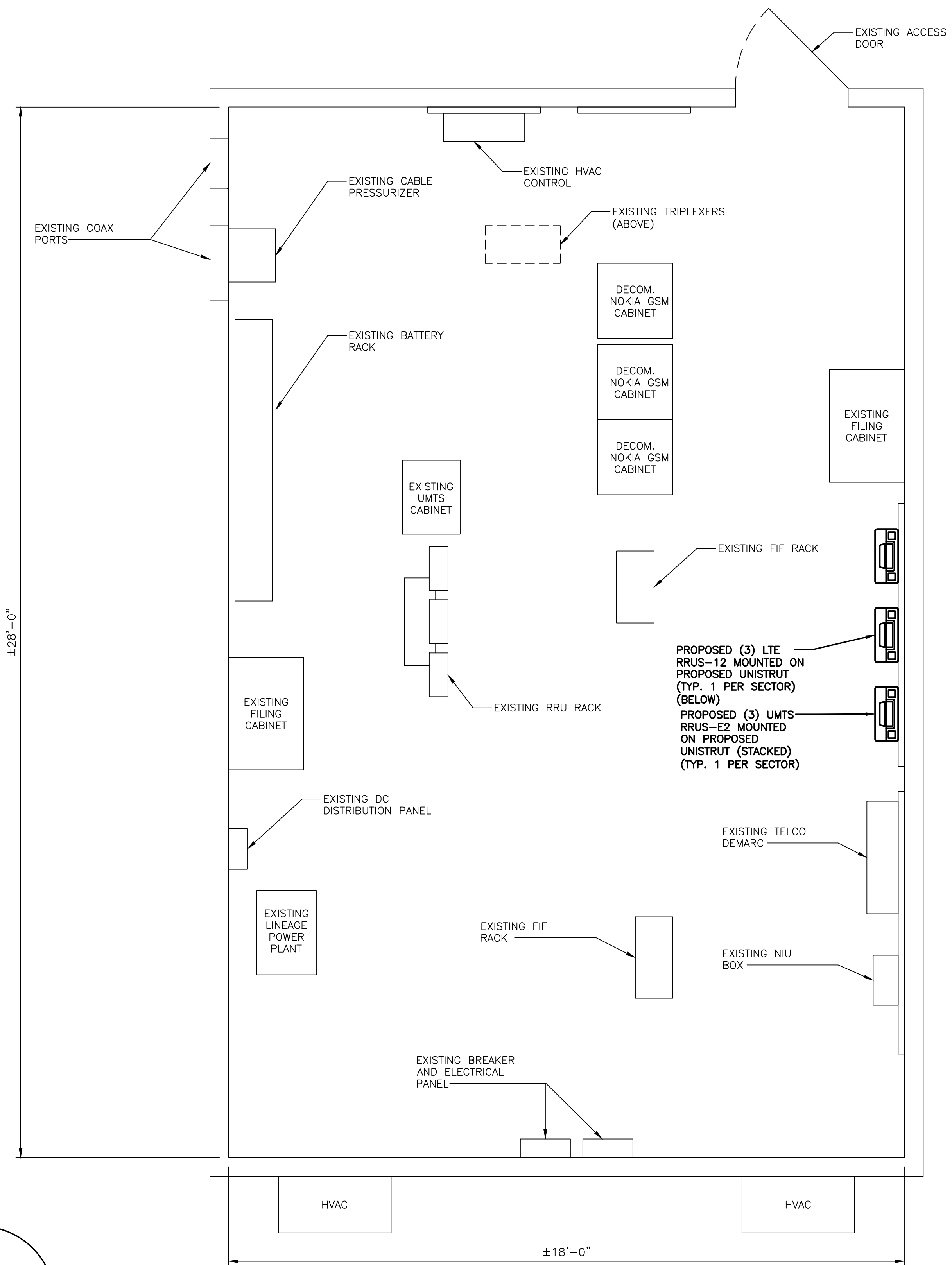
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(IN FEET)
1/2 Inch = 1 Foot



NORTH

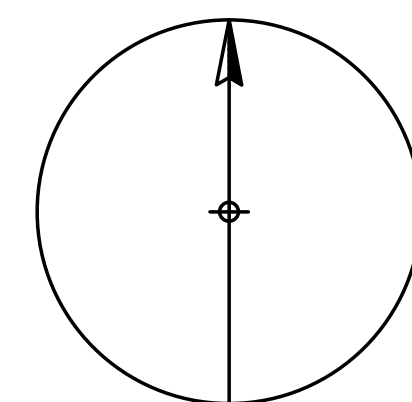


PROPOSED EQUIPMENT LAYOUT

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



(IN FEET)
1/2 Inch = 1 Foot



NORTH

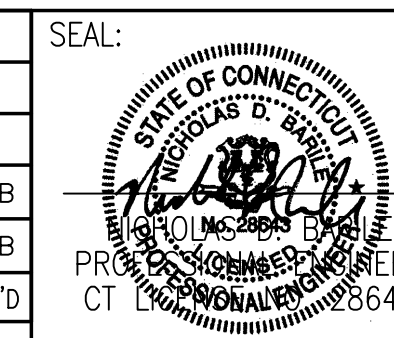
COM-EX
Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
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EMPIRE
telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

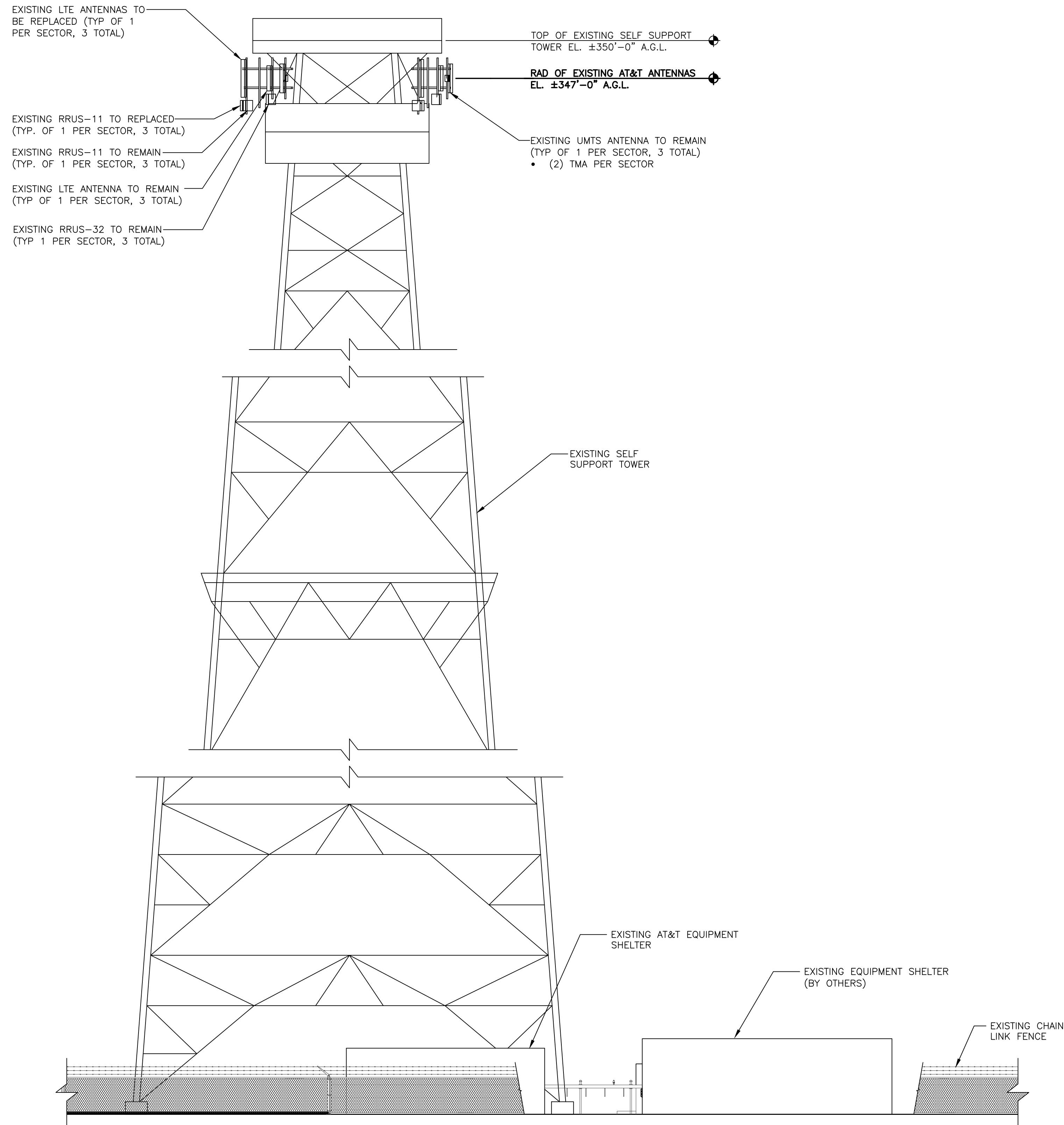
SITE NUMBER: CTL2132
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550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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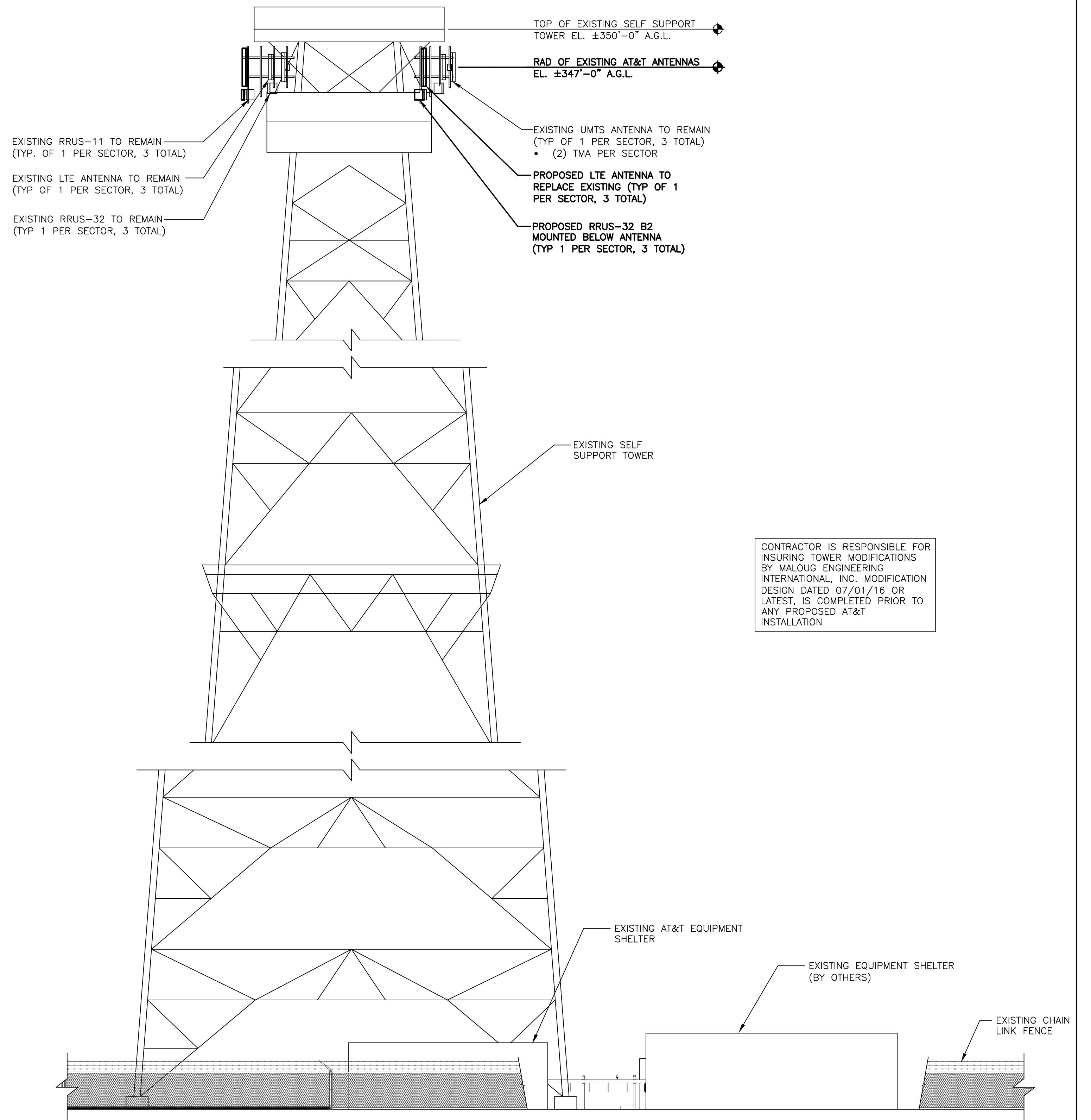


AT&T		
DRAWING TITLE: EQUIPMENT LAYOUTS		
JOB NUMBER 16050-EMP	DRAWING NUMBER A-2	REV 1



EXISTING TOWER ELEVATION

SCALE: 3/32" = 1'-0"
 0 5'-4" 10'-8" 21'-4"
 GRAPHIC SCALE: 3/32"=1'-0"



PROPOSED TOWER ELEVATION

SCALE: 3/32" = 1'-0"
 0 5'-4" 10'-8" 21'-4"
 GRAPHIC SCALE: 3/32"=1'-0"

CONTRACTOR IS RESPONSIBLE FOR INSURING TOWER MODIFICATIONS BY MALOUG ENGINEERING INTERNATIONAL, INC. MODIFICATION DESIGN DATED 07/01/16 OR LATEST. IS COMPLETED PRIOR TO ANY PROPOSED AT&T INSTALLATION

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EMPIRE
 telecom
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at&t
 MOBILITY
 550 COCHITUATE ROAD
 FRAMINGHAM, MA 01701

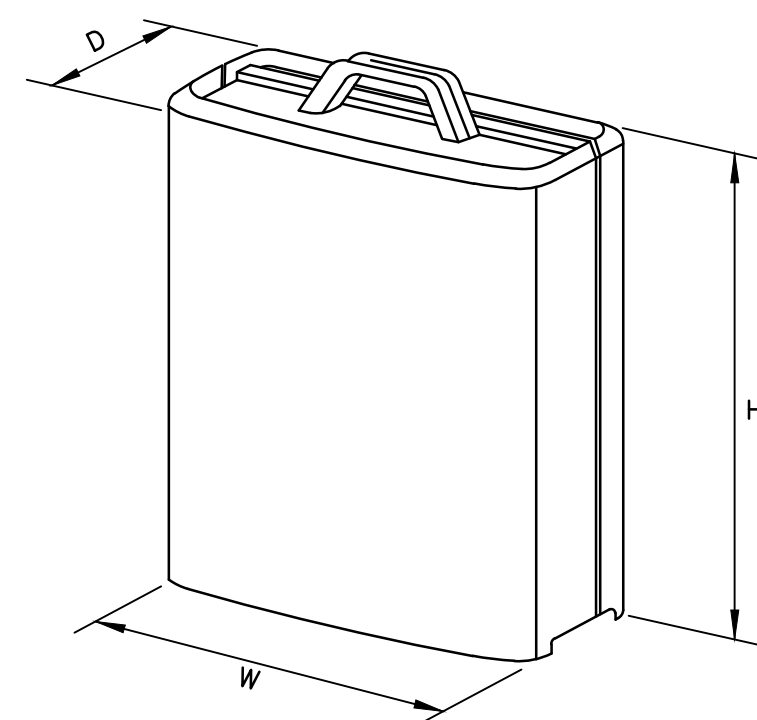
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0	08/16/17	ISSUED AS FINAL	NJM	NDB	NDB

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SEAL:

 NICHOLAS D. BELFRAGE
 PROFESSIONAL ENGINEER
 CT LICENSE NO. 28643

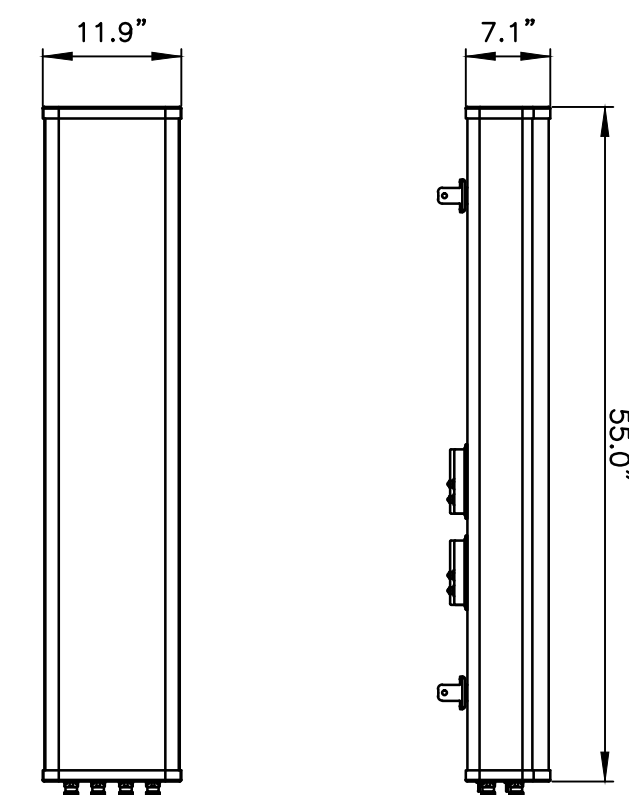
AT&T		
DRAWING TITLE:		
ELEVATIONS		
JOB NUMBER	DRAWING NUMBER	REV
16050-EMP	A-4	1



MODEL	L x W x H	WEIGHT
*RRUS-11	19.7" x 16.97" x 7.17"	50.7 LBS
*RRUS-32	29.9" x 13.3" x 9.5"	77 LBS
RRUS-32 B2	29.9" x 13.3" x 9.5"	77 LBS

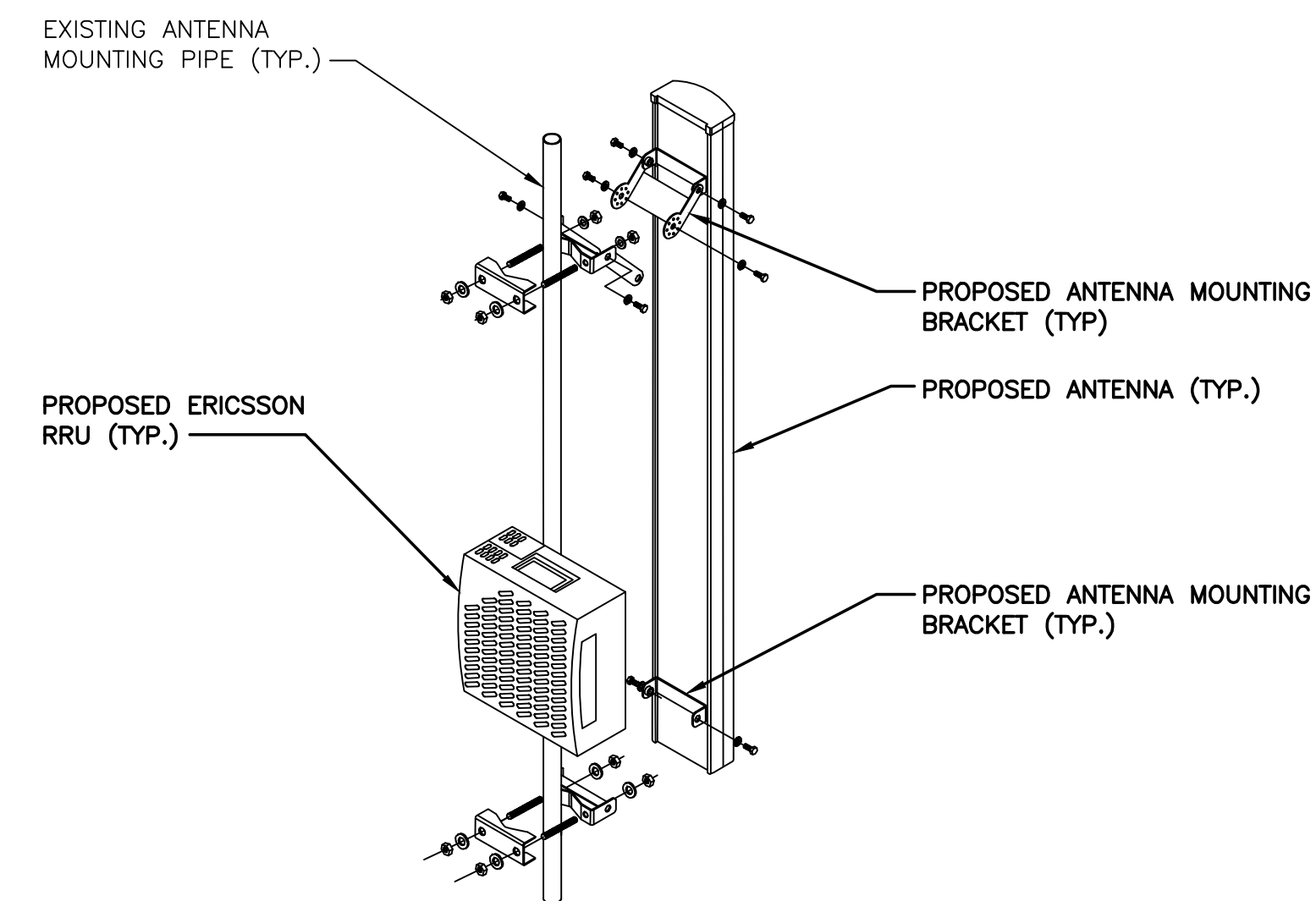
* DENOTES EXISTING

RRUS DETAIL
SCALE: N.T.S.



FRONT VIEW	MANUFACTURER	ANDREW
BOTTOM VIEW	MODEL	SBNHH-1D65A
	WEIGHT	33.5 LBS

ANTENNA DETAIL
SCALE: N.T.S.



ANTENNA AND RRUS MOUNTING DETAIL
SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	A3	-	-	-
	A4	KMW	AM-X-CD-65-00T-RET	48"x11.8"x5.9"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	B3	-	-	-
	B4	KMW	AM-X-CD-65-00T-RET	48"x11.8"x5.9"
GAMMA	G1	POWERWAVE	7770	55"x11"x5"
	G2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	G3	-	-	-
	G4	KMW	AM-X-CD-65-00T-RET	48"x11.8"x5.9"

PROPOSED ANTENNA SCHEDULE

SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	POWERWAVE	7770	55"x11"x5"
	A2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	A3	-	-	-
	A4	ANDREW	SBNHH-1D65A	55"x11.9"x7.1"
BETA	B1	POWERWAVE	7770	55"x11"x5"
	B2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	B3	-	-	-
	B4	ANDREW	SBNHH-1D65A	55"x11.9"x7.1"
GAMMA	C1	POWERWAVE	7770	55"x11"x5"
	C2	CCI	OPA-65R-LCUU-H4	48"x14.4"x7.3"
	C3	-	-	-
	C4	ANDREW	SBNHH-1D65A	55"x11.9"x7.1"

PROPOSED RRUS SCHEDULE

SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9"x13.3"x9.5"		
	ERICSSON	RRUS-32 B2	29.9"x13.3"x9.5"		
BETA	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9"x13.3"x9.5"		
	ERICSSON	RRUS-32 B2	29.9"x13.3"x9.5"		
GAMMA	ERICSSON	RRUS-11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	RRUS-32 (EXISTING)	29.9"x13.3"x9.5"		
	ERICSSON	RRUS-32 B2	29.9"x13.3"x9.5"		

CONTRACTOR IS RESPONSIBLE FOR INSURING TOWER MODIFICATIONS BY MALOUG ENGINEERING INTERNATIONAL, INC. MODIFICATION DESIGN DATED 07/01/16 OR LATEST, IS COMPLETED PRIOR TO ANY PROPOSED AT&T INSTALLATION

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

COM-EX
Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

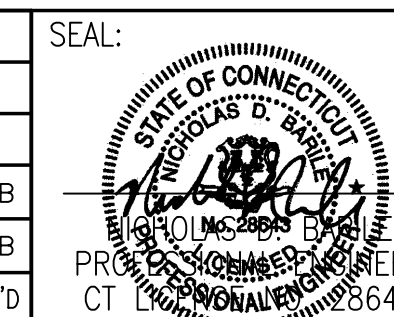
EMPIRE
telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CTL2132
SITE NAME: NORWALK EAST - WILLARD RD
88 PARSONAGE HILL ROAD
NORTHFORD, CT 06472
NEW HAVEN COUNTY

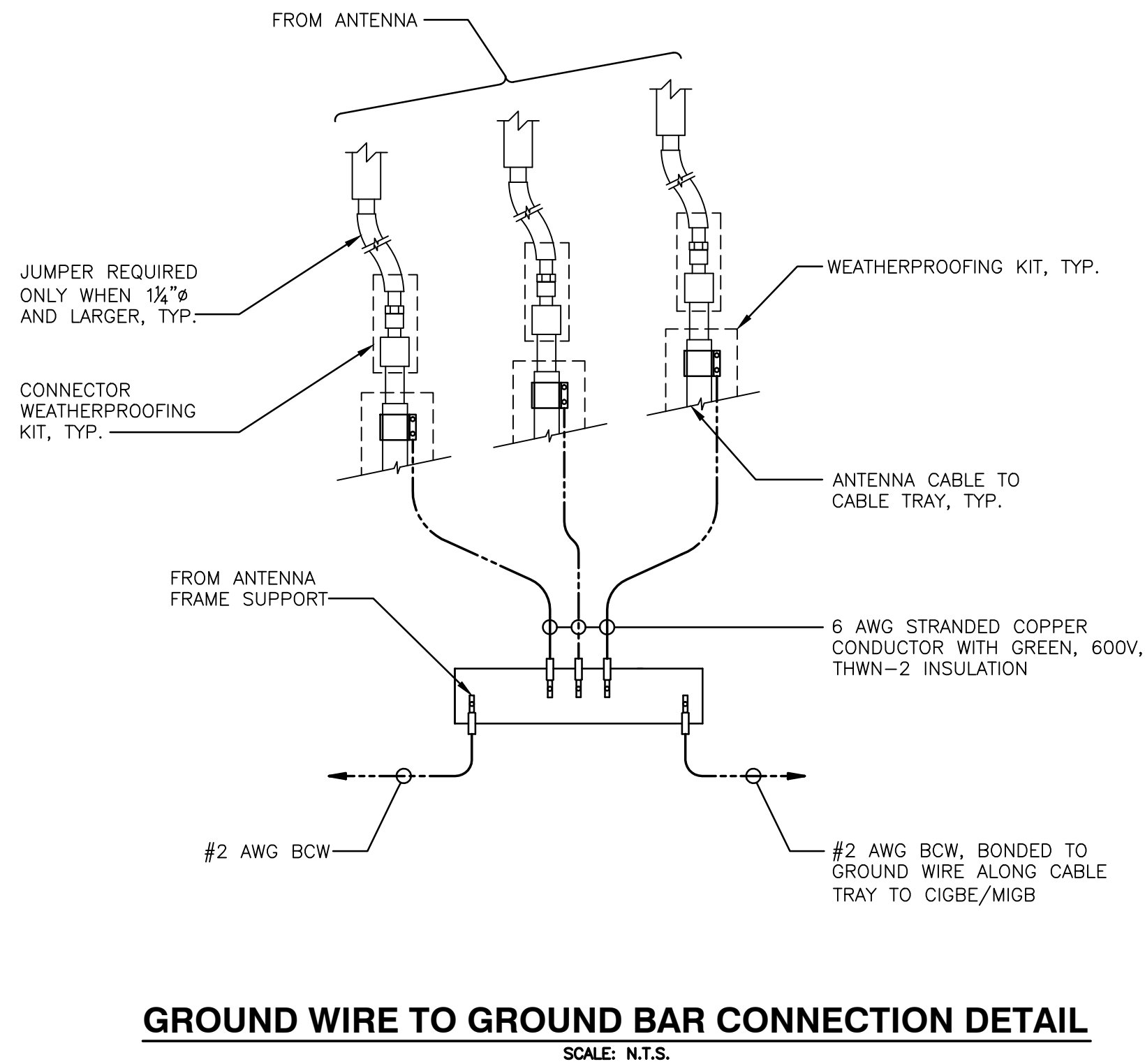
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MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

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0	08/16/17	ISSUED AS FINAL	NJM	NDB	NDB

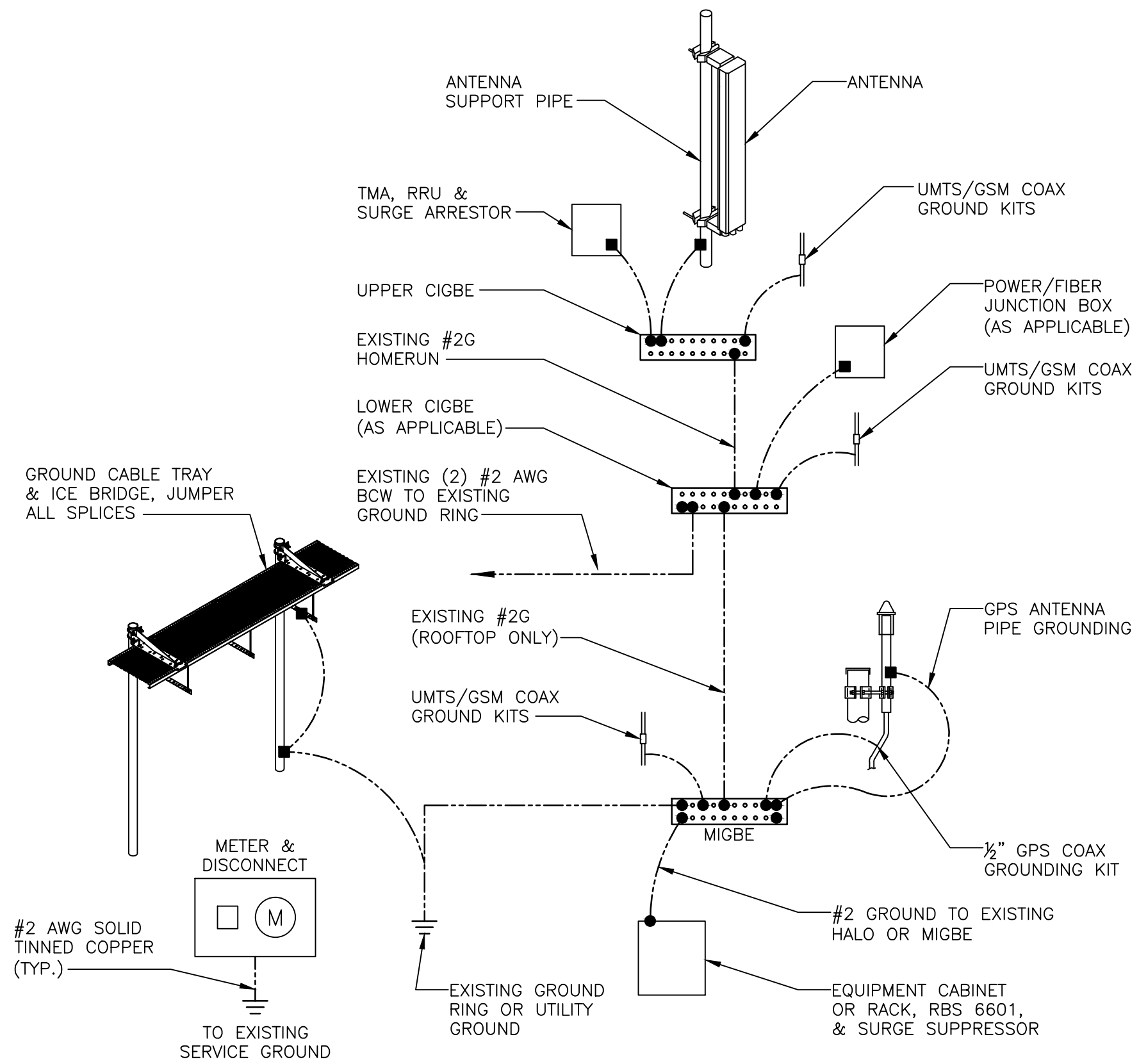
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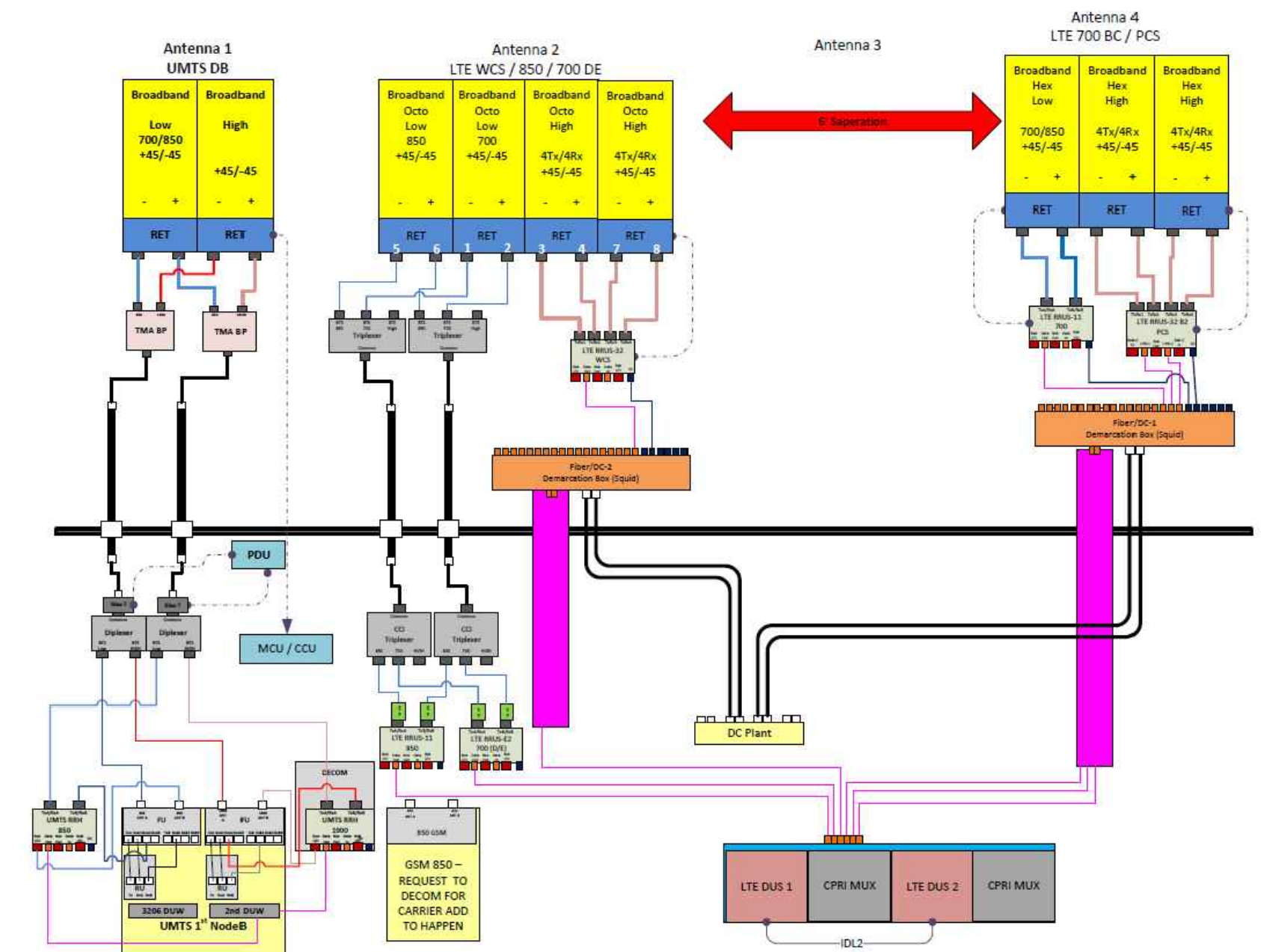
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JOB NUMBER	DRAWING NUMBER	REV
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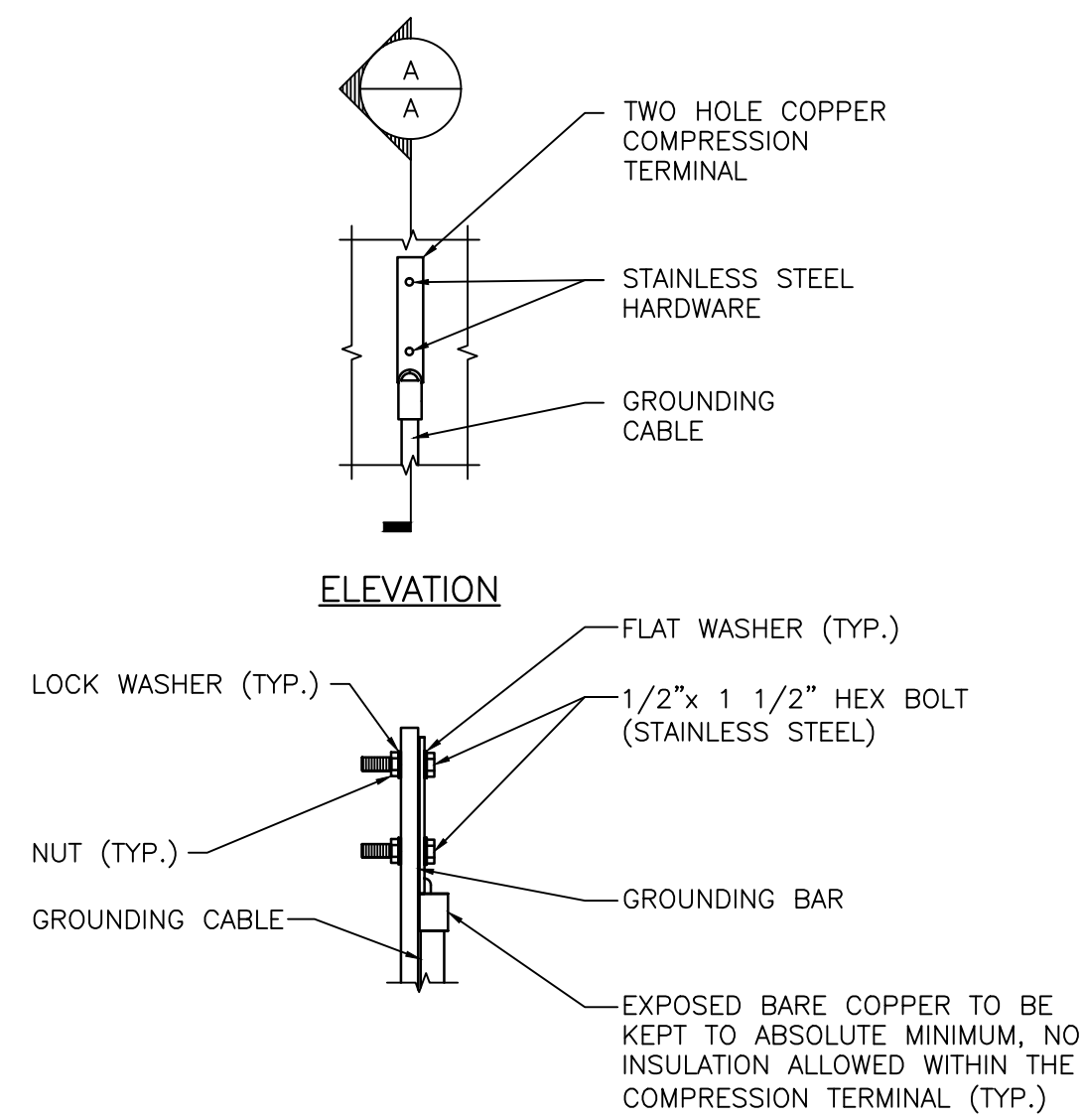
GROUND WIRE TO GROUND BAR CONNECTION DETAIL
SCALE: N.T.S.



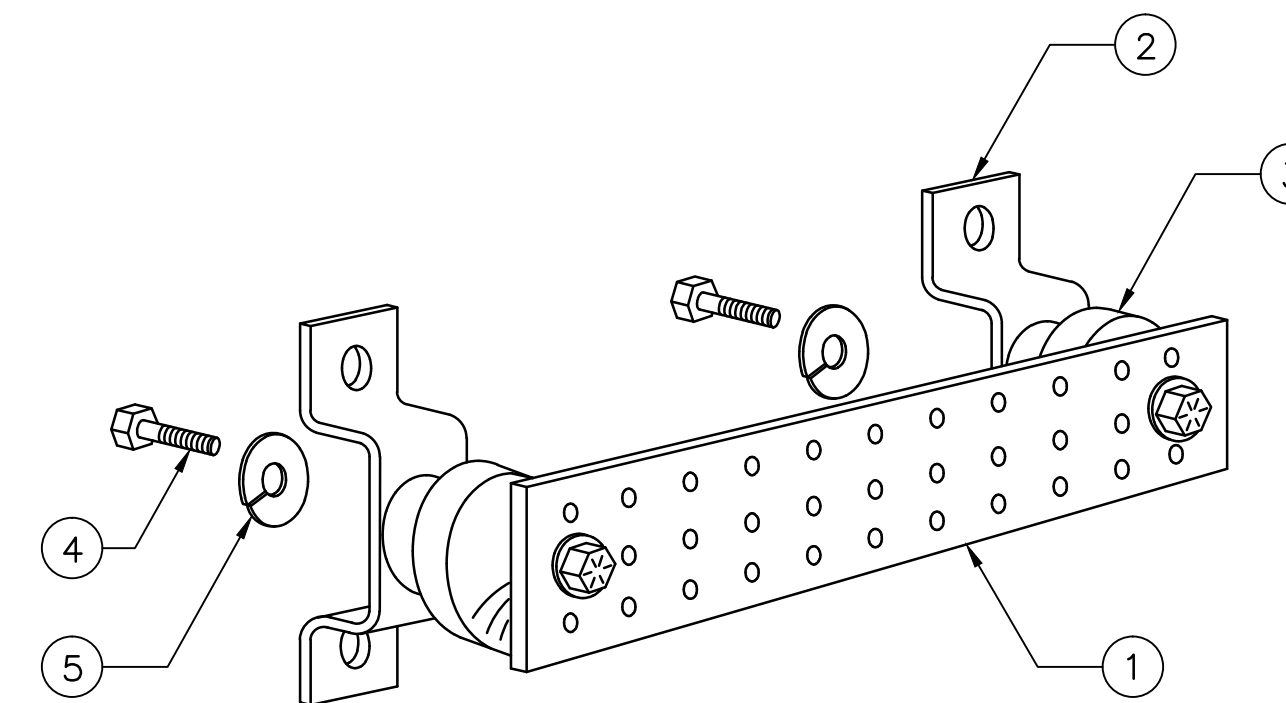
GROUNDING RISER DIAGRAM
SCALE: N.T.S.



TYPICAL PLUMBING DIAGRAM (PER SECTOR)
SCALE: N.T.S.



TYPICAL GROUND BAR CONNECTION DETAIL
SCALE: N.T.S.



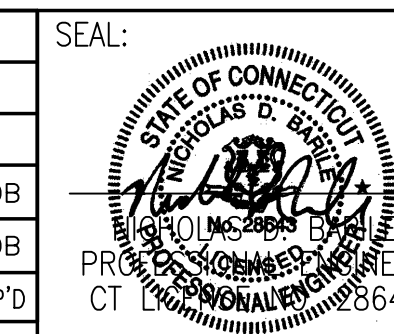
ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x 1/4")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	5/8"-11x1" H.H.C.S.
5	4	5/8" LOCK WASHER

- NOTES:
- EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION
- SECTION "P" - SURGE PRODUCERS**
- CABLE ENTRY PORTS (HATCH PLATES) (#2)
 - GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
 - TELCO GROUND BAR
 - COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
 - +24V POWER SUPPLY RETURN BAR (#2)
 - 48V POWER SUPPLY RETURN BAR (#2)
 - RECTIFIER FRAMES
- SECTION "A" - SURGE ABSORBERS**
- INTERIOR GROUND RING (#2)
 - EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
 - METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
 - BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL
SCALE: N.T.S.

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	08/22/17	ISSUED AS FINAL	NJM	NDB	NDB
0	08/16/17	ISSUED AS FINAL	NJM	NDB	NDB

SCALE: AS SHOWN DESIGNED BY: NJM DRAWN BY: JW



Rigorous Structural Analysis Report



AT&T – Norwalk East-Willard Rd #CTU2132 / FA #10034993
Owner: Fuller Development LLC - Norwalk
Norwalk, Connecticut

September 7, 2017

MEI PROJECT ID: CT04761S-17V0

MALOUF ENGINEERING INTL., INC.



STRUCTURAL CONSULTANTS

17950 PRESTON ROAD, SUITE 720 ■ DALLAS, TEXAS 75252 ■ TEL. 972-783-2578 FAX 972-783-2583
www.maloufengineering.com





September 7, 2017

Ms. Nicole Caplan
Empire Telecom
 Billerica, MA 01862

RIGOROUS STRUCTURAL ANALYSIS

Structure/Make/Model:	351.67 ft Self-Supporting Tower	Not Known / Not Known
Client/Site Name/#:	Empire Telecom / AT&T	Norwalk East-Willard Rd #CTU2132 / FA #10034993
Owner/Site Name/#:	Fuller Development LLC	Norwalk
MEI Project ID:	CT04761S-17V0	
Location:	10 Willard Rd Norwalk, CT 06851	Fairfield County FCC #1046320
	LAT 41-07-41.8 N	LON 73-23-24.9 W

EXECUTIVE SUMMARY:

Malouf Engineering Int'l (MEI), as requested, has performed a rigorous structural analysis of the above mentioned structure to assess the impact of the changed condition as noted in Table 1.

Based on the stress analysis performed, the existing structure **is in conformance** with the Int'l Building Code (IBC) / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections **after proper installation of the previous structural strengthening modifications** as per MEI drawings ID CT04761S-16V0-R1 - tower rated at 96.1% - Sub Bracing. No additional modification is required.

The installation of the proposed changed condition as noted in Table 1 is structurally acceptable after proper installation of the previous strengthening modifications as outlined in MEI Drawings referenced above.

MEI appreciates the opportunity of providing our continuing professional services to you. If you have any questions or need further assistance on this or other projects please contact us.

Respectfully submitted,

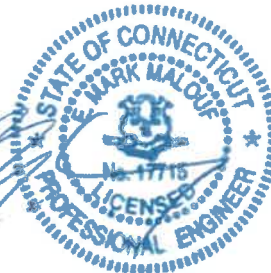
MALOUF ENGINEERING INT'L, INC.

Analysis performed by:

Reviewed & Approved by:

Krishna Manda, PE
 Sr. Project Engineer


 E. Mark Malouf, PE
 Connecticut #17715
 972-783-2578 ext. 106
 mmalouf@maloufengineering.com



9/7/2017

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1. INTRODUCTION & SCOPE

A rigorous structural analysis was performed by Malouf Engineering Int'l (MEI), as requested and authorized by Ms. Nicole Caplan, Empire Telecom, on behalf of AT&T, to determine the acceptance of the proposed changed conditions in conformance with the IBC / ANSI/TIA-222-G Standard, "Structural Standard for Antenna Supporting Structures and Antennas".

The scope of this independent analysis is to determine the overall stability and the adequacy of structural members, foundations, and member connections, as available and stated. This analysis considers the structure to have been properly installed and maintained with no structural defects. Installation procedures and related loading are not within the scope of this analysis and should be performed and evaluated by a competent person of the erection contractor.

The different report sections detail the applicable information used in this evaluation, relating to the tower data, the appurtenances configuration and the wind and ice loading considered.

2. SOURCE OF DATA

The following information has been used in this evaluation as source data that accurately represent the existing structure and the related appurtenances:

	Source	Information	Reference
STRUCTURE			
Tower	MEI Records	Previous Structural Analysis / Mods	ID CT04761S-16V0-R1 Dated 08/11/2016
Foundation	MEI Records	Previous Structural Analysis / Mods	ID CT04761S-16V0-R1 Dated 08/11/2016
Material Grade	As per supplied documents (GPD Analysis included specific material grades for the different components) - Refer to Appendix		
CURRENT APPURTENANCES			
	MEI Records	Previous Structural Analysis / Mods	ID CT04761S-16V0-R1 Dated 08/11/2016
CHANGED CONDITION			
	Empire Telecom / Ms. Nicole Caplan	AT&T RF Data Sheets	Dated 03/22/2016 & Dated 04/14/2016
		Email Instructions	Dated 9/06/2017

Background Information:

Based on available information, the following is known regarding this structure:

DESIGNER / FABRICATOR	Not Known / Not Known
ORIGINAL DESIGN CRITERIA	TIA/EIA 222-Unknown
PRIOR STRUCTURAL MODIFICATIONS	As per GPD modification design Job #2012766.02 dated 06/27/2012; MEI Drawings ID CT04761S-16V0-R1 dated 08/11/2016 are considered properly installed for the purposes of this analysis.

3. ANALYSIS CRITERIA

The structural analysis performed used the following criteria:

CODE / STANDARD	2012 Int'l Building Code with 2016 CT Amendments / ANSI/TIA-222-G-2 Standard	
LOADING CASES	Full Wind:	120 Mph ultimate gust [equiv. 93 Mph (3-sec gust)] w/No Radial Ice**
	Iced Case:	50 Mph + 0.75" Radial Ice
	Service:	60 Mph
	Seismic:	$S_s = 0.232 / S_1 = 0.067$ / Site Class: D – Stiff Soil
STRUCTURE CRITERIA	Structure Classification: Class II	
	Exposure Category: 'C' – Topographic Category: 1	

Appurtenances Configuration

The following appurtenances configuration is denoted by the *summation of Tables 1 & 2*:

Table 1: Tenant with Changed Condition Appurtenances Configuration

Elev (ft)	Tenant	Ant #	Ants Qty	Appurtenance Model / Description	Mount Description	Line #	Lines Qty	Line size & Location
347	AT&T		3	SBNHH-1D65A Panel Antennas				
			6	TPX-070821 Triplexer Boxes				
			3	RRUS-32 B2 Boxes				
Current Appurtenances To Remain								
347	AT&T		3	7770.00 Panel Antennas	(3) Sector Mounts w/V-Stabilizer (Commscope MTC3615 AD A)	49-60	12	1-5/8" 3/4" DC Power [Existing/New] 5/8" Fiber-(FZ) [Existing/New]
			3	RRUS-11 Boxes				
			6	LGP21401 TMAs		48	2	
			3	DC6-48-60-18-8F Suppressors				
			3	OPA-65R-LCUU-H4 Panel Antennas				
			3	RRUS-32 Boxes				
344.5		6	7020 RET Motors					
Appurtenances to be Removed								
347	AT&T	23	3	AM-X-CD-65-00T-RET Panel Antennas				
			3	RRUS-11 Boxes				

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances

Elev (ft)	Tenant	Ant #	Ants Qty	Appurtenance Model / Description	Mount Description	Line #	Lines Qty	Line size & Location
365		40	1	12ft Whip Antenna + TMA	10ft Pipe Mount	25	1	7/8"-(FZ)
369.5		38	1	Whip Antenna	15ft Pipe Mount w/ Guys	34	1	1/2"-(FZ)
357	[Dead]	39	1	15ft Whip Antenna	4ft Pipe Mount	-	-	-
362		42	1	4ft Lightning Rod	14ft Mount	-	1	Grounding
				Beacon / Strobe				
355.5		31	1	4ft Whip Antenna	8ft Pipe Mount	38	1	1-5/8"-(FZ)
354.5		32	1	15ft Whip Antenna	8ft Pipe Mount	39	1	1-5/8"-(FZ)
354.5		30	1	10ft 4-Element Dipole Antenna	8ft Pipe Mount	24	1	7/8"-(FZ)
352			1	Top Stub Tower				
350.5		35			3ft Empty Sidearm Mount			
					Top Platform w/ Rails			
350	[Dead]					35-36	2	0.25" Cables
350	[Dead]					44	1	0.8" SO Cord
349.75		34	1	8ft Whip Antenna	Railing Mounted	32	1	7/8"-(FZ)
349.5		36	1	21ft Whip Antenna	Railing Mounted	37	1	7/8"-(FZ)

(Appurtenances continue on next page.)

Table 2: Remaining Tenants Current and Reserved/Future Appurtenances – Cont'd

Elev (ft)	Tenant	Ant #	Ants Qty	Appurtenance Model / Description	Mount Description	Line #	Lines Qty	Line size & Location
349		37			8ft Empty Pipe Mount			
348.25		29	1	20ft 4-Element Dipole Antenna	6ft Pipe Mount	21	1	7/8"-(FZ)
343.67		27	1	3ft 3-Element Yagi Antenna	8ft Pipe Mount on Sector Mount	30	1	1/2"-(FZ)
343.25		33	3	TA-2335-DAB Panel Antennas	8ft Pipe Mount	19	1	EW4.75"x2.5"-(FZ)
339.5					4-Way Walkway Platform w/ Rails			
338	[Dead]					45	1	3/4" R.C.
325					(4) Face Frames			
306		21			(4) 14ft Empty Pipe Mounts			
299	[Dead]							
269.25		20	2	OB Lights		23	1	1-1/4"-(FZ)
262	T-Mobile	18-19	3	AIR21 B2A B4P Panel Antennas	(3) 10.5ft Sector Mounts (Sitepro1 #VFA10-U)	40	1	0.6" SO Cord
			3	ATMAA1412D-1A20 TMAs		2-7	6	1-5/8"
	T-Mobile [New]	-	3	AIR32 B66Aa/B2a Panel Antennas		16-18	3	1" (3x6) Hybrid Cables-(FZ)
			3	LNX-6515DS-VTM Panel Antennas		-	3	1" (6x12) Hybrid Cables-(FZ)
			3	RRUS-11 Boxes				
255.5		17	1	12in Square Panel Antenna	Pipe Mount	1	1	7/8"-(FZ)
253		16			(2) 25ft Rest Platform w/ Rails			
245	Sprint	15	3	ALU-RRH 4x45 Boxes	(3) 13ft Sector Mounts	26-28	3	HB114-1 1-1/4" Hybrid Cables-(FZ)
243.5	Sprint	14	3	APXVSP18-C-A20 Panel Antennas				
242.25	Sprint	13	3	RRH Boxes				
			3	800 Ext. Notch Filters				
208.5		12	1	7ft 5-Element Yagi Antenna	5ft Pipe Mount	31	1	1/2"-(FZ)
191.5		11			(4) Corner Rest Platforms			
186		10	2	Beacon Ice Shield	Leg Mounted			
182.5		9	2	Beacon / Strobe		41-42	2	0.6" SO Cords
125	[Dead]					22	1	0.95"-(FZ)
		8			(2) 41ft Rest Platform w/ Rails			
100		7			4ft Rest Platform w/ Rails			
93		6	2	OB Lights		40		[Shared]
50.25		5			4ft Rest Platform w/ Rails			
47.5		4	1	3ft Dia. Dish (Az. 220°±)	4ft Sidearm Mount-NW Leg	20	1	7/8"-(FZ)
31		1	1	4ft Dia. Dish (Az. 200°±)	10ft Pipe Mount/Standoff-S Face	33	1	1/2"-(FZ)
26		2	1	GPS Antenna	Pipe Mount	29	1	1/2"-(FZ)
25		3			(4) Corner Rest Platforms			
16.67					(4) Face Frames			

Notes:

- **As per 2012 IBC for ultimate 3-sec gust wind speed converted to nominal 3-sec gust wind speed as per Sect. 1609.3.1 as required to be used in ANSI/TIA-222-G Standard per exception 5 of Sect. 1609.1.1.
- All elevations are measured from tower base.
- Please note appurtenances not listed above are to be removed/not present as per data supplied.
- (I) = Internal; (E) = External; (FZ) = Within Face Zone; (OFZ) = Outside Face Zone - as per TIA-222.
- The above appurtenances represent MEI's understanding of the appurtenances configuration. If different than above, the analysis is invalid. Please contact MEI if any discrepancies are found.

4. ANALYSIS PROCEDURE

The subject structure is analyzed for feasibility of the installation of the proposed changed condition previously noted. The data records furnished were reviewed and a computer stress analysis was performed in accordance with the TIA-222 Standard provisions and with the agreed scope of work terms and the results of this analysis are reported.

Analysis Programs

The two computer programs used to model the structure are rigorous Finite Element Analysis programs, the first is trnTower (ver. 7.07) (formerly RISATower), a commercially available program by Tower Numerics Inc. and the second is STAADPro v8i FEA program, a structural finite element program by Bentley Systems, Carlsbad, CA. The structure members are modeled using beam/truss members. The structural parameters and geometry of the members are included in the model. The dead and temperature loads and the wind loads are internally calculated by the programs for the different loading directions and then applied as external loads on the structure. This analysis comprised of the two different analytical models with combination of the above noted 2 software programs in order to evaluate the different portions of the tower accounting for the geometrical limitation in the trnTower software. Any applicable exemptions, as per Section 15.6 of the TIA-222-G Standard for existing structures originally designed in accordance with a previous revision of the TIA-222 Standard, have been taken.

Assumptions

This engineering study is based on the theoretical capacity of the members and is not a condition assessment of the structure. This analysis is based on information supplied, and therefore, its results are based on and as accurate as that supplied data. MEI has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural stress analysis:

- This existing tower is considered, for the purpose of this analysis, to have been properly maintained and to be in good condition with no structural defects and with no deterioration to its member capacities ('as-new' condition).
- The tower member sizes and configuration are considered accurate as obtained or supplied. The material grade is as per data supplied and/or as assumed and as stated.
- The appurtenances configuration is as obtained and/or as stated in the report. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
- Some assumptions are made regarding antennas and mounts sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type & industry practice.
- Mounts/Platforms are considered adequate to support the loading. No actual analysis of the platform/mount themselves are performed, with the analysis being limited to analyzing the structure.
- The soil parameters are as per data supplied or as assumed and stated in the calculations. Refer to the Appendix.
- All welds and connections are assumed to develop at least the member capacity, unless determined otherwise and explicitly stated in this report.
- All prior structural modifications, if any, are considered to be as per data supplied/available, and to have been properly installed and to be fully effective.

If any of the above assumptions are not valid or have been made in error, this analysis results may be invalidated, MEI should be contacted to review any contradictory information to determine its effect.

5. ANALYSIS RESULTS

The results of the structural stress analysis based on data available and with the previous listed criteria, indicated the following:

Table 3: Stress Analysis Results – AFTER NOTED MODIFICATIONS

Component Type	Maximum Stress Ratio	Controlling Elev. (ft) / Component	Pass/Fail	Comment
LEGS	92.1%	25 – 0	Pass	
DIAGONALS	85.7%	125 – 100	Pass	
HORIZONTALS	90.8%	150 – 125	Pass	Bolts Control
SECONDARY HORIZONTALS	11.8%	351.67 - 337.5	Pass	
SUB BRACING	96.1%	50 – 25	Pass	
FOUNDATION	64.1%	Uplift	Pass	Geotechnical report not available. Based on soil parameters in supplied calcs in prev. SA.

Table 4: Serviceability Requirements

	Maximum Value	TIA Requirement (10dB)	Pass/Fail	Comment
TWIST/SWAY	0.0104 Deg.	1.7125 Deg.	Pass	4ft Dish Elev. 31.00ft
	0.0164 Deg.	2.35 Deg.	Pass	3ft Dish Elev. 47.50ft
	0.0809 Deg.	4 Deg. from Vert. or Horiz. Axis	Pass	
HORIZONTAL DISPLACEMENT	4.290 In./ 0.10% of Ht.	3.0% of Height	Pass	

Notes:

1. Please note that the analysis results noted above are based on the combined analytical models using the 2 noted FEA programs.
2. The Maximum Stress Ratio is the percentage that the maximum load in the member is relative to the allowable load as determined by Code requirements.
3. Refer to the Appendix 1 for more details on the member loads.
4. A maximum stress ratio between 100% and 105% may be considered as *Acceptable* according to industry standard practice.

6. FINDINGS & RECOMMENDATIONS

- Based on the rigorous stress analysis results, the subject structure is **rated at 96.1%** of its support capacity (controlling component: Sub-Bracing) with the proposed changed condition considered after strengthening. Please refer to Table 3 and to Appendix 1 for more details of the analysis results.
- Based on the stress analysis performed, the existing structure **is in conformance** with the IBC / ANSI/TIA **222-G** Standard for the loading considered under the criteria listed and referenced in the report sections
- Please note that no geotechnical data is available. However based on soil parameters included in supplied data, the foundation is considered acceptable.
- ***The installation of the proposed changed condition as noted in Table 1 is structurally acceptable after proper installation of the previous strengthening modifications as outlined in MEI Drawings referenced above.*** Please refer to Appendix 1 for Schematic Lines Layout.
- This structure is at its maximum support capacity for the appurtenances and loading criteria considered even after proper installation of the proposed modifications. Therefore, no changes to the configuration considered should be made without performing a new proper evaluation.

Rigging and temporary supports required for the erection/modification shall be determined, documented, furnished and installed by the erector/contractor accounting for the loads imposed on the structure due to the proposed construction method.

7. REPORT DISCLAIMER

The engineering services rendered by Malouf Engineering International, Inc. ('MEI') in connection with this Structural Analysis are limited to a computer analysis of the tower structure, size and capacity of its members. MEI does not analyze the fabrication, including welding and connection capacities, except as included in this Report.

The analysis performed and the conclusions contained herein are based on the assumption that the tower has been properly installed and maintained, including, but not limited to the following:

1. Proper alignment and plumbness.
2. Correct guy tensions, as applicable.
3. Correct bolt tightness or slip jacking of sleeved connections.
4. No significant deterioration or damage to any structural component.

Furthermore, the information and conclusions contained in this Report were determined by application of the current "state-of-the-art" engineering and analysis procedures and formulae. MALOUF ENGINEERING INTERNATIONAL, INC. assumes no obligation to revise any of the information or conclusions contained in this Report in the event that such engineering and analysis procedures and formulae are hereafter modified or revised. In addition, under no circumstances will MALOUF ENGINEERING INTERNATIONAL, INC. have any obligation or responsibility whatsoever for or on account of consequential or incidental damages sustained by any person, firm or organization as a result of any information or conclusions contained in the Report, and the maximum liability of MALOUF ENGINEERING INTERNATIONAL, INC., if any, pursuant to this Report shall be limited to the total funds actually received by MALOUF ENGINEERING INTERNATIONAL, INC. for preparation of this Report.

Customer has requested MALOUF ENGINEERING INTERNATIONAL, INC. to prepare and submit to Customer an engineering analysis with respect to the Subject Tower and has further requested MALOUF ENGINEERING INTERNATIONAL, INC. to make appropriate recommendations regarding suggested structural modifications and changes to the Subject Tower. In making such request of MALOUF ENGINEERING INTERNATIONAL, INC., Customer has informed MALOUF ENGINEERING INTERNATIONAL, INC. that Customer will make a determination as to whether or not to implement any of the changes or modifications which may be suggested by MALOUF ENGINEERING INTERNATIONAL, INC. and that Customer will have any such changes or modifications made by riggers, erectors and other subcontractors of Customer's choice. MALOUF ENGINEERING INTERNATIONAL, INC. shall have the right to rely upon the accuracy of the information supplied by the customer and shall not be held responsible for the Customer's misrepresentation or omission of relevant fact whether intentional or otherwise.

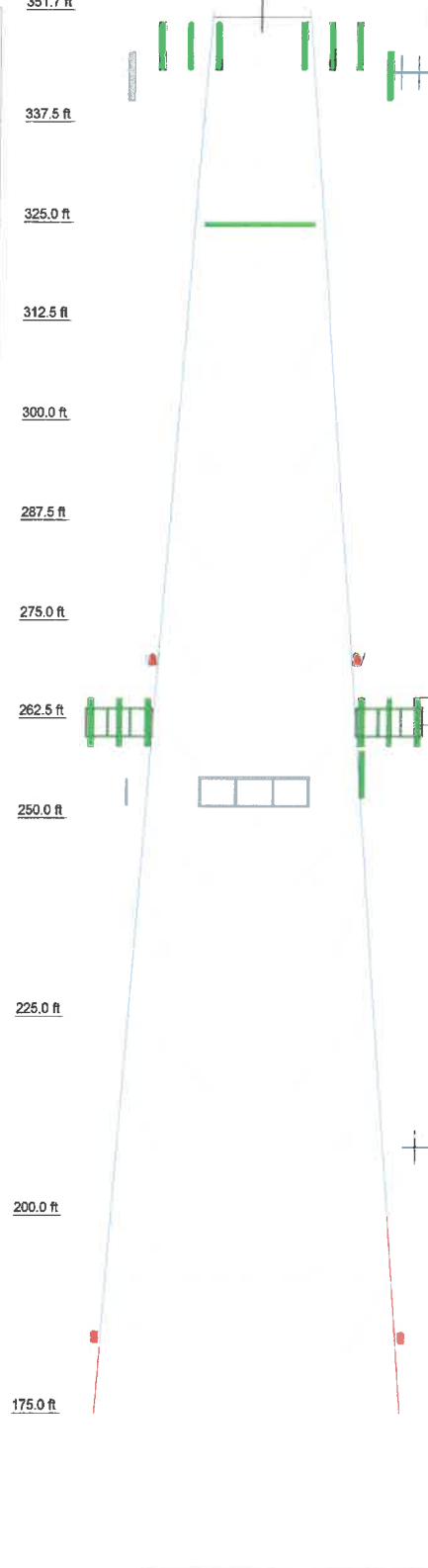
Customer hereby agrees and acknowledges that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability whatsoever to Customer or to others for any work or services performed by any persons other than MALOUF ENGINEERING INTERNATIONAL, INC. in connection with the implementation of services including but not limited to any services rendered for Customer or for others by riggers, erectors or other subcontractors. Customer acknowledges and agrees that any riggers, erectors or subcontractors retained or employed by Customer shall be solely responsible to Customer and to others for the quality of work performed by them and that MALOUF ENGINEERING INTERNATIONAL, INC. shall have no liability or responsibility whatsoever as a result of any negligence or breach of contract by any such rigger, erector or subcontractor and that Customer and rigger, erector, or subcontractor will provide MALOUF ENGINEERING INTERNATIONAL, INC. with a Certificate of Insurance naming MALOUF ENGINEERING INTERNATIONAL, INC. as additional insured.

APPENDIX 1 - ANALYSIS PRINTOUT & GRAPHICS

AFTER NOTED MODIFICATIONS



Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	L8x8x1 1/8	L8x8x7/8	L8x8x7/8	L8x8x7/8	L8x8x3/4	L8x8x3/4	L8x8x7/8	L8x8x7/8	L8x8x5/8	L8x8x5/8	L8x8x5/8
Leg Grade	A500-46										
Diagonals	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8	2L2.5x3.5x5/16 + 2L3x3.5x3/8
Diagonal Grade	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36	A36
Top Girts	2L3.1/2x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Horizontals	2L3.1/2x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Sec. Horizontals	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16	2L1.3/4x1.3/4x3/16
Red. Horizontals	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16
Red. Diagonals	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16	2L2x2x3/16
Red. Sub-Horiz	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8
Red. Hips	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8	2L2.1/2x3x1/4x3/8
Inner Bracing	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8	2L3x2.1/2x1/4x3/8
Face Width (ft)	39.6845	34.938	31.2115	27.487	23.7584	21.8952	20.0319	18.1687	16.3054	14.4422	12.33
# Panels @ (ft)	21.9	19.7	17.7	15.7	13.7	11.7	9.7	7.7	5.7	3.7	1.7
Weight (K)	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9	100.9



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	2L2 1/2x2 1/2x1/4x3/8	B	L2 1/2x2 1/2x3/16

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A36	36 ksi	58 ksi	A500-46	46 ksi	62 ksi

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft

 <p>Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	Job: 350ft SST / Norwalk East - Willard RD Site #CTU2132
	Project: CT04761S-17V0 - Top Tower // FA #10034993
	Client: EMPIRE TELECOM / AT&T Drawn by: KM App'd:
	Code: TIA-222-G Date: 09/07/17 Scale: NTS
	Path: Dwg No: E-1



Malouf Engineering International Inc.
17960 Preston Rd. Suite 720
Dallas, Texas. 75252 / p (972)-783-2578
maloufengineering.com

Job No
CT04761S-17V

Sheet No

1

Rev

0

Software licensed to MEI

Job Title 351.7ft Self Supporting Tower

Part

Ref

By KM

Date 7-Sep-17

Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std

Date/Time 07-Sep-2017 09:40

175ft

150ft

125ft

100ft

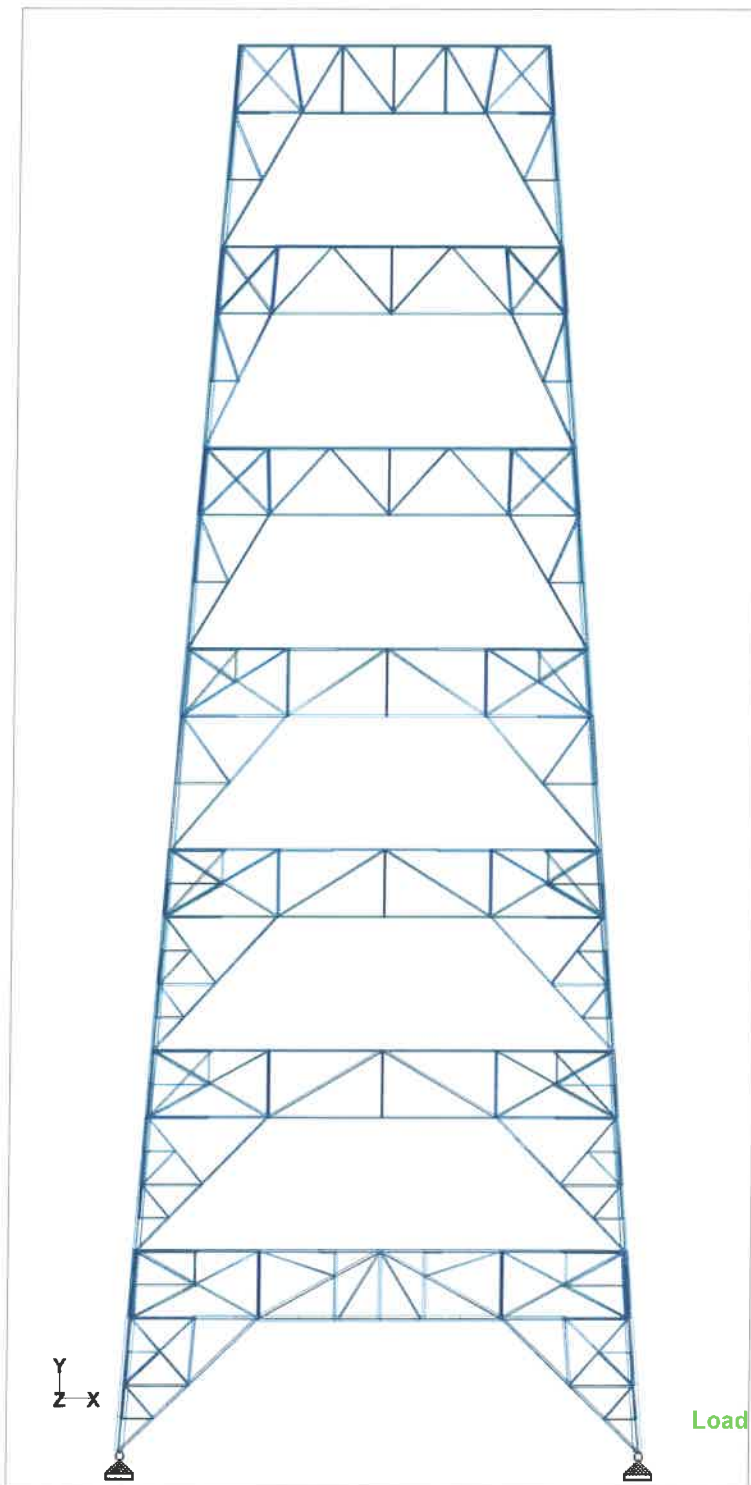
75ft

50ft

25ft

0ft

Tower Elevation



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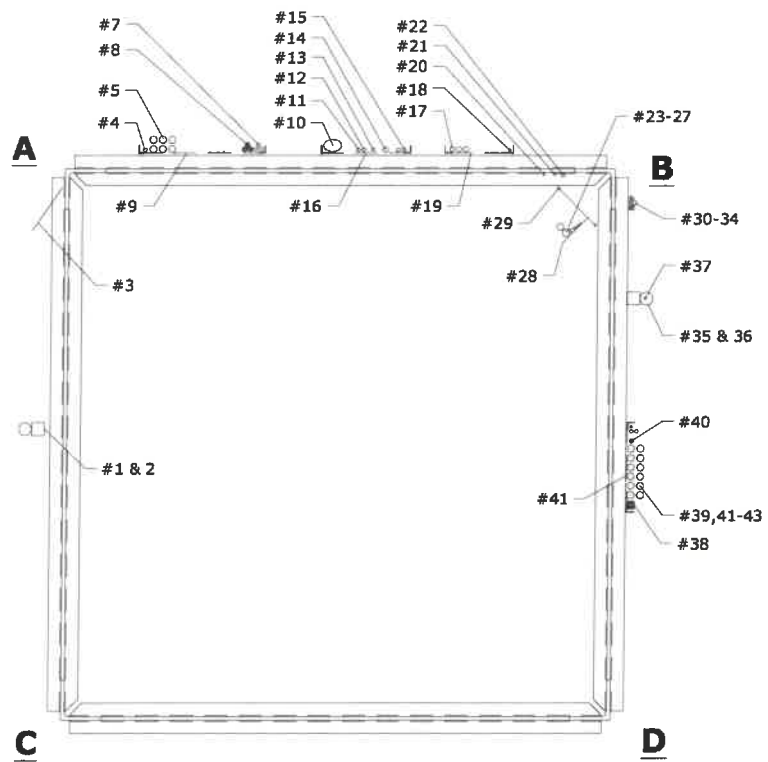
No.	QTY.	DESCRIPTION	ELEV.	TENANT
1	1	Conduit Shield	35'	E
2	1	Unused Codult Supports	320'	E / WG "G"
3	1	Unused Waveguide Brackets	200'	E / WG "H"
4	1	7/8"	255'	E / #1
5	6	1 5/8"	262'	T-Mobile / E / #2-7
6	-	-	-	-
7	3	1" Huber & Suhner Cable	262'	T-Mobile / E / #16 - 18
8	3	1" Huber & Suhner Cable	262'	T-Mobile / NEW
9	1	Feedline Ladder (Af)	265'	T-Mobile / E / WG "A"
10	1	EW 4.75" x 2.5"	343'	E / #19
11	1	7/8"	47'	E / #20
12	1	7/8"	348'	E / #21
13	1	0.95" Dead Cable	125'	E / #22
14	1	1 1/4" Dead Cable	299'	E / #23
15	2	7/8"	350'	E / #24, 25
16	1	Feedline Ladder (Af)	345'	E / WG "B"
17	3	HB114-1 1 1/4" Hybrid Cable	244'	Sprint / E / #26-28
18	1	LDF4-50A (1/2 FOAM)	26'	E / #29
19	1	Feedline Ladder (Af)	241'	Sprint / E / WG "C"
20	1	1/2"	343'	E / #30

21	1	1/2"	208'	E / #31
22	1	7/8"	349'	E / #32
23	2	1/2"	31'	E / #33, 34
24	1	1/2"	350'	E / #34
25	2	0.25" Dead Cables	350'	E / #35, 36
26	1	7/8"	349'	E / #37
27	2	1 5/8"	350'	E / #38, 39
28	1	Waveguide Brackets	348'	E / WG "D"
29	1	Climbing Ladder	350'	E
30	4	0.6" SO Cords	182'	E / #40-43
31	2	0.6" SO Cords	269'	E / #40,43
32	1	0.6" SO Cord	350'	E / #43
33	1	0.8" Dead SO Cord	350'	E / #44
34	1	3/4" Rigid Conduit Unused	338'	E / #45
35	1	Conduit Shield	35'	E
36	1	Unused Codult Supports	320'	E / WG "E"
37	1	Grounding Cable	350'	E
38	4	3/4" DC Power Cable	347'	ATT / E
39	12	1 5/8"	347'	ATT / E / #49-60
40	1	5/8" Fiber Cable	347'	ATT / E
41	2	3/4" DC POWER CABLE	345'	ATT / E
42	1	5/8" FIBER CABLE	347'	ATT / E
43	1	Feedline Ladder (Af)	347'	ATT / E / WG "F"

LEGEND:

- E = EXISTING #X
- P = PROPOSED #X
- F = FUTURE #X
- R = REMOVE #X
- TO RELOCATE #X

CONTACT MEI IF LINE LAYOUT IS DIFFERENT FROM WHAT IS SHOWN BELOW.



101 PLAN: SCHEMATIC Tx-LINE LAYOUT
SCALE: NOT TO SCALE APPROX.

- NOTES:**
1. Tx LINE LAYOUT IS SCHEMATIC ONLY, BASED UPON MEI MAPPING (SUB: HTS) DATED 11/30/15 .
 2. NEW BRACKET SUPPORT SPECIFICATION BY OTHERS.

09/07/2017

MALOUF ENGINEERING INTERNATIONAL, INC.

 STRUCTURAL CONSULTANTS

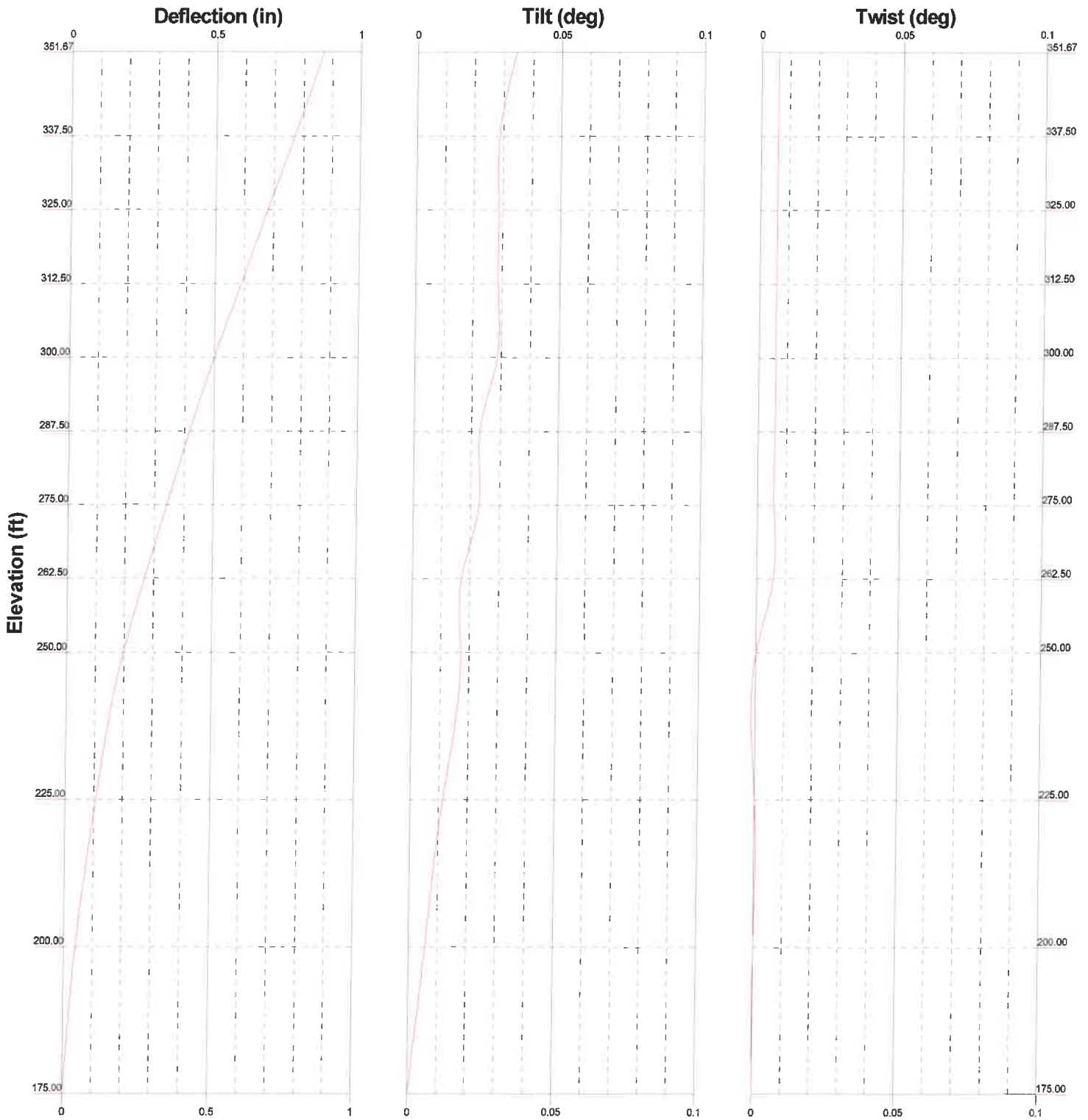
17950 PRESTON ROAD SUITE 720
 DALLAS, TEXAS 75252-5635
 972-783-2578 (fax: 2583)
 www.maloufengineering.com
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350FT SST / NORWALK EAST - WILLARD RD SITE #CTU2132

TOWER TxLINE LAYOUT

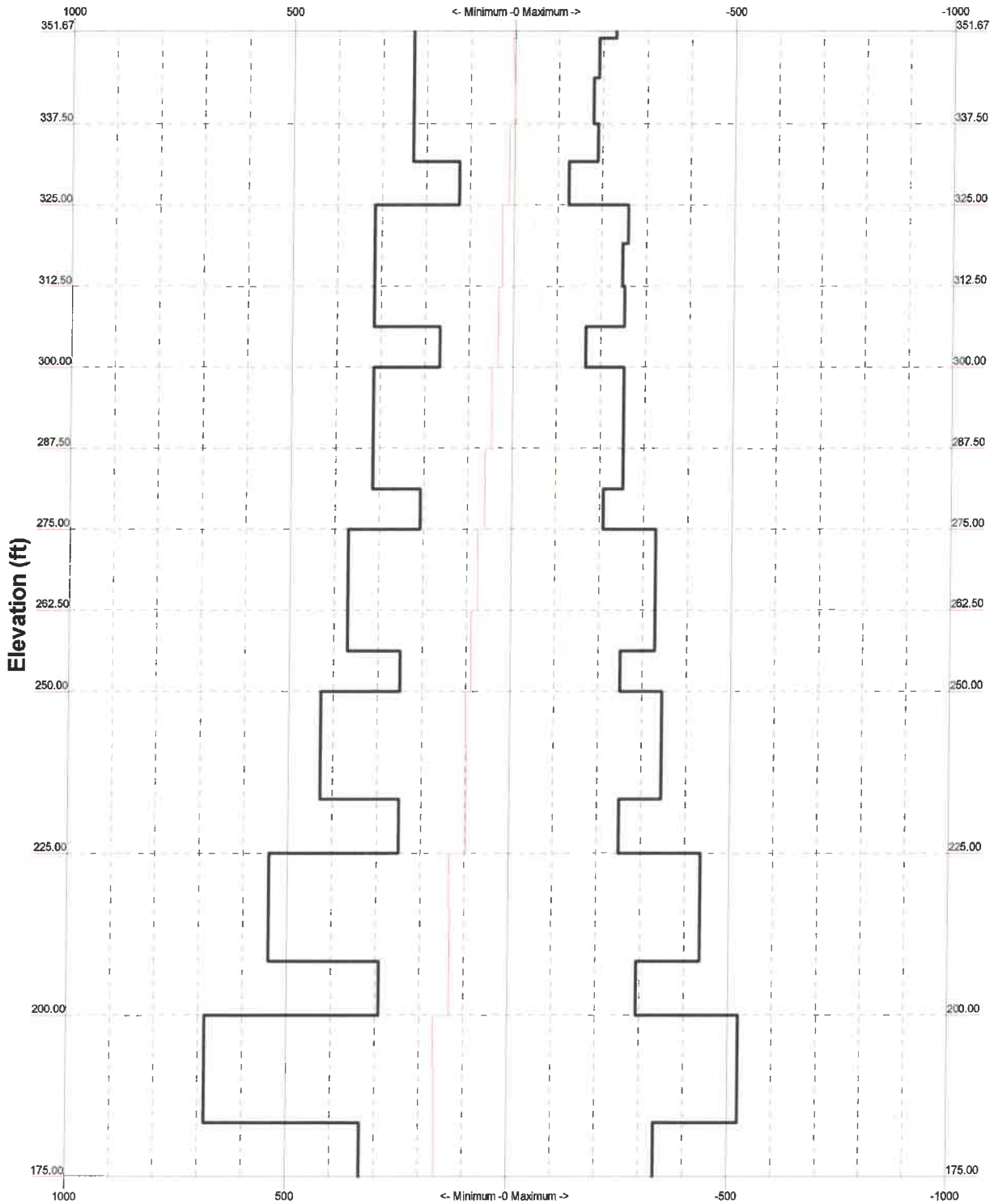
MEI PROJECT ID	SHEET NUMBER REV.
CT04761S-17V0	L01 0



 maloufengineering.com	Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583		Job: 350ft SST / Norwalk East - Willard RD Site #CTU2132 Project: CT04761S-17V0 - Top Tower // FA #10034993 Client: EMPIRE TELECOM / AT&T	
	Drawn by: KM	App'd:		
	Code: TIA-222-G	Date: 09/07/17	Scale: NTS	
	Path:	Dwg No: E-5		
	(Empty row for additional information)			

TIA-222-G - 93 mph/50 mph 0.7500 in Ice Exposure C

Leg Capacity ——— Leg Compression (K)



 <p>Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583</p>	Job: 350ft SST / Norwalk East - Willard RD Site #CTU2132
	Project: CT04761S-17V0 - Top Tower // FA #10034993
	Client: EMPIRE TELECOM / AT&T Drawn by: KM App'd: _____
	Code: TIA-222-G Date: 09/07/17 Scale: NTS
	Path: _____ Dwg No: E-3

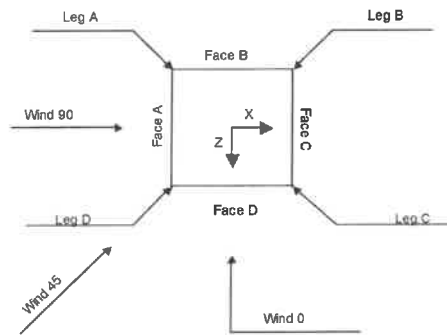
tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 1 of 17
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	Client EMPIRE TELECOM / AT&T	Designed by KM

Tower Input Data

The main tower is a 4x free standing tower with an overall height of 351.67 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 12.33 ft at the top and 64.75 ft at the base.
This tower is designed using the TIA-222-G standard.

The following design criteria apply:

- Tower is located in Fairfield County, Connecticut.
- ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
- Basic wind speed of 93 mph.
- Structure Class II.
- Exposure Category C.
- Topographic Category 1.
- Crest Height 0.00 ft.
- Nominal ice thickness of 0.7500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.



Square Tower

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Placement	#	Weight	Description	Placement	#	Weight
	ft		plf		ft		plf
Conduit Shield (E)	35.00 - 12.00	1	18.50	(E / #1) 1 5/8	262.00 - 6.00	6	1.04
Unused Coduit Supports (E / WG "G")	320.00 - 37.00	1	9.56	(Rework - Bundle / T-Mobile / E / #2-7)			
Unused Waveguide Brackets (E / WG "H")	200.00 - 27.00	1	1.25	1" (3x6)	262.00 - 6.00	3	0.78
	7/8	255.50 - 6.00	1	Hybrid Cables (T-Mobile / E / #16 - 18)			

tnxTower

Malouf Engineering Int'l Inc.

17950 Preston Road, STE 720

Dallas, Texas 75252

Phone: (972) 783 2578

FAX: (972) 783 2583

Job	350ft SST / Norwalk East - Willard RD Site #CTU2132	Page	2 of 17
Project	CT04761S-17V0 / FA #10034993	Date	12:09:15 09/07/17
Client	EMPIRE TELECOM / AT&T	Designed by	KM

Description	Placement	#	Weight
	ft		plf
1" (6x12) Hybrid Cables (T-Mobile / New)	262.00 - 6.00	3	0.85
Feedline Ladder (Af) (T-Mobile / E / WG "A")	265.00 - 8.50	1	8.40
EW 4.75" x 2.5" (E / #19)	343.25 - 6.00	1	1.85
7/8 (E / #20)	47.50 - 6.00	1	0.54
7/8 (E / #21)	348.25 - 6.00	1	0.54
0.95" Dead Cable (E / #22)	125.00 - 6.00	1	0.49
1 1/4 Dead Cable (E / #23)	299.00 - 6.00	1	0.66
7/8 (E / #24, 25)	350.00 - 6.00	2	0.54
Feedline Ladder (Af) (E / WG "B")	345.00 - 8.50	1	8.50
HB114-1 1/4" Hybrid Cable (Sprint / E / #26-28)	244.00 - 0.00	3	1.08
LDF4-50A (1/2 FOAM) (E / #29)	26.00 - 0.00	1	0.15
Feedline Ladder (Af) (Sprint / E / WG "C")	241.00 - 2.00	1	8.45
1/2 (E / #30)	343.67 - 6.00	1	0.25
1/2 (E / #31)	208.50 - 6.00	1	0.25
7/8 (E / #32)	349.75 - 6.00	1	0.54
1/2 (E / #33, 34)	31.00 - 6.00	2	0.25
1/2 (E / #34)	350.00 - 6.00	1	0.25
0.25" Dead Cables (E / #35, 36)	350.00 - 6.00	2	0.26
7/8	349.50 - 6.00	1	0.54

Description	Placement	#	Weight
	ft		plf
(E / #37)			
1 5/8	350.00 - 6.00	2	1.04
(E / #38, 39) Waveguide Brackets (E / WG "D")	348.00 - 15.00	1	1.15
Climbing Ladder (E)	350.00 - 0.50	1	9.50
Safety Rail (E)	350.00 - 0.00	1	2.75
0.6" SO Cords (E / #40-43)	182.50 - 0.00	4	0.35
0.6" SO Cords (E / #40,43)	269.25 - 182.50	2	0.35
0.6" SO Cord (E / #43)	350.00 - 269.25	1	0.35
0.8" Dead SO Cord (E / #44)	350.00 - 14.00	1	0.40
3/4" Rigid Conduit Unused (E / #45)	338.00 - 0.00	1	1.13
Conduit Shield (E)	35.00 - 12.00	1	18.50
Unused Conduit Supports (E / WG "E")	320.00 - 37.00	1	9.56
Grounding Cable (E)	350.00 - 0.00	1	0.25
3/4" DC Power Cable (ATT / New / E / #46,47)	347.00 - 6.00	6	0.80
1 5/8 (ATT / E / #49-60)	347.00 - 6.00	12	1.04
5/8" Fiber Cable (ATT / New / E / #48)	347.00 - 6.00	2	0.50
Feedline Ladder (Af) (ATT / E / WG "F")	345.00 - 14.50	1	13.50

inxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job	350ft SST / Norwalk East - Willard RD Site #CTU2132	Page	3 of 17
	Project	CT04761S-17V0 / FA #10034993	Date	12:09:15 09/07/17
	Client	EMPIRE TELECOM / AT&T	Designed by	KM

Discrete Tower Loads

Description	Placement	Weight	Description	Placement	Weight
	<i>ft</i>	<i>K</i>		<i>ft</i>	<i>K</i>
4ft Lightning Rod (E / #42)	364.00	0.01 0.01 0.01	8ft Pipe Mount (E / #32)	351.00	0.08 0.04 0.05
Beacon / Strobe (E / #41)	363.00	0.04 0.07 0.09	4ft Whip Antenna (E / #31)	355.50	0.01 0.02 0.03
14ft Mount (E / #41 / 42)	355.00	0.17 0.25 0.33	8ft Pipe Mount (E / #31)	351.00	0.04 0.05 0.06
12ft Whip Antenna (E / #40)	371.00	0.02 0.04 0.06	10ft 4-Element Dipole (E / #30)	354.50	0.03 0.04 0.07
TMA (E / #40)	353.00	0.03 0.04 0.05	8ft Pipe Mount (E / #30)	351.00	0.04 0.05 0.06
10ft Pipe Mount (E / #40)	360.00	0.05 0.07 0.08	20ft 4-Element Dipole (E / #29)	348.25	0.04 0.09 0.13
15ft Whip Antenna (E / #39)	364.50	0.03 0.05 0.08	6ft Pipe Mount (E / #29)	351.00	0.04 0.05 0.06
4ft Pipe Mount (E / #39)	356.25	0.02 0.03 0.03	Top Platform w/ Rails (E)	350.50	17.00 21.25 25.50
Top Stub Tower (E)	352.00	0.66 0.86 1.06	3ft 3-Elem Yagi (Unknown / E / #27)	343.67	0.02 0.03 0.03
Whip (E / #38)	369.50	0.02 0.05 0.07	8ft Pipe Mount on Sector Mount (Unknown / E / #27)	341.00	0.02 0.03 0.03
15ft Pipe Mount w/ Guys (E / #38)	355.50	0.13 0.17 0.21	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.02 0.04 0.05
8ft Empty Pipe Mount (E / #37)	349.00	0.04 0.05 0.06	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.02 0.04 0.05
21ft Whip Antenna (E / #36)	349.50	0.03 0.07 0.10	Raycap DC6-48-60-18-8F SUPPRESSOR (ATT / E)	347.00	0.02 0.04 0.05
3ft Empty Side Arm Mount (E / #35)	350.50	0.17 0.24 0.30	RRUS-11 (ATT / E / #25)	347.00	0.05 0.07 0.10
8ft Whip Antenna (E / #34)	349.75	0.02 0.03 0.04	RRUS-11 (ATT / E / #25)	347.00	0.05 0.07 0.10
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.06 0.11 0.17	RRUS-11 (ATT / E / #25)	347.00	0.05 0.07 0.10
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.06 0.11 0.17	7770.00 Panels w/ Pipe Mount (ATT / E / #24)	347.00	0.04 0.09 0.15
TA-2335-DAB Panel w/ Pipe Mount (E / #33)	343.25	0.06 0.11 0.17	7770.00 Panels w/ Pipe Mount (ATT / E / #24)	347.00	0.04 0.09 0.15
15ft Whip Antenna (E / #32)	354.50	0.03 0.05	7770.00 Panels w/ Pipe	347.00	0.15 0.04

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job	Page
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	Project	Date
	CT04761S-17V0 / FA #10034993	12:09:15 09/07/17
Client	Designed by	
	EMPIRE TELECOM / AT&T	KM

Description	Placement	Weight	Description	Placement	Weight
	ft	K		ft	K
Mount		0.09	RRUS-32 B2	347.00	0.05
(ATT / E / #24)		0.15	(ATT / P)		0.07
(2) LGP21401 TMA'S	347.00	0.02			0.10
(ATT / E / #24)		0.03	RRUS-32 B2	347.00	0.05
		0.04	(ATT / P)		0.07
(2) LGP21401 TMA'S	347.00	0.02			0.10
(ATT / E / #24)		0.03	Sector Mount w V-Stabilizer	347.00	0.72
		0.04	(Commscope MTC3615 AD		0.95
(2) LGP21401 TMA'S	347.00	0.02	A)		1.19
(ATT / E / #24)		0.03	(ATT / E)		
		0.04	Sector Mount w V-Stabilizer	347.00	0.72
(2) 7020 RET Motor	344.50	0.00	(Commscope MTC3615 AD		0.95
(ATT / E)		0.00	A)		1.19
		0.00	(ATT / E)		
(2) 7020 RET Motor	344.50	0.00	Sector Mount w V-Stabilizer	347.00	0.72
(ATT / E)		0.00	(Commscope MTC3615 AD		0.95
		0.00	A)		1.19
(2) 7020 RET Motor	344.50	0.00	(ATT / E)		
(ATT / E)		0.00	4-Way Walkway Platform w/	339.00	10.25
		0.00	Rails		13.32
SBNHH-1D65A w/ pipe	347.00	0.06	(E)		16.40
mount		0.12	Corner Ladder	350.00 - 339.00	0.45
(ATT / P)		0.18	(E)		0.59
SBNHH-1D65A w/ pipe	347.00	0.06			0.74
mount		0.12	4-Way Face Frame	325.00	3.00
(ATT / P)		0.18	(E)		3.90
SBNHH-1D65A w/ pipe	347.00	0.06			4.79
mount		0.12	(4) 14ft Empty Pipe Mounts	306.00	0.06
(ATT / P)		0.18	(E / #21)		0.09
(2) TPX-070821 Triplexer	347.00	0.01			0.13
(ATT / P)		0.01	OB Light	269.25	0.01
		0.02	(E / #20)		0.01
(2) TPX-070821 Triplexer	347.00	0.01			0.02
(ATT / P)		0.01	OB Light	269.25	0.01
		0.02	(E / #20)		0.01
(2) TPX-070821 Triplexer	347.00	0.01			0.02
(ATT / P)		0.01	AIR21 B2A B4P w/ pipe	262.00	0.13
		0.02	Mount		0.18
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / E / #19)		0.25
Mounts		0.13	AIR21 B2A B4P w/ pipe	262.00	0.13
(ATT / E)		0.20	Mount		0.18
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / E / #19)		0.25
Mounts		0.13	AIR21 B2A B4P w/ pipe	262.00	0.13
(ATT / E)		0.20	Mount		0.18
OPA-65R-LCUU-H4 w/ Pipe	347.00	0.08	(T-Mobile / E / #19)		0.25
Mounts		0.13	ATMAA1412D-1A20	262.00	0.01
(ATT / E)		0.20	TMA'S		0.02
RRUS-32	347.00	0.08	(T-Mobile / E / #19)		0.03
(ATT / E)		0.10	ATMAA1412D-1A20	262.00	0.01
		0.14	TMA'S		0.02
RRUS-32	347.00	0.08	(T-Mobile / E / #19)		0.03
(ATT / E)		0.10	ATMAA1412D-1A20	262.00	0.01
		0.14	TMA'S		0.02
RRUS-32	347.00	0.08	(T-Mobile / E / #19)		0.03
(ATT / E)		0.10	LNx-6515DS-VTM w/ Pipe	262.00	0.08
		0.14	Mnt.		0.17
RRUS-32 B2	347.00	0.05	(T-Mobile / New)		0.26
(ATT / P)		0.07	LNx-6515DS-VTM w/ Pipe	262.00	0.08
		0.10	Mnt.		0.17

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	Project CT04761S-17V0 / FA #10034993	Date 12:09:15 09/07/17
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Description	Placement	Weight	Description	Placement	Weight
	ft	K		ft	K
(T-Mobile / New)		0.26	(Sprint / E / #13)		0.07
LNx-6515DS-VTM w/ Pipe	262.00	0.08			0.09
Mnt.		0.17	RRH	242.25	0.05
(T-Mobile / New)		0.26	(Sprint / E / #13)		0.07
RRUS-11	262.00	0.05			0.09
(T-Mobile / New)		0.07	RRH	242.25	0.05
		0.10	(Sprint / E / #13)		0.07
RRUS-11	262.00	0.05			0.09
(T-Mobile / New)		0.07	800 Ext. Notch Filter	242.25	0.01
		0.10	(Sprint / E / #13)		0.02
RRUS-11	262.00	0.05			0.02
(T-Mobile / New)		0.07	800 Ext. Notch Filter	242.25	0.01
		0.10	(Sprint / E / #13)		0.02
AIR32 B66Aa/B2a Panel w/	262.00	0.15			0.02
Pipe Mount		0.22	800 Ext. Notch Filter	242.25	0.01
(T-Mobile / New)		0.28	(Sprint / E / #13)		0.02
AIR32 B66Aa/B2a Panel w/	262.00	0.15			0.02
Pipe Mount		0.22	13ft Sector Mount	244.25 - 241.50	0.57
(T-Mobile / New)		0.28	(Sprint / E / #13-15)		0.78
AIR32 B66Aa/B2a Panel w/	262.00	0.15			0.98
Pipe Mount		0.22	13ft Sector Mount	244.25 - 241.50	0.57
(T-Mobile / New)		0.28	(Sprint / E / #13-15)		0.78
10.5ft Sector Mount (Sitepro1	262.00	0.35			0.98
#VFA10-U)		0.48	13ft Sector Mount	244.25 - 241.50	0.57
(T-Mobile / New)		0.60	(Sprint / E / #13-15)		0.78
10.5ft Sector Mount (Sitepro1	262.00	0.35			0.98
#VFA10-U)		0.48	7ft 5-Elem Yagi	208.50	0.01
(T-Mobile / New)		0.60	(E / #12)		0.02
10.5ft Sector Mount (Sitepro1	262.00	0.35			0.03
#VFA10-U)		0.48	5ft Pipe Mount	204.50	0.03
(T-Mobile / New)		0.60	(E / #12)		0.03
12" Square Panel w/ Pipe	255.50	0.01			0.04
Mount		0.02	Corner Rest Platform	191.50	0.75
(E / #17)		0.03	(E / #11)		1.01
25ft Rest Platform w/ Rails	251.50	2.65			1.27
(E / #16)		3.58	Corner Rest Platform	191.50	0.75
		4.50	(E / #11)		1.01
25ft Rest Platform w/ Rails	251.50	2.65			1.27
(E / #16)		3.58	Corner Rest Platform	191.50	0.75
		4.50	(E / #11)		1.01
ALU-RRH 4x45	245.00	0.06			1.27
(Sprint / E / #15)		0.08	Corner Rest Platform	191.50	0.75
		0.11	(E / #11)		1.01
ALU-RRH 4x45	245.00	0.06			1.27
(Sprint / E / #15)		0.08	Beacon Ice Shield	186.00	0.10
		0.11	(E / #10)		0.14
ALU-RRH 4x45	245.00	0.06			0.17
(Sprint / E / #15)		0.08	Beacon Ice Shield	186.00	0.10
		0.11	(E / #10)		0.14
APXVSP18-C-A20 w/ Pipe	243.50	0.09			0.17
Mount		0.16	Beacon / Strobe	182.50	0.14
(Sprint / E / #14)		0.24	(E / #9)		0.18
APXVSP18-C-A20 w/ Pipe	243.50	0.09			0.22
Mount		0.16	Beacon / Strobe	182.50	0.14
(Sprint / E / #14)		0.24	(E / #9)		0.18
APXVSP18-C-A20 w/ Pipe	243.50	0.09			0.22
Mount		0.16	41ft Rest Platform w/ Rails	125.00	3.75
(Sprint / E / #14)		0.24	(E / #8)		5.50
RRH	242.25	0.05			7.25

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 6 of 17
	Project CT04761S-17V0 / FA #10034993	Date 12:09:15 09/07/17
	Client EMPIRE TELECOM / AT&T	Designed by KM

Description	Placement	Weight
	ft	K
41ft Rest Platform w/ Rails (E / #8)	125.00	3.75 5.50 7.25
4ft Rest Platform w/ Rails (E / #7)	100.00	0.45 0.61 0.77
OB Light (E / #6)	93.00	0.01 0.01 0.02
OB Light (E / #6)	93.00	0.01 0.01 0.02
4ft Rest Platform w/ Rails (E / #5)	50.25	0.45 0.61 0.77
4ft Side Arm (E / #4)	46.50	0.55 0.78 1.00
Corner Rest Platform (E / #3)	26.00	0.75 1.01

Description	Placement	Weight
	ft	K
Corner Rest Platform (E / #3)	26.00	1.27 0.75 1.01 1.27
Corner Rest Platform (E / #3)	26.00	0.75 1.01 1.27
Corner Rest Platform (E / #3)	26.00	0.75 1.01 1.27
GPS w/ Pipe Mount (E / #2)	26.00	0.01 0.01 0.01
10ft Pipe Mount w/ Standoff (E / #1)	34.00 - 24.00	0.12 0.16 0.19
Face Frame w/ Knee Braces (E)	25.00 - 16.67	8.50 11.05 13.60

Dishes

Description	Elevation	Weight
	ft	K
3ft Dish (E / #4)	47.50	0.09 0.13 0.17
4ft Dish (E / #1)	31.00	0.10 0.17 0.24

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Load Combinations

Comb. No.	Description	Comb. No.	Description
1	Dead Only	19	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
2	1.2 Dead+1.6 Wind 0 deg - No Ice	20	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
3	0.9 Dead+1.6 Wind 0 deg - No Ice	21	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
4	1.2 Dead+1.6 Wind 45 deg - No Ice	22	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
5	0.9 Dead+1.6 Wind 45 deg - No Ice	23	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
6	1.2 Dead+1.6 Wind 90 deg - No Ice	24	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
7	0.9 Dead+1.6 Wind 90 deg - No Ice	25	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
8	1.2 Dead+1.6 Wind 135 deg - No Ice	26	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
9	0.9 Dead+1.6 Wind 135 deg - No Ice	27	Dead+Wind 0 deg - Service
10	1.2 Dead+1.6 Wind 180 deg - No Ice	28	Dead+Wind 45 deg - Service
11	0.9 Dead+1.6 Wind 180 deg - No Ice	29	Dead+Wind 90 deg - Service
12	1.2 Dead+1.6 Wind 225 deg - No Ice	30	Dead+Wind 135 deg - Service
13	0.9 Dead+1.6 Wind 225 deg - No Ice	31	Dead+Wind 180 deg - Service
14	1.2 Dead+1.6 Wind 270 deg - No Ice	32	Dead+Wind 225 deg - Service
15	0.9 Dead+1.6 Wind 270 deg - No Ice	33	Dead+Wind 270 deg - Service
16	1.2 Dead+1.6 Wind 315 deg - No Ice	34	Dead+Wind 315 deg - Service
17	0.9 Dead+1.6 Wind 315 deg - No Ice		
18	1.2 Dead+1.0 Ice+1.0 Temp		

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	351.67 - 337.5	0.870	28	0.0315	0.0066
T2	337.5 - 325	0.770	28	0.0313	0.0062
T3	325 - 312.5	0.678	28	0.0301	0.0058
T4	312.5 - 300	0.589	28	0.0286	0.0054
T5	300 - 287.5	0.499	28	0.0269	0.0048
T6	287.5 - 275	0.417	28	0.0245	0.0042
T7	275 - 262.5	0.341	28	0.0217	0.0037
T8	262.5 - 250	0.267	28	0.0191	0.0031
T9	250 - 225	0.197	28	0.0162	0.0024
T10	225 - 200	0.107	32	0.0107	0.0015
T11	200 - 175	0.041	32	0.0056	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
371.00	12ft Whip Antenna	28	0.870	0.0315	0.0066	752637
369.50	Whip	28	0.870	0.0315	0.0066	752637
364.50	15ft Whip Antenna	28	0.870	0.0315	0.0066	752637
364.00	4ft Lightning Rod	28	0.870	0.0315	0.0066	752637
363.00	Beacon / Strobe	28	0.870	0.0315	0.0066	752637
360.00	10ft Pipe Mount	28	0.870	0.0315	0.0066	752637
356.25	4ft Pipe Mount	28	0.870	0.0315	0.0066	752637
355.50	15ft Pipe Mount w/ Guys	28	0.870	0.0315	0.0066	752637
355.00	14ft Mount	28	0.870	0.0315	0.0066	752637
354.50	15ft Whip Antenna	28	0.870	0.0315	0.0066	752637
353.00	TMA	28	0.870	0.0315	0.0066	752637
352.00	Top Stub Tower	28	0.870	0.0315	0.0066	752637
351.00	8ft Pipe Mount	28	0.865	0.0315	0.0065	752637

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Elevation	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
350.50	3ft Empty Side Arm Mount	28	0.862	0.0315	0.0065	752637
349.75	8ft Whip Antenna	28	0.856	0.0315	0.0065	752637
349.50	21ft Whip Antenna	28	0.855	0.0315	0.0065	752637
349.00	8ft Empty Pipe Mount	28	0.851	0.0315	0.0065	752637
348.25	20ft 4-Element Dipole	28	0.846	0.0315	0.0065	752637
347.00	Raycap DC6-48-60-18-8F SUPRESSOR	28	0.837	0.0315	0.0065	752637
344.50	(2) 7020 RET Motor	28	0.820	0.0315	0.0064	524847
343.67	3ft 3-Elem Yagi	28	0.814	0.0315	0.0064	470395
343.25	TA-2335-DAB Panel w/ Pipe Mount	28	0.811	0.0315	0.0064	446932
341.00	8ft Pipe Mount on Sector Mount	28	0.795	0.0314	0.0063	355084
339.00	4-Way Walkway Platform w/ Rails	28	0.780	0.0314	0.0062	320138
325.00	4-Way Face Frame	28	0.678	0.0301	0.0058	368835
306.00	(4) 14ft Empty Pipe Mounts	28	0.542	0.0278	0.0051	554795
269.25	OB Light	28	0.307	0.0205	0.0035	Inf
262.00	AIR21 B2A B4P w/ pipe Mount	28	0.264	0.0190	0.0031	Inf
255.50	12" Square Panel w/ Pipe Mount	28	0.226	0.0175	0.0027	137659
251.50	25ft Rest Platform w/ Rails	28	0.205	0.0166	0.0025	87966
245.00	ALU-RRH 4x45	28	0.174	0.0151	0.0022	92162
243.50	APXVSPPI8-C-A20 w / Pipe Mount	28	0.168	0.0147	0.0021	100000
242.25	RRH	28	0.163	0.0144	0.0021	107629
241.50	13ft Sector Mount	28	0.160	0.0143	0.0020	112791
208.50	7ft 5-Elem Yagi	32	0.062	0.0074	0.0010	269398
204.50	5ft Pipe Mount	32	0.052	0.0066	0.0009	214605
191.50	Corner Rest Platform	32	0.025	0.0038	0.0005	264574
186.00	Beacon Ice Shield	32	0.016	0.0025	0.0003	396863
182.50	Beacon / Strobe	32	0.011	0.0017	0.0002	582062

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	351.67 - 337.5	3.233	4	0.1144	0.0252
T2	337.5 - 325	2.868	4	0.1136	0.0238
T3	325 - 312.5	2.532	4	0.1092	0.0223
T4	312.5 - 300	2.205	4	0.1038	0.0209
T5	300 - 287.5	1.873	4	0.0979	0.0184
T6	287.5 - 275	1.570	4	0.0893	0.0163
T7	275 - 262.5	1.289	4	0.0790	0.0142
T8	262.5 - 250	1.014	4	0.0697	0.0119
T9	250 - 225	0.751	4	0.0591	0.0090
T10	225 - 200	0.411	12	0.0391	0.0058
T11	200 - 175	0.156	12	0.0207	0.0028

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Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	351.67 - 337.5	Leg	L6x6x5/8	3	-23.59	179.77	13.1	Pass
		Diagonal	L3 1/2x3 1/2x5/16	14	-7.43	20.67	36.0	Pass
		Secondary Horizontal	L3x3x1/4	18	-1.88	15.87	11.8	Pass
		Top Girt	C8x11.5	5	-0.19	54.59	0.7	Pass
T2	337.5 - 325	Leg	L6x6x5/8	23	-30.34	180.87	16.8	Pass
							24.2 (b)	
		Diagonal	L3 1/2x3 1/2x5/16	34	-10.44	19.20	54.4	Pass
		Horizontal	C7x9.8	25	3.63	87.64	4.1	Pass
T3	325 - 312.5	Secondary Horizontal	L3x2 1/2x1/4	38	-0.46	8.46	5.4	Pass
		Leg	L6x6x7/8	43	-49.39	247.24	20.0	Pass
		Diagonal	L3 1/2x4x5/16	59	-11.59	20.13	57.6	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	47	6.17	63.37	9.7	Pass
T4	312.5 - 300	Secondary Horizontal	L3x2 1/2x1/4	63	-0.74	7.02	10.6	Pass
		Inner Bracing	2L2x2 1/2x1/4x3/8	53	0.01	69.01	0.8	Pass
		Leg	L6x6x7/8	68	-61.23	253.32	24.2	Pass
							36.7 (b)	
T5	300 - 287.5	Diagonal	2L2 1/2x2 1/2x1/4x3/8	88	-14.58	21.60	67.5	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	84	-8.19	31.81	25.7	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	82	-0.92	15.09	6.1	Pass
		Redund Diag 1 Bracing	L2 1/2x2x3/16	83	-0.76	4.69	16.1	Pass
T6	287.5 - 275	Inner Bracing	2L2x2 1/2x1/4x3/8	102	-0.02	3.55	0.9	Pass
		Leg	L6x6x7/8	105	-78.95	253.32	31.2	Pass
		Diagonal	2L2 1/2x2 1/2x5/16x3/8	125	-15.36	25.05	61.3	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	121	-9.85	26.71	36.9	Pass
T7	275 - 262.5	Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	119	-1.19	18.49	6.4	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	120	-0.92	8.41	10.9	Pass
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	139	-0.02	5.50	1.1	Pass
		Leg	L6x6x7/8	142	-96.94	253.32	38.3	Pass
T8	262.5 - 250						46.4 (b)	
		Diagonal	2L2 1/2x2 1/2x5/16x3/8	162	-15.94	23.23	68.6	Pass
		Horizontal	2L2 1/2x2 1/2x1/4x3/8	158	-10.61	22.98	46.2	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x1/4	160	-1.46	16.35	8.9	Pass
T9	250 - 237.5	Redund Diag 1 Bracing	L2 1/2x2 1/2x1/4	161	-1.07	7.74	13.8	Pass
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	176	-0.02	4.61	1.2	Pass
		Leg	L8x8x3/4	179	-115.11	327.61	35.1	Pass
		Diagonal	2L2 1/2x2 1/2x1/4x3/8	201	-16.60	30.68	54.1	Pass
T10	237.5 - 225	Horizontal	2L2 1/2x2 1/2x1/4x3/8	197	-11.48	19.98	57.4	Pass
		Redund Horz 1 Bracing	L2 1/2x2 1/2x3/16	193	-1.73	11.03	15.7	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	194	-1.21	5.50	22.1	Pass
		Redund Hip 1 Bracing	L3x3x1/4	195	-0.05	11.22	0.6	Pass
T11	225 - 212.5	Redund Hip Diagonal 1 Bracing	2L2 1/2x2 1/2x1/4x3/8	196	-0.11	9.97	1.1	Pass
		Inner Bracing	2L2 1/2x2 1/2x3/16x3/8	221	-0.02	3.03	1.6	Pass
		Leg	L8x8x3/4	224	-136.72	327.61	41.7	Pass
		Diagonal	2L2 1/2x2 1/2x1/4x3/8	246	-18.94	28.93	65.5	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T9	250 - 225	Horizontal	2L2 1/2x2 1/2x1/4x3/8	242	-13.62	17.73	76.8	Pass
		Redund Horiz 1 Bracing	L2 1/2x2 1/2x3/16	238	-2.06	9.40	21.9	Pass
		Redund Diag 1 Bracing	L2 1/2x2 1/2x3/16	239	-1.39	5.22	26.6	Pass
		Redund Hip 1 Bracing	L3x3x1/4	260	-0.05	9.65	0.6	Pass
		Redund Hip Diagonal 1 Bracing	2L2 1/2x2 1/2x1/4x3/8	241	-0.11	8.81	1.2	Pass
		Inner Bracing	2L2 1/2x2 1/2x3/16x3/8	266	-0.02	2.60	1.7	Pass
		Leg	L8x8x7/8	269	-148.50	344.61	43.1	Pass
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	303	-35.93	58.63	59.3 (b)	Pass
		Horizontal	2L3x2 1/2x1/4x3/8	297	-15.68	24.69	61.3	Pass
		Redund Horiz 1 Bracing	2L1 3/4x1 3/4x3/16	290	-2.23	18.90	66.9 (b)	Pass
		Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	291	-2.23	28.33	11.8	Pass
		Redund Diag 1 Bracing	2L2x2x3/16	292	-2.25	11.88	19.0	Pass
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	307	-8.32	12.12	68.7	Pass
		Redund Hip 2 Bracing	L3 1/2x3 1/2x5/16	325	-0.18	9.30	1.9	Pass
T10	225 - 200	Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	296	-0.14	6.33	2.3	Pass
		Redund Sub Horiz Bracing	2L2 1/2x2 1/2x1/4x3/8	308	-9.70	20.40	47.5	Pass
		Inner Bracing	2L2 1/2x2 1/2x1/4x3/8	331	-0.03	11.69	1.5	Pass
		Leg	L8x8x1 1/8	334	-197.28	434.78	45.4	Pass
		Diagonal	2L2.5x3x5/16 + 2L3x3x3/8	368	-37.20	51.39	67.5 (b)	Pass
		Horizontal	2L3x2 1/2x1/4x3/8	362	-17.89	51.94	72.4	Pass
		Redund Horiz 1 Bracing	2L1 3/4x1 3/4x3/16	355	-2.97	17.87	34.4	Pass
		Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	356	-2.97	21.77	40.2 (b)	Pass
		Redund Diag 1 Bracing	2L2x2x3/16	357	-2.72	10.92	16.6	Pass
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	372	-5.84	10.35	24.9	Pass
		Redund Hip 2 Bracing	L4x4x3/8	390	-0.20	12.87	56.4	Pass
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	361	-0.14	5.15	1.5	Pass
		Redund Sub Horiz Bracing	2L2 1/2x2 1/2x1/4x3/8	373	-7.35	16.28	2.8	Pass
		T11	200 - 175	Inner Bracing	L3x3x1/4	396	-0.02	3.25
Leg	L8x8x1 1/8			399	-243.80	522.80	46.6	Pass
Diagonal	2L2.5x3.5x5/16 + 2L3x3.5x3/8			433	-41.49	70.20	73.0 (b)	Pass
Horizontal	2L3 1/2x2 1/2x1/4x3/8			427	-20.85	53.17	59.1	Pass
Redund Horiz 1 Bracing	2L1 3/4x1 3/4x3/16			420	-3.67	16.78	39.2	Pass
Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8			421	-3.67	17.25	46.4 (b)	Pass
Redund Diag 1 Bracing	2L2x2x3/16			422	-3.10	10.05	21.9	Pass
Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8			421	-3.67	17.25	21.3	Pass
Redund Diag 1 Bracing	2L2x2x3/16			422	-3.10	10.05	30.8	Pass
Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8			421	-3.67	17.25	21.3	Pass
Redund Diag 1 Bracing	2L2x2x3/16			422	-3.10	10.05	30.8	Pass
Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8			421	-3.67	17.25	21.3	Pass
Redund Diag 1 Bracing	2L2x2x3/16			422	-3.10	10.05	30.8	Pass
Redund Horiz 2 Bracing	2L2 1/2x2 1/2x1/4x3/8			421	-3.67	17.25	21.3	Pass

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow} K$	% Capacity	Pass Fail
		Redund Diag 2 Bracing	2L2 1/2x2x3/16x3/8	437	-7.91	8.88	89.1	Pass
		Redund Hip 2 Bracing	L4x4x3/8	455	-0.20	10.27	1.9	Pass
		Redund Hip Diagonal 2 Bracing	2L2 1/2x2 1/2x1/4x3/8	426	-0.15	4.26	3.5	Pass
		Redund Sub Horz Bracing	2L2 1/2x3x1/4x3/8	438	-10.65	14.08	75.6	Pass
		Inner Bracing	2L3x2 1/2x1/4x3/8	461	-0.04	12.07	2.1	Pass
RATING =							89.1	Pass

*Elev. 175-351.67ft – Modelled in TnxTower.

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Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T12	175 - 150	*Legs - A	ST L808018	265.34	522.8	50.75	89.38	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L2.5x3x5/16 + 2L3x3x3/8	60.8	101.93	59.65	63.71	Pass
		*Horizontals - O / Added Redundant Braces	LD L35255 SP 0.4375	38.49	65	59.21	60.5	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.27	13.41	9.47	7.99	Pass
		*Red Diag 1 - D	ST L30303	1.39	8.13	17.11	8.74	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.375	1.81	53.8	3.36	5.69	Pass
		*Red Diag 2 - L	LD L30306 SP 0.4375	25.66	37.98	67.56	40.33	Pass
		*Red Sub Diagonal - M / New Reinforcement	2L3x2.5x1/4 + L3.5x2.5x3/8	40.34	59.54	67.76	42.27	Pass
		*Red Vertical - N	ST L30304	0.02	11.34	0.18	0.13	Pass
		*Red Sub Horizontal - F / Bolt Replacement	LD L30304 SP 0.4375	30.56	46.52	65.69	38.43	Pass
		*Hip Horizontal 2 - G	LD L40304 SP 0.375	3.2	89.16	3.59	10.06	Pass
		*Hip Diagonal 2 - K	LD L25254 SP 0.375	5.62	16.99	33.08	17.67	Pass
		*Hip Horz 2 Sub Braces - H (LLV)	ST L30254	0.23	17.78	1.29	1.45	Pass
		*Level 1 Internal Sub Diagonals - J	ST L30304	2.2	13.17	16.7	13.83	Pass
		*Level 1 Internal Horizontal - I	LD L40304 SP 0.375	4.61	71.54	6.44	14.49	Pass
		*Level 2 Internal Corner Diagonals - Q	ST L30304	2.28	9.62	23.71	14.34	Pass
		*Level 2 Internal Middle Diagonals - S	ST L30304	2.27	9.42	24.11	14.27	Pass
		*Level 2 Internal Corner Diagonals Sub Braces - P	ST L30254	2.18	12.19	17.89	13.71	Pass
		*Level 2 Internal Horizontal - R	LD L40304 SP 0.375	2.03	46.83	4.33	6.38	Pass
T13	150 - 125	*Legs - A	ST L808018	275.86	522.39	52.81	78.02	Pass
		*Diagonals - B / Reinforcement / Bolt Replacement	2L3x3.5x3/8 + 2L3x3.5x3/8	87.37	105.63	82.71	78.48	Pass
		*Horizontals - K / Added Redundant Braces	LD L35305 SP 0.4375	57.74	80.3	71.9	90.76	Pass
		*Red Horiz 1 - C (LLV)	ST L25204	1.39	22.08	6.3	8.74	Pass
		*Red Diag 1 - D	ST L30303	1.95	8.65	22.54	12.26	Pass
		*Red Horiz 2 - E	SD L25203 SP 0.375	5.16	16.82	30.68	16.22	Pass
		*Red Diag 2 - I / Replace Existing	LD L35356 SP 0.4375	54.64	71.18	76.76	85.89	Pass
		*Red Sub Diagonal - J / New Reinf. - Replace Bolts	2L3x2.5x1/4 + L3.5x2.5x3/8	45.52	55.38	82.2	38.16	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	40.23	55.51	72.47	63.24	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0	23.37	0	0	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0.01	16.35	0.06	0.03	Pass
		*Internal Corner Diagonals - M (LLH)	ST L35304	1.69	10.39	16.27	10.63	Pass
		*Internal Middle Diagonals - N (LLV)	ST L35304	1.47	9.45	15.56	9.24	Pass
		*Internal Corner Diagonals Sub Braces - L (LLV)	ST L30254	4.72	10.42	45.32	29.68	Pass

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 13 of 17
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	Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Internal Horizontal - O (LLV)	LD L40304 SP 0.375	3.71	39.7	9.35	11.66	Pass
T14	125 - 100	*Legs - A / Replace Bolts @ 103.5ft Approx.	ST L808016	349.75	497.74	70.27	46.16	Pass
		*Diagonals - B / Bolt Replacement One End Only	2L3x3.5x3/8 + 2L3x3.5x3/8	79.71	92.98	85.73	50.12	Pass
		*Horizontals - K / Added Redundant Braces	LD L40355 SP 0.4375	58.46	92.83	62.98	73.51	Pass
		*Red Horiz 1 - C (LLV)	ST L25203	1.47	12.93	11.37	9.24	Pass
		*Red Diag 1 - D	ST L30303	1.62	8.03	20.18	10.19	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.4375	2.01	26.66	7.54	6.32	Pass
		*Red Diag 2 - I	LD L35356 SP 0.4375	47.34	63.66	74.36	74.41	Pass
		*Red Sub Diagonal - J / New Reinforcement	2L3x3x3/8 + L3.5x3x3/8	47.05	102.21	46.03	49.31	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	LD L40406 SP 0.5	44.18	56.75	77.85	46.3	Pass
		*Hip Horizontal 2 - G	SD L30254 SP 0.375	0.01	14.86	0.07	0.03	Pass
		*Hip Diagonal 2 - H	LD L25254 SP 0.375	0	15.07	0	0	Pass
		*Internal Corner Diagonals - M	ST L35354	2.95	10.55	27.96	18.55	Pass
		*Internal Middle Diagonals - N	ST L35354	2.62	10.93	23.96	16.47	Pass
		*Internal Corner Diagonals Sub Braces - L	ST L35354	6.26	17.07	36.67	39.36	Pass
		*Internal Horizontal - O	LD L40354 SP 0.375	5.1	37.75	13.51	16.03	Pass
T15	100 - 75	*Legs - A / Replace Bolts @ 78.5ft Approx.	ST L808016	453.96	497.74	91.2	52.43	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	61.34	139	44.13	77.14	Pass
		*Horizontals - Q / New Reinforcement	2L3.5x3x5/16 + L4x3.5x3/8	47.99	97.93	49.01	75.44	Pass
		*Red Horiz 1 - C	ST L25253	1.41	9.37	15.05	8.87	Pass
		*Red Diag 1 - D	LD L25253 SP 0.375	1.16	15.4	7.53	3.65	Pass
		*Red Horiz 2 - E	LD L25254 SP 0.5	1.8	40.09	4.49	5.66	Pass
		*Red Diag 2 - M / Replace Existing Member	LD L35356 SP 0.4375	24.39	38	64.18	38.34	Pass
		*Red Sub Diagonal - O	LD L40408 SP 0.4375	61.29	75.65	81.01	38.54	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	17.52	24.98	70.13	55.08	Pass
		*Red Vertical Outside - N	ST L25254	0.04	6.48	0.62	0.25	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.07	7.1	0.99	0.44	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.05	49.46	0.1	0.16	Pass
		*Hip Diagonal 2 - J	LD L25254 SP 0.375	0.01	33.01	0.03	0.03	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0	6.63	0	0	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	7.1	0	0	Pass

tnxTower

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 Dallas, Texas 75252
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Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Hip SubInternal 2 - H	ST L25253	0	8.1	0	0	Pass
		*Internal Corner Horizontal 1 - V	ST L30303	0.07	10.18	0.69	0.44	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.04	8.8	0.45	0.25	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	4.11	40.08	10.26	12.92	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.32	43.73	5.31	7.29	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	3.81	7.82	48.7	23.96	Pass
		*Internal Corner Horizontal 3 - R	LD L35254 SP 0.4375	5.76	53.92	10.68	18.11	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	5.39	47.01	11.47	16.95	Pass
T16	75 - 50	*Legs - A / Add Redundants / Replace Bolts	ST L808016	512.49	625.5	81.93	52.61	Pass
		*Diagonals - B	2L3x3.5x3/8 + 2L3x3.5x3/8	62.74	140.71	44.59	78.9	Pass
		*Horizontals - Q / New Reinforcement	2L4x3x1/4 + L4x3.5x3/8	50.94	76.37	66.7	64.06	Pass
		*Red Horiz 1 - C	ST L25253	1.12	8.72	12.84	7.04	Pass
		*Red Diag 1 - D	LD L25254 SP 0.375	4.92	38.59	12.75	15.47	Pass
		*Red Horiz 2 - E	LD L30254 SP 0.5	1.98	51.49	3.85	6.22	Pass
		*Red Diag 2 - M	LD L35356 SP 0.4375	26.33	70.68	37.25	59.6	Pass
		*Red Sub Diagonal - O / New Reinforcement	2L4x4x1/2 + L4x4x3/8	63.55	163.61	38.84	39.96	Pass
		*Red Sub Horizontal - F / Add Kicker Internal	SD L35304 SP 0.5	18.5	21.93	84.34	58.16	Pass
		*Red Vertical Outside - N	ST L25254	0.05	6.48	0.77	0.31	Pass
		*Red Vertical Center - P	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - CC	ST L30303	0.1	6.19	1.62	0.63	Pass
		*Hip Horizontal 2 - G	LD L35254 SP 0.375	0.06	46.3	0.13	0.19	Pass
		*Hip Diagonal 2 - J	LD L25254	0.03	29.89	0.1	0.09	Pass
		*Hip SubDiagonal 2 - K	ST L25253	0.01	5.97	0.17	0.06	Pass
		*Hip SubVertical 2 - L	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - I	ST L30303	0	6.19	0	0	Pass
		*Hip SubInternal 2 - H	ST L25253	0	7.06	0	0	Pass
		*Internal Corner Horizontal 1 - V	ST L30303	0.05	12.27	0.41	0.31	Pass
		*Internal Corner Diagonal 1 - U	ST L25253	0.04	7.25	0.55	0.25	Pass
		*Internal Corner Horizontal 2 - T	LD L30254 SP 0.375	4.87	37.03	13.15	15.31	Pass
		*Internal Corner Diagonal 2 - S	SD L30254 SP 0.375	2.8	40.52	6.91	8.8	Pass
		*Internal Corner Diagonal 2 - W	ST L30303	4.79	6.77	70.72	30.12	Pass
		*Internal Corner Horizontal 3 - R	LD L40356 SP 0.375	5.66	106.7	5.3	17.79	Pass
		*Internal Corner Diagonal 3 - X	LD L30304 SP 0.375	6.8	43.03	15.8	21.38	Pass
T17	50 - 25	*Legs - A / Replace Bolts @ 28.5ft Approx.	ST L808016	575.43	625.11	92.05	59.07	Pass
		*Diagonals - B	2L3x4x3/8 + 2L3x4x3/8	66.99	129.59	51.69	84.24	Pass

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 15 of 17
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	Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Horizontals - X / New Reinforcement	2L4x3x5/16 + L4x3.5x3/8	55.4	79.09	70.05	69.67	Pass
		*Red Horiz 1 - E	ST L25254	1.33	9.95	13.36	8.36	Pass
		*Red Diag 1 - G	LD L25253 SP 0.4375	5.08	36.86	13.78	15.97	Pass
		*Red Horiz 2 - M	LD L25254 SP 0.5	3.42	33.58	10.18	10.75	Pass
		*Red Diag 2 - T	LD L35356 SP 0.4375	29.32	92.25	31.78	46.09	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.56	24.86	10.3	16.1	Pass
		*Red Sub Diag 1 - D	ST L25254	2.76	15.38	17.95	24.99	Pass
		*Red Sub Diag 2 - F	ST L25254	4.9	13.28	36.89	44.37	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.56	24.85	18.35	41.29	Pass
		*Red Sub Diag 3 - R	ST L25254	2.05	5.78	35.49	18.56	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.69	8.06	33.37	24.36	Pass
		*Red Sub Diagonal - V / New Reinforcement	2L4x4x1/2 + L4x4x3/8	67.99	151.83	44.78	42.75	Pass
		*Red Sub Horizontal - N / Add Kicker Internal	SD L40304 SP 0.5	20.58	21.43	96.06	64.7	Pass
		*Red Vertical Outside - U	ST L25254	0.06	6.48	0.93	0.38	Pass
		*Red Vertical Center - W	ST L25254	0	6.48	0	0	Pass
		*Hip Horizontal 1 - I	ST L40406	0.09	24.95	0.36	0.57	Pass
		*Hip Horizontal 2 - J	LD L35255 SP 0.375	0.07	52.43	0.13	0.22	Pass
		*Hip Diagonal 2 - O	LD L25254 SP 0.375	0.01	27.15	0.04	0.03	Pass
		*Hip SubDiagonal 2 - Q	ST L25253	0.01	5.4	0.19	0.06	Pass
		*Hip SubVertical 2 - P	ST L25253	0	17.13	0	0	Pass
		*Hip SubInternal 2 - K	ST L30304	0	7.09	0	0	Pass
		*Hip SubInternal 2 - L	ST L25253	0	6.21	0	0	Pass
		*Internal Corner Horizontal 1 - C1	ST L30304	0.05	12.37	0.4	0.31	Pass
		*Internal Corner Diagonal 1 - B1	ST L30304	0.04	14.78	0.27	0.25	Pass
		*Internal Corner Horizontal 2 - A1	LD L30254 SP 0.375	4.88	32.65	14.94	15.34	Pass
		*Internal Corner Diagonal 2 - Z	LD L25254 SP 0.375	2.83	34.24	8.27	8.9	Pass
		*Internal Corner Diagonal 2 - D1	LD L25253 SP 0.375	4.78	15.55	30.74	15.03	Pass
		*Internal Corner Horizontal 3 - Y	LD L35255 SP 0.4375	5.5	56.66	9.71	17.29	Pass
		*Internal Corner Diagonal 3 - E1	LD L30304 SP 0.4375	6.77	39.65	17.07	21.28	Pass
T18	25 - 0	*Legs - A / Replace Splice Bolts @ 3.5ft Approx.	ST L808018	641.6	696.49	92.12	59.28	Pass
		*Diagonals - B	SD L60406 SP 0.5	67.06	102.1	65.68	72.28	Pass
		*Horizontals - L1	LD L50356 SP 0.4375	55.87	94.96	58.84	70.26	Pass
		*Red Horiz 1 - E	ST L25254	1.41	9.94	14.19	8.87	Pass
		*Red Diag 1 - G	LD L25254 SP 0.5	4.84	46.82	10.34	15.22	Pass
		*Red Horiz 2 - O	LD L35256 SP 0.4375	5.82	66.02	8.82	18.3	Pass

tnxTower Malouf Engineering Int'l Inc. 17950 Preston Road, STE 720 Dallas, Texas 75252 Phone: (972) 783 2578 FAX: (972) 783 2583	Job 350ft SST / Norwalk East - Willard RD Site #CTU2132	Page 16 of 17
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	Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
		*Red Diag 2 - T	LD L35356 SP 0.4375	29.65	89.22	33.23	31.07	Pass
		*Red Sub Horiz 1 - C	ST L25254	2.81	23.56	11.93	25.44	Pass
		*Red Sub Diag 1 - D	ST L25254	3.18	14.67	21.68	28.79	Pass
		*Red Sub Diag 2 - F	ST L25254	4.65	12.57	36.99	42.1	Pass
		*Red Sub Horiz 2 - H	ST L25254	4.38	23.56	18.59	39.66	Pass
		*Red Sub Diag 3 - R	ST L25254	1.81	5.31	34.07	16.39	Pass
		*Red Sub Horiz 3 - S	ST L25254	2.32	7.18	32.31	21.01	Pass
		*Red Sub Diagonal - V	LD L50506 SP 0.4375	59.44	155.95	38.12	27.46	Pass
		*Red Sub Horizontal - Q	ST C9X13	26.3	28.94	90.88	10.34	Pass
		*Red Vertical Outside - U	ST L25254	5.72	6.45	88.67	35.97	Pass
		*Red Vertical Center - Z	LD L30254 SP 0.5	0.03	43.37	0.07	0.09	Pass
		*Red Vertical Inner 1 - X	LD L25254 SP 0.375	14.71	51.22	28.72	46.25	Pass
		*Red Vertical Inner 2 - Y / Reinforcement DBL L	LD L30304 SP 0.5	18.39	37.02	49.68	57.81	Pass
		*Red Vertical Sub Diagonal - W	LD L25254 SP 0.5	17.91	20.49	87.39	56.31	Pass
		*Hip Horizontal 1 - I	ST L40406	0.12	22.23	0.54	0.75	Pass
		*Hip Diagonal 1 - J	LD L25254 SP 0.5	0.1	14.43	0.69	0.31	Pass
		*Hip Horizontal 2 - L	LD L35354 SP 0.4375	2.47	46.21	5.34	7.77	Pass
		*Hip Diagonal 2 - A1	LD L25254 SP 0.375	1.52	24.81	6.13	4.78	Pass
		*Hip SubDiagonal 2 - C1	ST L25253	0	4.86	0	0	Pass
		*Hip SubVertical 2 - B1	ST L25253	0	17.08	0	0	Pass
		*Hip SubInternal 2-1 - KK	LD L25253 SP 0.4375	3.49	24.2	14.42	10.97	Pass
		*Hip SubInternal 2-2 - K / Reinforcement DBL L	LD L25253 SP 0.4375	5.9	22.07	26.73	18.55	Pass
		*Internal-1 Sub Braces - N	ST L30304	1.89	8.94	21.13	11.88	Pass
		*Internal-1 Inner Horiz - M	LD L60355 SP 0.375	7.64	85.5	8.94	24.02	Pass
		*Internal-2 Corner Horizontal 1 - H1	LD L25253 SP 0.4375	0.1	27.08	0.37	0.31	Pass
		*Internal-2 Corner Diagonal 1 - G1	ST L25254	0.06	7.05	0.85	0.38	Pass
		*Internal-2 Corner Horizontal 2 - F1	LD L30254 SP 0.375	3.6	28.87	12.47	11.32	Pass
		*Internal-2 Corner Diagonal 2-1 - E1	LD L25254 SP 0.375	1.93	30.15	6.4	6.07	Pass
		*Internal-2 Corner Diagonal 2-2 - I1	LD L25253 SP 0.4375	3	13.74	21.83	9.43	Pass
		*Internal-2 Corner Horizontal 3 - D1	LD L35255 SP 0.4375	4.31	51.65	8.34	13.55	Pass
		*Internal-2 Corner Diagonal 3 - K2	LD L30254 SP 0.5	4.2	48.03	8.74	13.2	Pass
		*Internal-2 Corner Diagonal 3 - Sub1 - J1	ST L30304	0.16	12.76	1.25	1.01	Pass
		*Internal-2 Corner Diagonal 3 - Sub2 - K1	LD L30304 SP 0.5	0.01	53.07	0.02	0.03	Pass
T12	175-150	Reinforcement / Redundant Vertical / RV12	ST L25254	0.12	6.27	1.92	1.09	Pass
		Reinforcement / Internal / RI12	ST L25254	0.87	10.93	7.96	7.88	Pass

tnxTower

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Client EMPIRE TELECOM / AT&T	Designed by KM

Section No.	Elevation ft	Component Type	Member Size	P kips	Pallow kips	% Cap. Member	% Cap. Bolt	Pass Fail
T13	150-125	Reinforcement / Redundant Vertical / RV13	ST L25254	0.2	6.44	3.1	1.81	Pass
		Reinforcement / Internal / RI13	ST L25254	1.22	9.6	12.71	11.05	Pass
		Reinforcement / Internal Kicker / RK13	ST L30304	0.01	6.34	0.16	0.06	Pass
T14	100-125	Reinforcement / Redundant Vertical / RV14	ST L30304	0.18	11.39	1.58	1.13	Pass
		Reinforcement / Internal / RI14	ST L30304	1.07	13.08	8.18	6.73	Pass
		Reinforcement / Internal Kicker / RK14	ST L30304	0.01	5.67	0.18	0.06	Pass
T15	75-100	Reinforcement / Internal Kicker / RK15	ST L30304	0.01	6.83	0.15	0.06	Pass
T16	50-75	Reinforcement / Internal Kicker / RK16	ST L30304	0.01	6.46	0.15	0.06	Pass
		*Reinforcement / Red Sub Horiz 1 - C16	ST L25254	2.07	26.21	7.9	13.02	Pass
		*Reinforcement / Red Sub Diag 1 - D16	ST L25254	2.58	16.14	15.99	16.22	Pass
		*Reinforcement / Red Sub Diag 2 - F16	ST L25254	4.69	14.04	33.4	29.49	Pass
		*Reinforcement / Red Sub Horiz 2 - H16	ST L25254	4.03	26.21	15.38	25.34	Pass
		*Reinforcement / Red Sub Diag 3 - R16	ST L25254	1.8	6.35	28.35	11.32	Pass
		*Reinforcement / Red Sub Horiz 3 - S16	ST L25254	2.06	9.17	22.47	12.95	Pass
T17	25-50	*Reinforcement / Internal Kicker / RK17	ST L30304	0.01	6.11	0.16	0.06	Pass
T9	250-225	Red Horiz 1 - C	ST L25203	2.22	12.37	17.95	13.96	Pass
		Red Diag 1 - D	ST L30303	2.24	8.45	26.52	14.08	Pass
T10	225-200	Red Horiz 1 - C	ST L25204	2.84	12.61	22.53	17.86	Pass
		Red Diag 1 - D	ST L30303	2.6	7.77	33.45	16.35	Pass
T11	200-175	Red Horiz 1 - C	ST L25253	3.52	11.5	30.6	22.13	Pass
		Red Diag 1 - D	ST L30304	2.98	9.31	32	18.74	Pass

*Elev. 0-175ft – Tower modelled in Staad. Tower Members were considered as truss members and Loads are from Staad Analysis.



Malouf Engineering International Inc.
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Dallas, Texas. 75252 / p (972)-783-2578
maloufengineering.com

Job No CT04761S-17V	Sheet No 1	Rev 0
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Software licensed to MEI

Job Title 351.7ft Self Supporting Tower

Part	Ref
By KM	Date 7-Sep-17 Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std	Date/Time 07-Sep-2017 11:57
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Job Information

	Engineer	Checked	Approved
Name:	KM	HML	MM
Date:	7-Sep-17	7-Sep-17	7-Sep-17

Project ID	
Project Name	

Comments

2016 CT SBC / 2012 IBC / ANSI/TIA-222-G
Vult=120MPH / Vasd=93MPH / 50MPH + 3/4" ICE / Vservice=60MPH
EXPOSURE 'C' / CLASS 'II' / TOPO 1
0 to 175ft of Tower Modelled

Structure Type SPACE FRAME

Number of Nodes	804	Highest Node	820
Number of Elements	2008	Highest Beam	2024

Number of Basic Load Cases	-2
Number of Combination Load Cases	0

Included in this printout are data for:

All	The Whole Structure
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Included in this printout are results for load cases:

Type	L/C	Name
Primary	1	DEAD ONLY
Primary	2	1.2 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	3	0.9 DEAD+1.6 WIND 0 DEG - NO ICE
Primary	4	1.2 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	5	0.9 DEAD+1.6 WIND 45 DEG - NO ICE
Primary	6	1.2 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	7	0.9 DEAD+1.6 WIND 90 DEG - NO ICE
Primary	8	1.2 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	9	0.9 DEAD+1.6 WIND 135 DEG - NO ICE
Primary	10	1.2 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	11	0.9 DEAD+1.6 WIND 180 DEG - NO ICE
Primary	12	1.2 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	13	0.9 DEAD+1.6 WIND 225 DEG - NO ICE
Primary	14	1.2 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	15	0.9 DEAD+1.6 WIND 270 DEG - NO ICE
Primary	16	1.2 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	17	0.9 DEAD+1.6 WIND 315 DEG - NO ICE
Primary	18	1.2 DEAD+1.0 ICE+1.0 TEMP
Primary	19	1.2 DEAD+1.0 WIND 0 DEG+1.0 ICE+1.0



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Job Title **351.7ft Self Supporting Tower**

Client **Empire Telecom / AT&T**

Job Information Cont...

Type	L/C	Name
Primary	23	1.2 DEAD+1.0 WIND 180 DEG+1.0 ICE+1
Primary	24	1.2 DEAD+1.0 WIND 225 DEG+1.0 ICE+1
Primary	25	1.2 DEAD+1.0 WIND 270 DEG+1.0 ICE+1
Primary	26	1.2 DEAD+1.0 WIND 315 DEG+1.0 ICE+1
Primary	27	DEAD+WIND 0 DEG - SERVICE
Primary	28	DEAD+WIND 45 DEG - SERVICE
Primary	29	DEAD+WIND 90 DEG - SERVICE
Primary	30	DEAD+WIND 135 DEG - SERVICE
Primary	31	DEAD+WIND 180 DEG - SERVICE
Primary	32	DEAD+WIND 225 DEG - SERVICE
Primary	33	DEAD+WIND 270 DEG - SERVICE
Primary	34	DEAD+WIND 315 DEG - SERVICE

Supports

Node	X (kip/in)	Y (kip/in)	Z (kip/in)	rX (kip'ft/deg)	rY (kip'ft/deg)	rZ (kip'ft/deg)
224	Fixed	Fixed	Fixed	-	-	-
227	Fixed	Fixed	Fixed	-	-	-
230	Fixed	Fixed	Fixed	-	-	-
233	Fixed	Fixed	Fixed	-	-	-

Node Displacement Summary

	Node	L/C	X (in)	Y (in)	Z (in)	Resultant (in)	rX (rad)	rY (rad)	rZ (rad)
Max X	476	6:1.2 DEAD+1.	6.437	-1.019	0.041	6.518	-0.000	-0.001	-0.004
Min X	478	15:0.9 DEAD+1.	-6.419	-0.909	0.046	6.483	-0.000	0.001	0.004
Max Y	423	5:0.9 DEAD+1.	2.712	0.738	-2.745	3.929	-0.003	-0.000	-0.003
Min Y	476	4:1.2 DEAD+1.	4.796	-1.323	-4.761	6.886	-0.003	-0.000	-0.003
Max Z	474	11:0.9 DEAD+1.	-0.015	-0.902	6.393	6.456	0.004	-0.001	-0.000
Min Z	476	2:1.2 DEAD+1.	-0.012	-1.019	-6.419	6.499	-0.004	0.001	-0.000
Max rX	798	8:1.2 DEAD+1.	0.841	-0.721	0.962	1.467	0.015	0.015	-0.004
Min rX	798	17:0.9 DEAD+1.	-0.889	0.416	-0.983	1.390	-0.010	-0.010	0.003
Max rY	798	8:1.2 DEAD+1.	0.841	-0.721	0.962	1.467	0.015	0.015	-0.004
Min rY	795	12:1.2 DEAD+1.	-0.870	-0.713	0.942	1.467	0.014	-0.015	0.004
Max rZ	462	14:1.2 DEAD+1.	-4.310	0.294	-0.075	4.321	-0.000	0.001	0.006
Min rZ	467	6:1.2 DEAD+1.	4.308	0.308	-0.062	4.320	-0.000	-0.001	-0.005
Max Rst	476	4:1.2 DEAD+1.	4.796	-1.323	-4.761	6.886	-0.003	-0.000	-0.003



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Reactions

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
224	1:DEAD ONLY	9.911	106.969	-9.992	0.000	0.000	0.000
	2:1.2 DEAD+1.	-24.702	-262.094	58.851	0.000	0.000	0.000
	3:0.9 DEAD+1.	-27.670	-294.140	61.848	0.000	0.000	0.000
	4:1.2 DEAD+1.	-68.181	-454.738	68.653	0.000	0.000	0.000
	5:0.9 DEAD+1.	-71.150	-486.763	71.647	0.000	0.000	0.000
	6:1.2 DEAD+1.	-58.762	-261.535	24.732	0.000	0.000	0.000
	7:0.9 DEAD+1.	-61.734	-293.581	27.725	0.000	0.000	0.000
	8:1.2 DEAD+1.	-13.613	128.702	-37.622	0.000	0.000	0.000
	9:0.9 DEAD+1.	-16.589	96.616	-34.628	0.000	0.000	0.000
	10:1.2 DEAD+.	48.404	518.698	-82.838	0.000	0.000	0.000
	11:0.9 DEAD+.	45.427	486.574	-79.841	0.000	0.000	0.000
	12:1.2 DEAD+.	92.005	711.291	-92.528	0.000	0.000	0.000
	13:0.9 DEAD+.	89.029	679.145	-89.528	0.000	0.000	0.000
	14:1.2 DEAD+.	82.499	518.308	-48.792	0.000	0.000	0.000
	15:0.9 DEAD+.	79.526	486.184	-45.790	0.000	0.000	0.000
	16:1.2 DEAD+.	37.325	127.921	13.687	0.000	0.000	0.000
	17:0.9 DEAD+.	34.355	95.835	16.687	0.000	0.000	0.000
	18:1.2 DEAD+.	22.899	247.243	-23.168	0.000	0.000	0.000
	19:1.2 DEAD+.	11.388	124.866	-1.527	0.000	0.000	0.000
	20:1.2 DEAD+.	-1.931	63.318	1.890	0.000	0.000	0.000
	21:1.2 DEAD+.	1.461	125.244	-11.580	0.000	0.000	0.000
	22:1.2 DEAD+.	15.358	247.368	-30.756	0.000	0.000	0.000
	23:1.2 DEAD+.	34.392	369.595	-44.812	0.000	0.000	0.000
	24:1.2 DEAD+.	47.738	431.143	-48.207	0.000	0.000	0.000
	25:1.2 DEAD+.	44.329	369.257	-34.774	0.000	0.000	0.000
	26:1.2 DEAD+.	30.423	247.085	-15.570	0.000	0.000	0.000
	27:DEAD+WIN	0.388	5.377	8.443	0.000	0.000	0.000
	28:DEAD+WIN	-10.914	-44.699	10.981	0.000	0.000	0.000
	29:DEAD+WIN	-8.472	5.531	-0.438	0.000	0.000	0.000
	30:DEAD+WIN	3.278	107.043	-16.654	0.000	0.000	0.000
	31:DEAD+WIN	19.411	208.526	-28.427	0.000	0.000	0.000
	32:DEAD+WIN	30.749	258.610	-30.937	0.000	0.000	0.000
	33:DEAD+WIN	28.283	208.425	-19.568	0.000	0.000	0.000
	34:DEAD+WIN	16.520	106.850	-3.319	0.000	0.000	0.000
227	1:DEAD ONLY	-9.864	108.624	-10.186	0.000	0.000	0.000
	2:1.2 DEAD+1.	23.978	-262.327	59.799	0.000	0.000	0.000
	3:0.9 DEAD+1.	26.933	-294.870	62.854	0.000	0.000	0.000
	4:1.2 DEAD+1.	-37.829	128.240	14.279	0.000	0.000	0.000
	5:0.9 DEAD+1.	-34.874	95.658	17.338	0.000	0.000	0.000
	6:1.2 DEAD+1.	-82.498	520.436	-49.104	0.000	0.000	0.000
	7:0.9 DEAD+1.	-79.539	487.813	-46.044	0.000	0.000	0.000
	8:1.2 DEAD+1.	-91.408	715.073	-93.718	0.000	0.000	0.000
	9:0.9 DEAD+1.	-88.446	682.430	-90.659	0.000	0.000	0.000
	10:1.2 DEAD+.	-47.735	523.116	-84.204	0.000	0.000	0.000



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Reactions Cont...

Node	L/C	Horizontal			Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip'in)	MY (kip'in)	MZ (kip'in)
	11:0.9 DEAD+*	-44.772	490.494	-81.149	0.000	0.000	0.000
	12:1.2 DEAD+*	14.209	132.364	-38.660	0.000	0.000	0.000
	13:0.9 DEAD+*	17.171	99.782	-35.608	0.000	0.000	0.000
	14:1.2 DEAD+*	58.761	-259.578	24.633	0.000	0.000	0.000
	15:0.9 DEAD+*	61.720	-292.121	27.685	0.000	0.000	0.000
	16:1.2 DEAD+*	67.671	-454.487	69.373	0.000	0.000	0.000
	17:0.9 DEAD+*	70.627	-487.011	72.425	0.000	0.000	0.000
	18:1.2 DEAD+*	-22.785	255.380	-24.083	0.000	0.000	0.000
	19:1.2 DEAD+*	-11.507	132.215	-2.067	0.000	0.000	0.000
	20:1.2 DEAD+*	-30.489	254.695	-16.224	0.000	0.000	0.000
	21:1.2 DEAD+*	-44.233	377.512	-35.720	0.000	0.000	0.000
	22:1.2 DEAD+*	-47.463	439.966	-49.431	0.000	0.000	0.000
	23:1.2 DEAD+*	-34.082	378.568	-46.092	0.000	0.000	0.000
	24:1.2 DEAD+*	-15.071	256.037	-31.928	0.000	0.000	0.000
	25:1.2 DEAD+*	-1.349	133.286	-12.454	0.000	0.000	0.000
	26:1.2 DEAD+*	1.877	70.785	1.285	0.000	0.000	0.000
	27:DEAD+WIND	-0.548	6.461	8.556	0.000	0.000	0.000
	28:DEAD+WIND	-16.621	108.071	-3.296	0.000	0.000	0.000
	29:DEAD+WIND	-28.249	210.110	-19.781	0.000	0.000	0.000
	30:DEAD+WIND	-30.561	260.731	-31.380	0.000	0.000	0.000
	31:DEAD+WIND	-19.203	210.811	-28.917	0.000	0.000	0.000
	32:DEAD+WIND	-3.090	109.135	-17.057	0.000	0.000	0.000
	33:DEAD+WIND	8.505	7.181	-0.599	0.000	0.000	0.000
	34:DEAD+WIND	10.811	-43.489	11.032	0.000	0.000	0.000
230	1:DEAD ONLY	-10.313	112.974	10.233	0.000	0.000	0.000
	2:1.2 DEAD+1.	-48.136	528.266	84.301	0.000	0.000	0.000
	3:0.9 DEAD+1.	-45.038	494.338	81.231	0.000	0.000	0.000
	4:1.2 DEAD+1.	-93.085	721.908	92.789	0.000	0.000	0.000
	5:0.9 DEAD+1.	-89.988	687.960	89.716	0.000	0.000	0.000
	6:1.2 DEAD+1.	-84.667	527.685	47.708	0.000	0.000	0.000
	7:0.9 DEAD+1.	-81.573	493.757	44.634	0.000	0.000	0.000
	8:1.2 DEAD+1.	-39.730	135.311	-15.190	0.000	0.000	0.000
	9:0.9 DEAD+1.	-36.639	101.423	-18.263	0.000	0.000	0.000
	10:1.2 DEAD+*	23.363	-257.004	-59.687	0.000	0.000	0.000
	11:0.9 DEAD+*	26.453	-290.853	-62.756	0.000	0.000	0.000
	12:1.2 DEAD+*	68.352	-450.789	-68.171	0.000	0.000	0.000
	13:0.9 DEAD+*	71.443	-484.618	-71.238	0.000	0.000	0.000
	14:1.2 DEAD+*	59.930	-256.609	-23.165	0.000	0.000	0.000
	15:0.9 DEAD+*	63.023	-290.459	-26.231	0.000	0.000	0.000
	16:1.2 DEAD+*	14.945	136.109	39.861	0.000	0.000	0.000
	17:0.9 DEAD+*	18.042	102.220	36.794	0.000	0.000	0.000
	18:1.2 DEAD+*	-24.465	271.426	24.197	0.000	0.000	0.000
	19:1.2 DEAD+*	-35.720	394.509	46.205	0.000	0.000	0.000
	20:1.2 DEAD+*	-49.556	456.400	49.158	0.000	0.000	0.000



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Reactions Cont...

Node	L/C	Horizontal			Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
	21:1.2 DEAD+	-46.508	394.121	35.288	0.000	0.000	0.000
	22:1.2 DEAD+	-32.650	271.307	15.967	0.000	0.000	0.000
	23:1.2 DEAD+	-13.217	148.369	2.200	0.000	0.000	0.000
	24:1.2 DEAD+	0.629	86.457	-0.751	0.000	0.000	0.000
	25:1.2 DEAD+	-2.420	148.712	13.100	0.000	0.000	0.000
	26:1.2 DEAD+	-16.291	271.597	32.449	0.000	0.000	0.000
	27:DEAD+WIND	-19.619	215.151	28.976	0.000	0.000	0.000
	28:DEAD+WIND	-31.305	265.504	31.172	0.000	0.000	0.000
	29:DEAD+WIND	-29.122	214.990	19.451	0.000	0.000	0.000
	30:DEAD+WIND	-17.424	112.905	3.094	0.000	0.000	0.000
	31:DEAD+WIND	-1.015	10.836	-8.494	0.000	0.000	0.000
	32:DEAD+WIND	10.682	-39.542	-10.689	0.000	0.000	0.000
	33:DEAD+WIND	8.501	10.937	1.010	0.000	0.000	0.000
	34:DEAD+WIND	-3.211	113.102	17.401	0.000	0.000	0.000
233	1:DEAD ONLY	10.266	110.123	9.944	0.000	0.000	0.000
	2:1.2 DEAD+1.	48.969	522.580	82.758	0.000	0.000	0.000
	3:0.9 DEAD+1.	45.885	489.509	79.775	0.000	0.000	0.000
	4:1.2 DEAD+1.	-14.310	131.015	38.556	0.000	0.000	0.000
	5:0.9 DEAD+1.	-17.392	97.982	35.577	0.000	0.000	0.000
	6:1.2 DEAD+1.	-59.978	-260.160	-23.653	0.000	0.000	0.000
	7:0.9 DEAD+1.	-63.058	-293.153	-26.632	0.000	0.000	0.000
	8:1.2 DEAD+1.	-69.100	-452.660	-67.714	0.000	0.000	0.000
	9:0.9 DEAD+1.	-72.176	-485.633	-70.694	0.000	0.000	0.000
	10:1.2 DEAD+	-24.350	-258.385	-58.915	0.000	0.000	0.000
	11:0.9 DEAD+	-27.425	-291.378	-61.899	0.000	0.000	0.000
	12:1.2 DEAD+	38.982	133.560	-14.582	0.000	0.000	0.000
	13:0.9 DEAD+	35.906	100.528	-17.568	0.000	0.000	0.000
	14:1.2 DEAD+	84.619	524.304	47.432	0.000	0.000	0.000
	15:0.9 DEAD+	81.539	491.232	44.446	0.000	0.000	0.000
	16:1.2 DEAD+	93.718	716.883	91.611	0.000	0.000	0.000
	17:0.9 DEAD+	90.635	683.792	88.625	0.000	0.000	0.000
	18:1.2 DEAD+	24.351	260.392	23.054	0.000	0.000	0.000
	19:1.2 DEAD+	35.886	382.851	44.700	0.000	0.000	0.000
	20:1.2 DEAD+	16.388	260.029	31.008	0.000	0.000	0.000
	21:1.2 DEAD+	2.298	137.564	11.915	0.000	0.000	0.000
	22:1.2 DEAD+	-0.969	75.800	-1.648	0.000	0.000	0.000
	23:1.2 DEAD+	12.810	137.909	1.403	0.000	0.000	0.000
	24:1.2 DEAD+	32.322	260.805	15.122	0.000	0.000	0.000
	25:1.2 DEAD+	46.403	383.186	34.175	0.000	0.000	0.000
	26:1.2 DEAD+	49.664	444.974	47.765	0.000	0.000	0.000
	27:DEAD+WIND	19.800	211.701	28.374	0.000	0.000	0.000
	28:DEAD+WIND	3.342	109.815	16.864	0.000	0.000	0.000
	29:DEAD+WIND	-8.544	8.059	0.686	0.000	0.000	0.000
	30:DEAD+WIND	-10.908	-41.990	-10.769	0.000	0.000	0.000



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Reactions Cont...

Node	L/C	Horizontal	Vertical	Horizontal	Moment		
		FX (kip)	FY (kip)	FZ (kip)	MX (kip·in)	MY (kip·in)	MZ (kip·in)
	31:DEAD+WIN	0.726	8.517	-8.491	0.000	0.000	0.000
	32:DEAD+WIN	17.198	110.488	3.052	0.000	0.000	0.000
	33:DEAD+WIN	29.078	212.147	19.178	0.000	0.000	0.000
	34:DEAD+WIN	31.435	262.227	30.664	0.000	0.000	0.000



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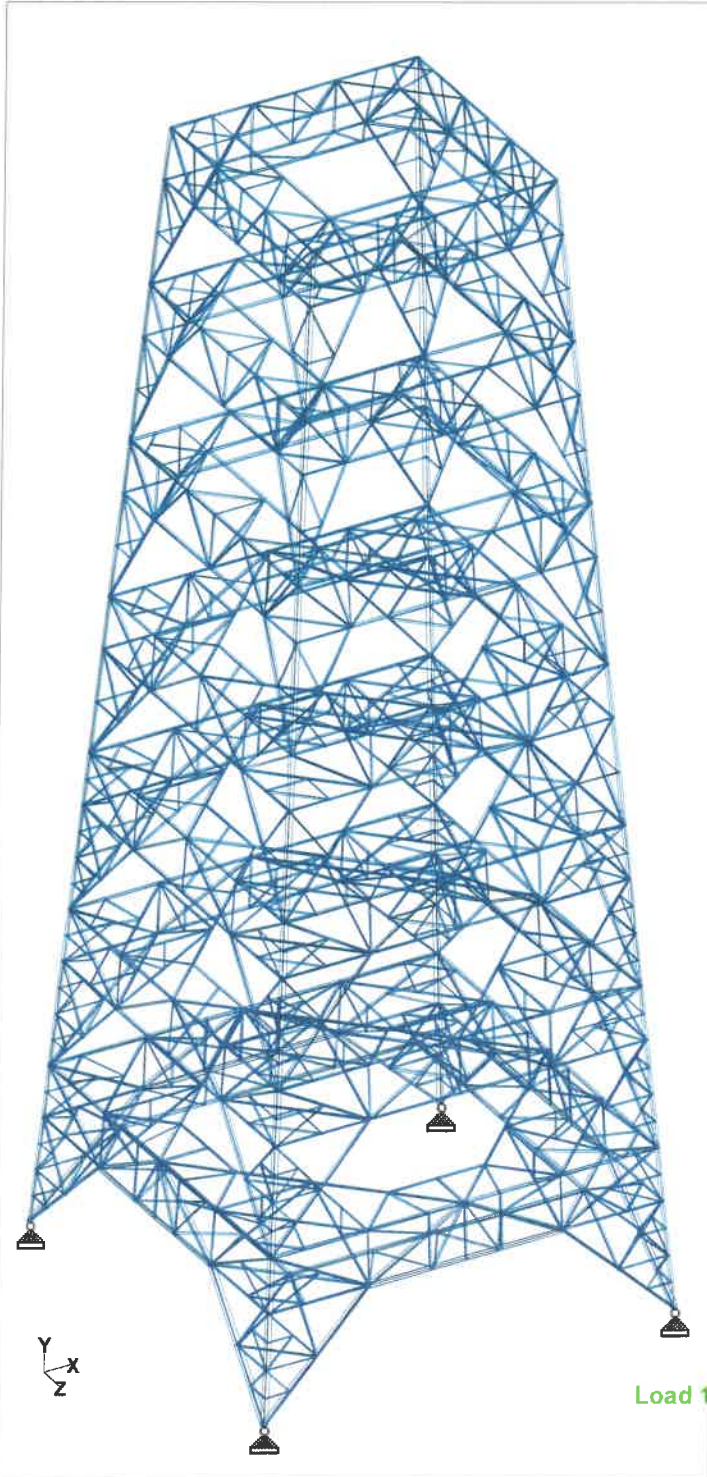
Date 7-Sep-17

Chd HML

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Structure 0-175ft (ISOMETRIC VIEW)



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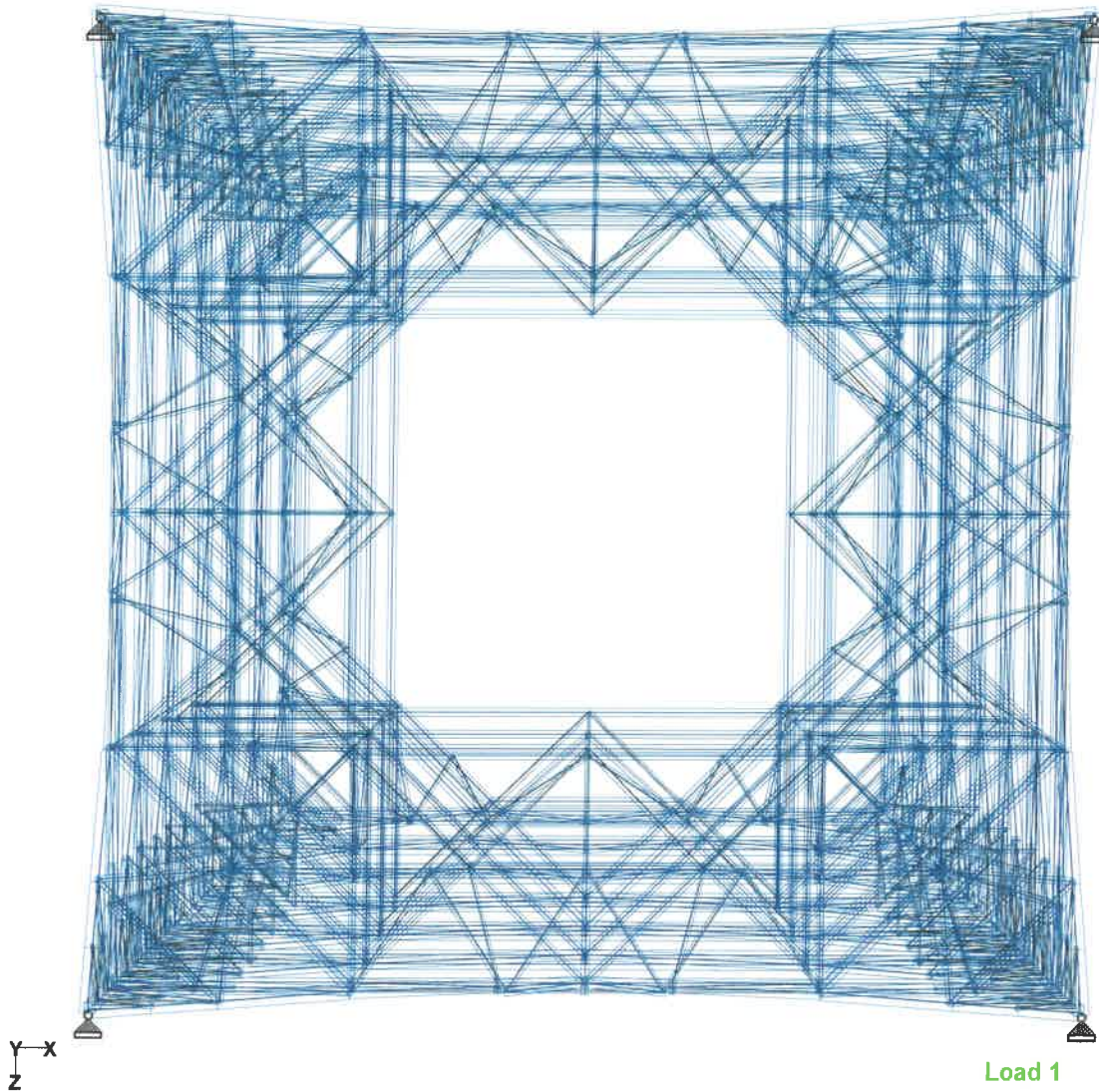
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Structure 0-175 ft (PLAN VIEW)



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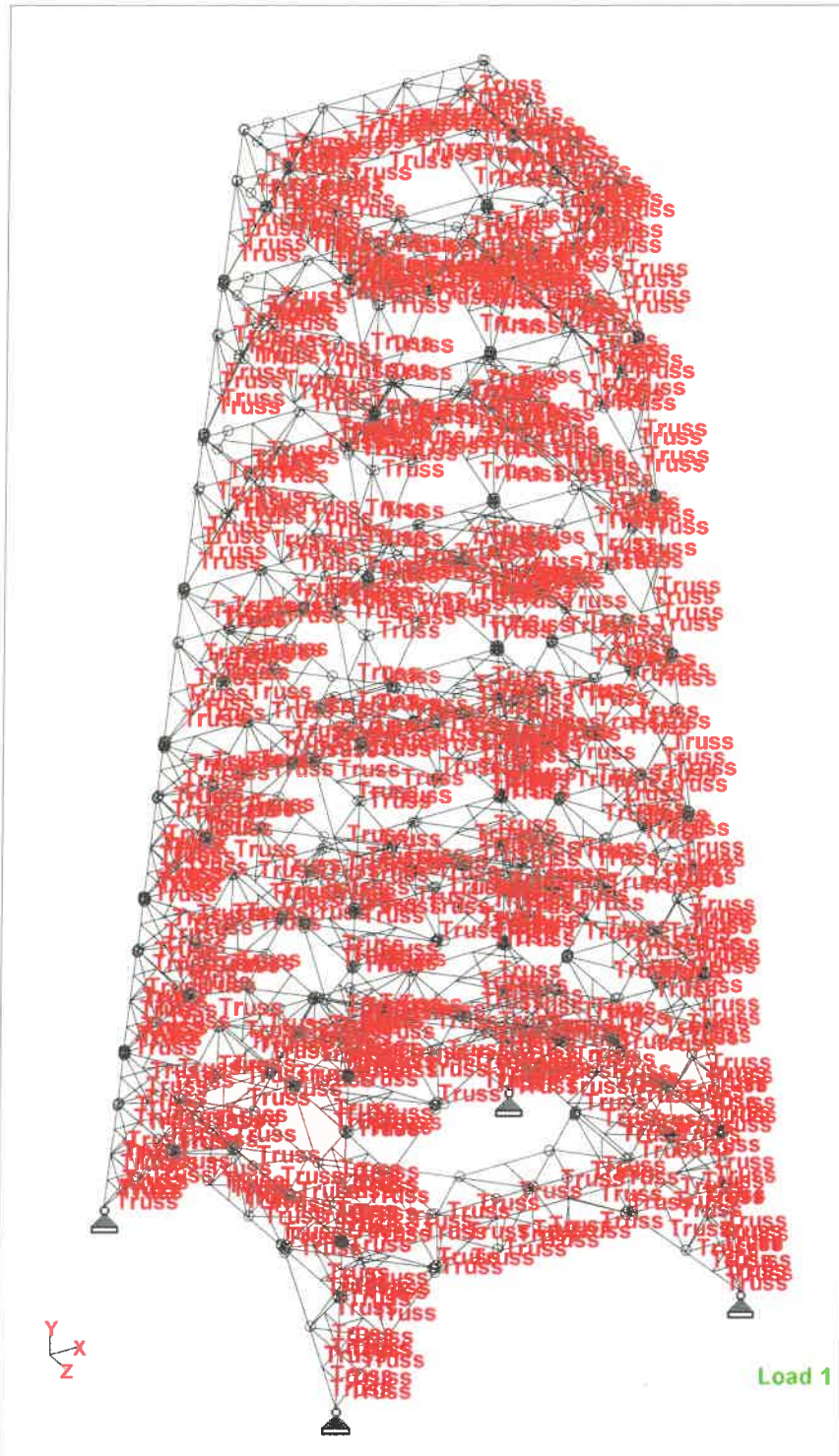
Date **7-Sep-17**

Chd **HML**

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Structure 0-175ft - Truss Members / Releases



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Job No
CT04761S-17V

Sheet No

10

Rev

0

Software licensed to MEI

Job Title 351.7ft Self Supporting Tower

Part

Ref

By KM

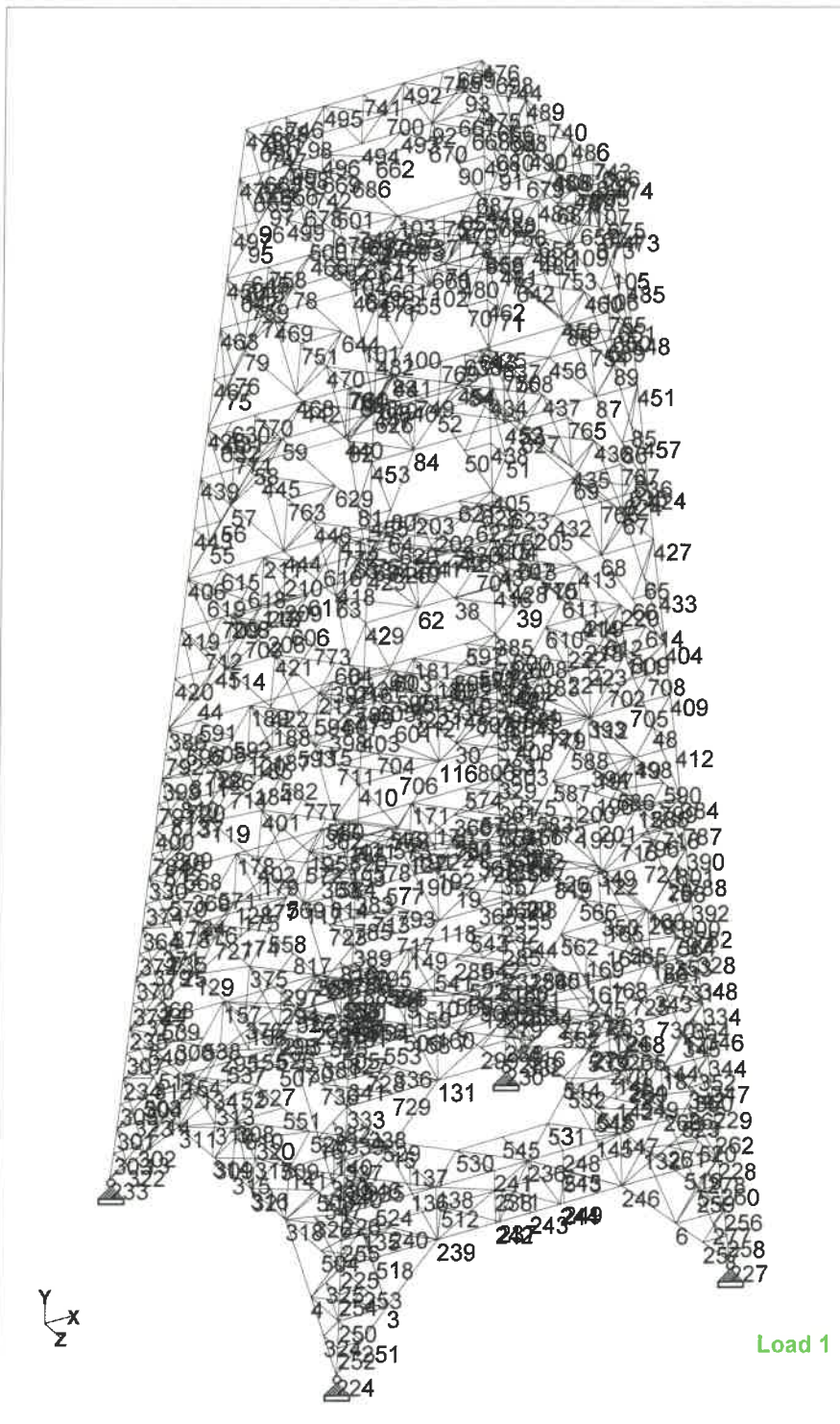
Date 7-Sep-17

Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std

Date/Time 07-Sep-2017 11:57



Structure 0-175 ft (Node Numbers)



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Sheet No
11

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Job Title 351.7ft Self Supporting Tower

Part

Ref

By KM

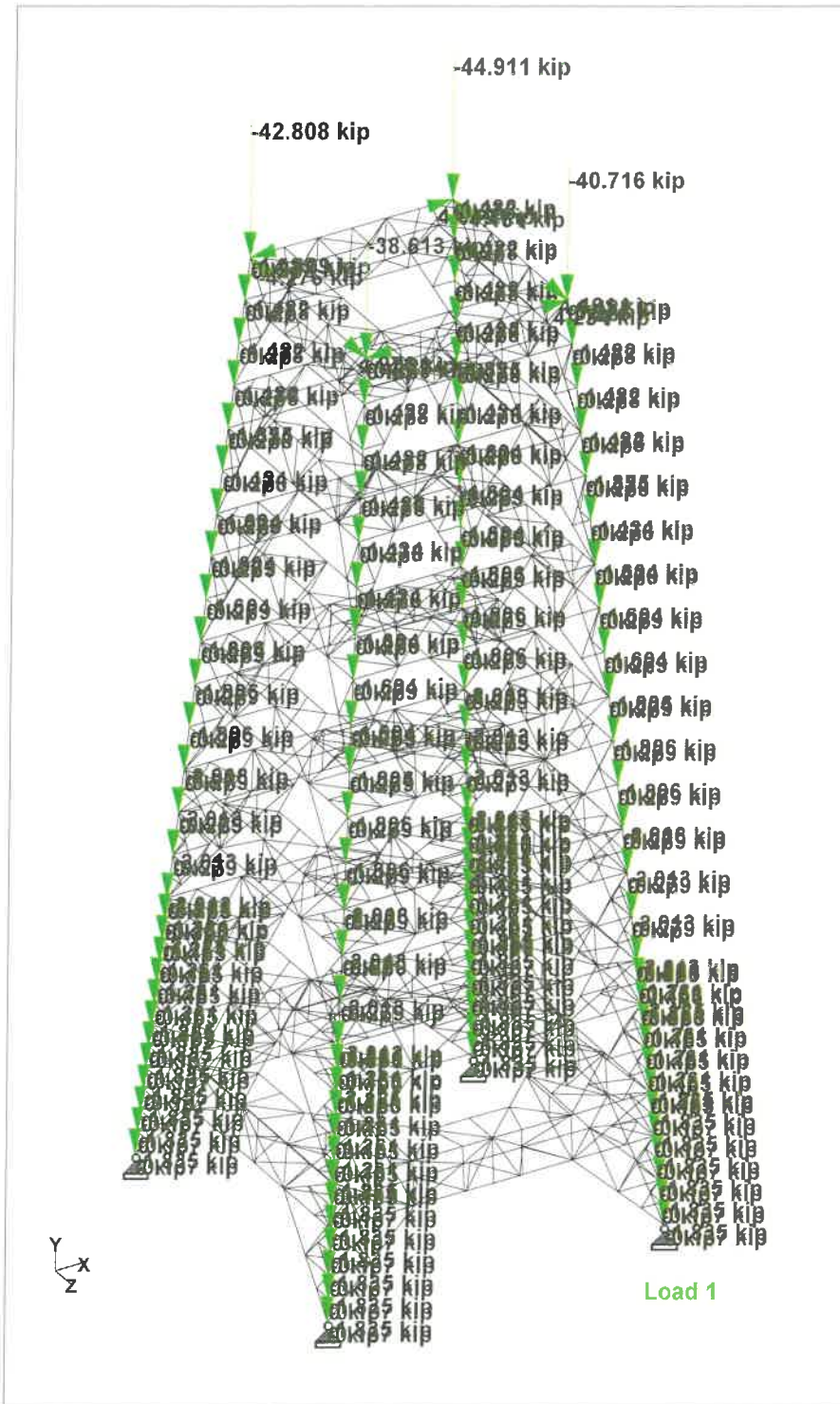
Date 7-Sep-17

Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std

Date/Time 07-Sep-2017 11:57



Whole Structure Loads 0.133517kip:1in 1 DEAD ONLY



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Job No CT04761S-17V	Sheet No 12	Rev 0
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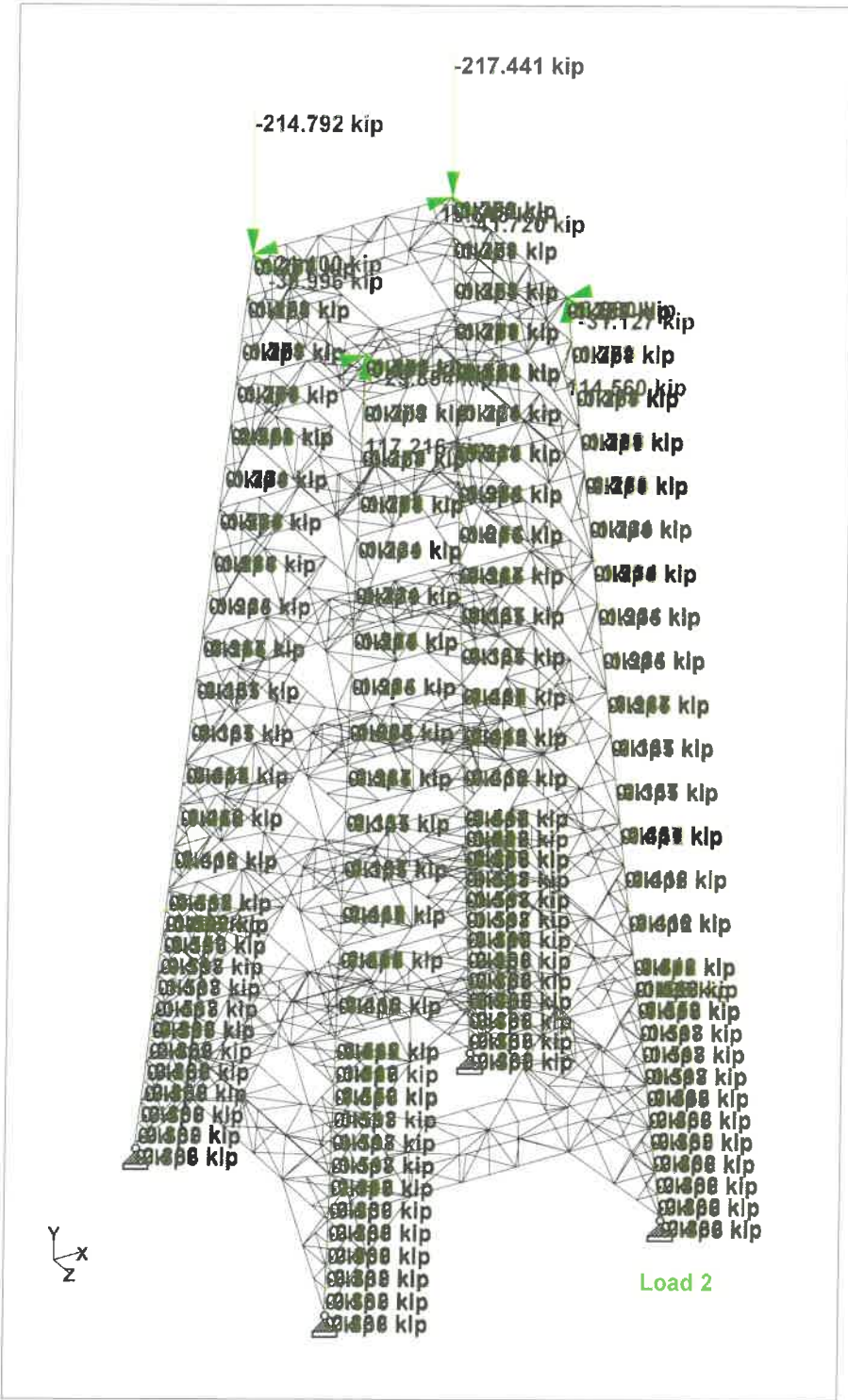
Software licensed to MEI

Job Title 351.7ft Self Supporting Tower

Part	Ref
By KM	Date 7-Sep-17
Chd HML	

Client Empire Telecom / AT&T

File CT04761S-17V0.std	Date/Time 07-Sep-2017 11:57
------------------------	-----------------------------



Whole Structure Loads 0.646437kip:1in 2 1.2 DEAD+1.6 WIND 0 DEG - NO ICE



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13

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Job Title 351.7ft Self Supporting Tower

Part

Ref

By KM

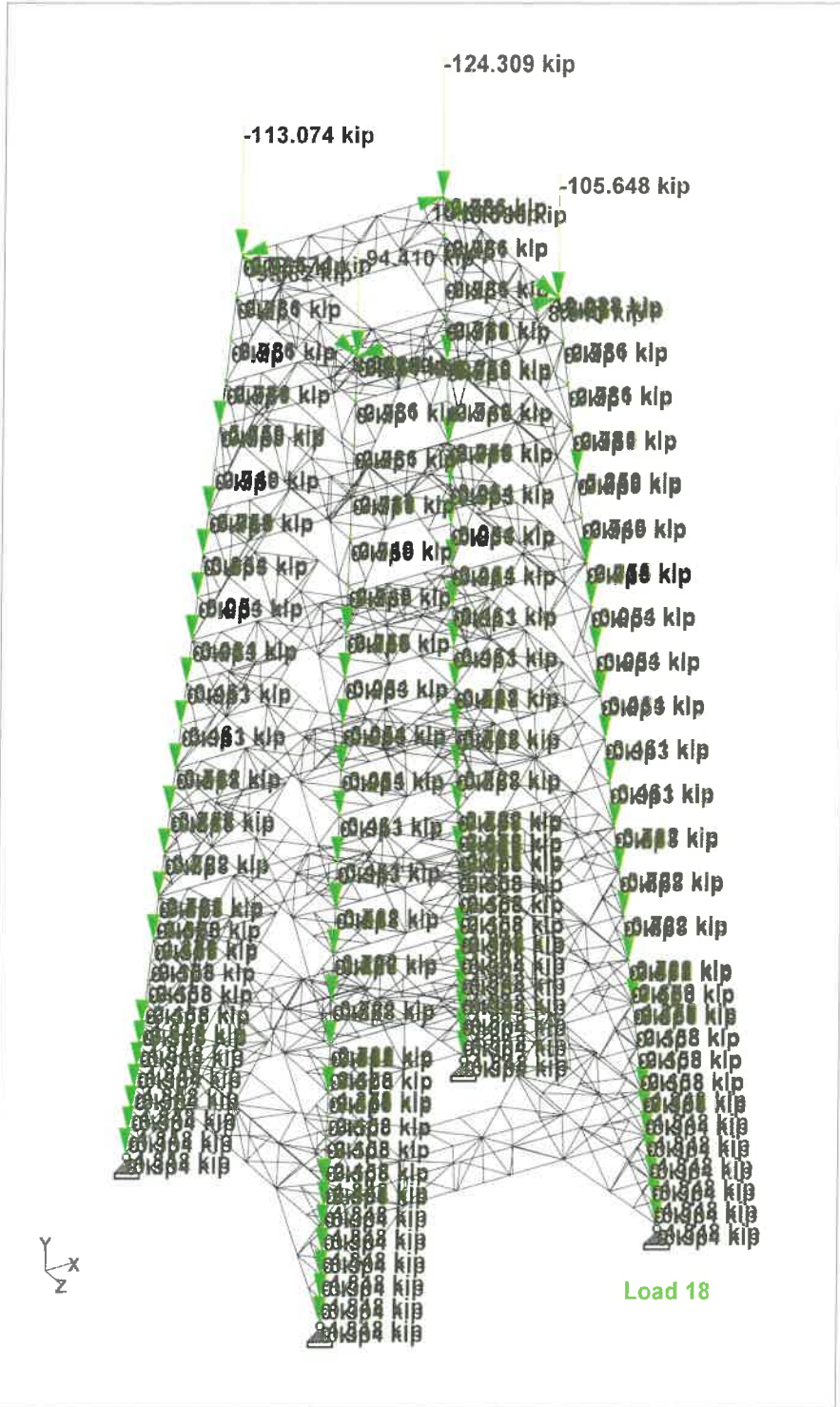
Date 7-Sep-17

Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std

Date/Time 07-Sep-2017 11:57



Whole Structure Loads 0.369562kip:1in 18 1.2 DEAD+1.0 ICE+1.0 TEMP



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Job No
CT04761S-17V

Sheet No
14

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Job Title **351.7ft Self Supporting Tower**

Part

Ref

By **KM**

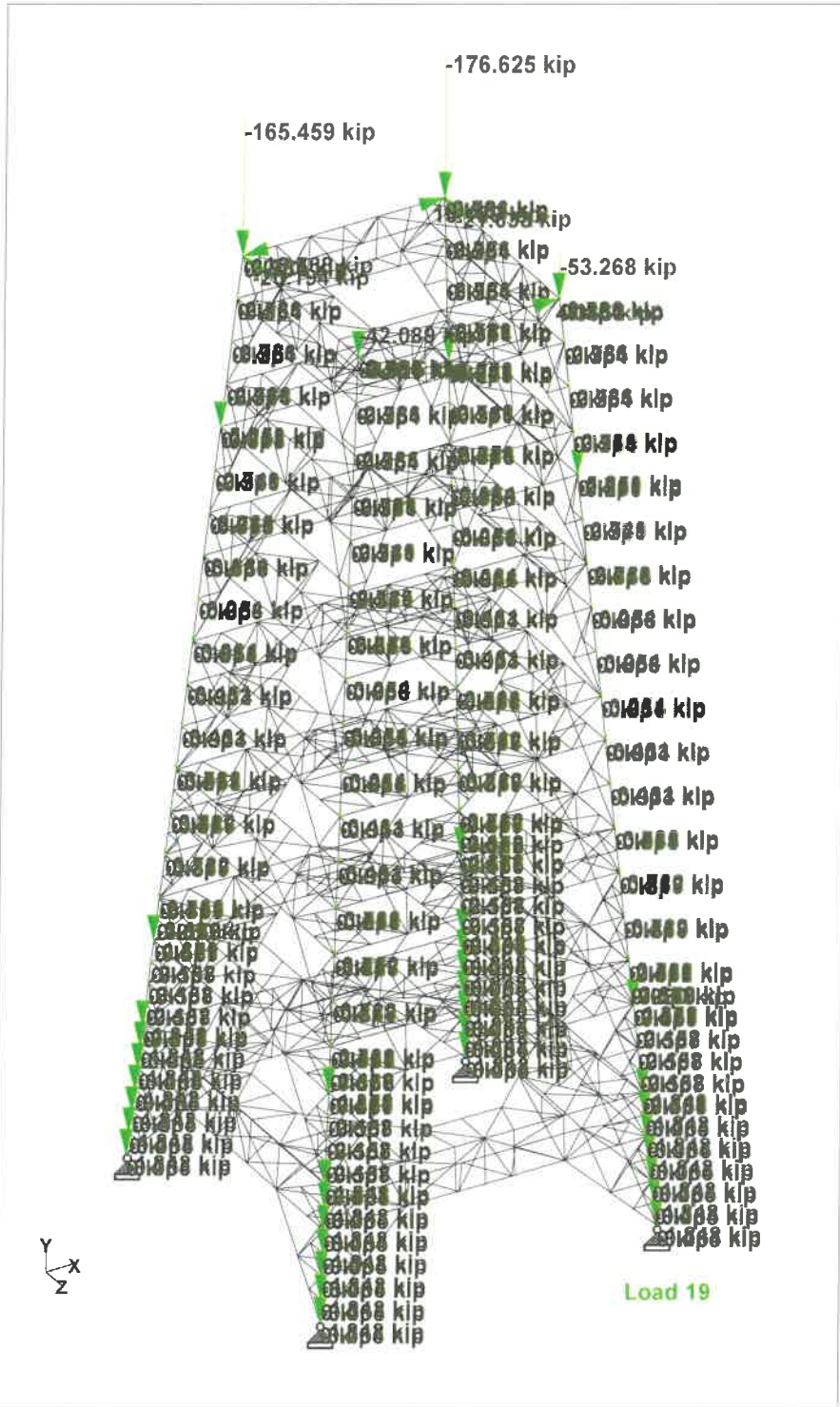
Date **7-Sep-17**

Chd **HML**

Client **Empire Telecom / AT&T**

File **CT04761S-17V0.std**

Date/Time **07-Sep-2017 11:57**



Whole Structure Loads 0.525094kip:1in 19 1.2 DEAD+1.0 WIND 0 DEG+1.0 ICE+1.0 TEMP



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CT04761S-17V

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15

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Job Title 351.7ft Self Supporting Tower

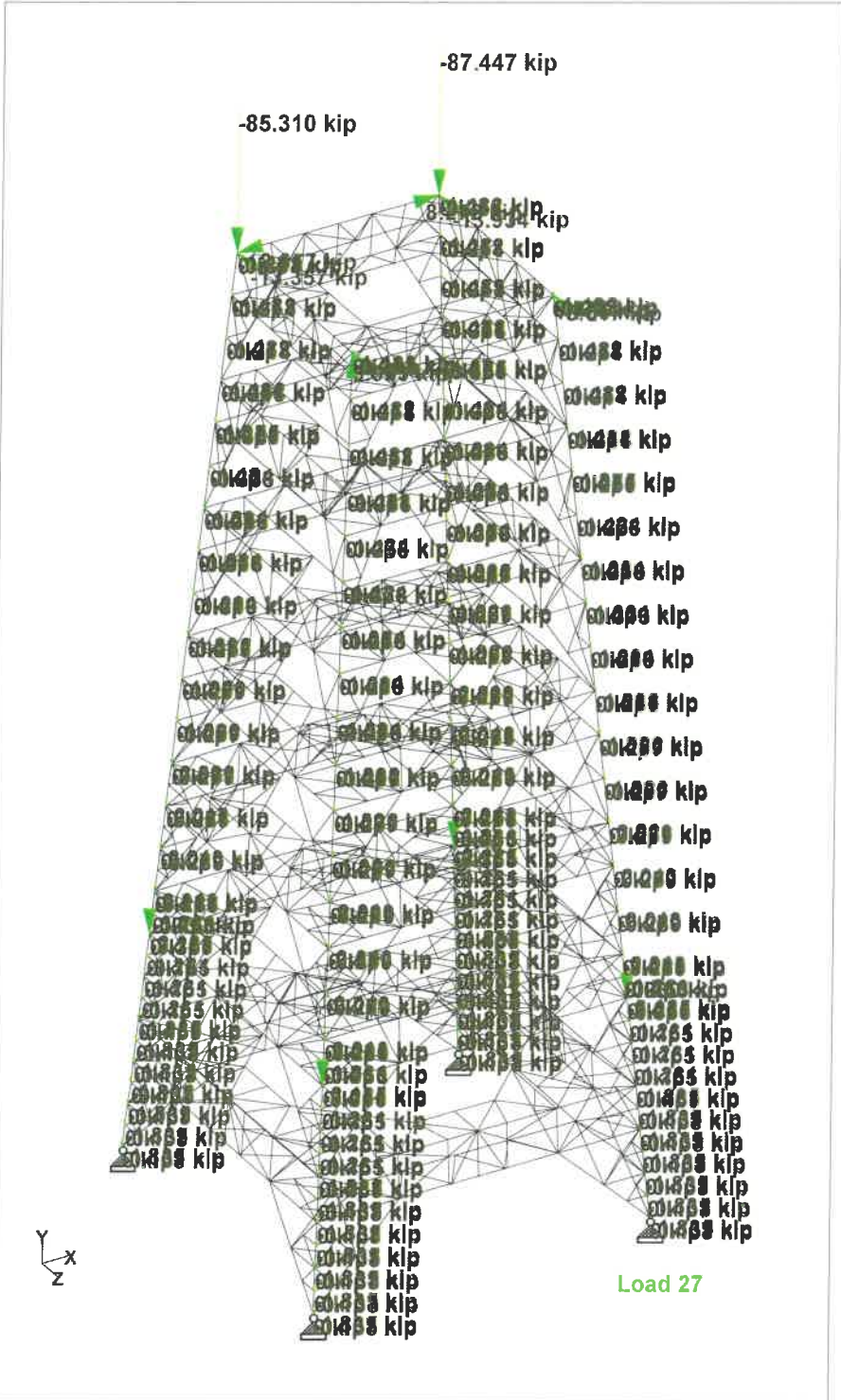
Part

Ref

By KM Date 7-Sep-17 Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std Date/Time 07-Sep-2017 11:57



Whole Structure Loads 0.259973kip:1in 27 DEAD+WIND 0 DEG - SERVICE



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CT04761S-17V

Sheet No
16

Rev
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Job Title 351.7ft Self Supporting Tower

Part

Ref

By KM

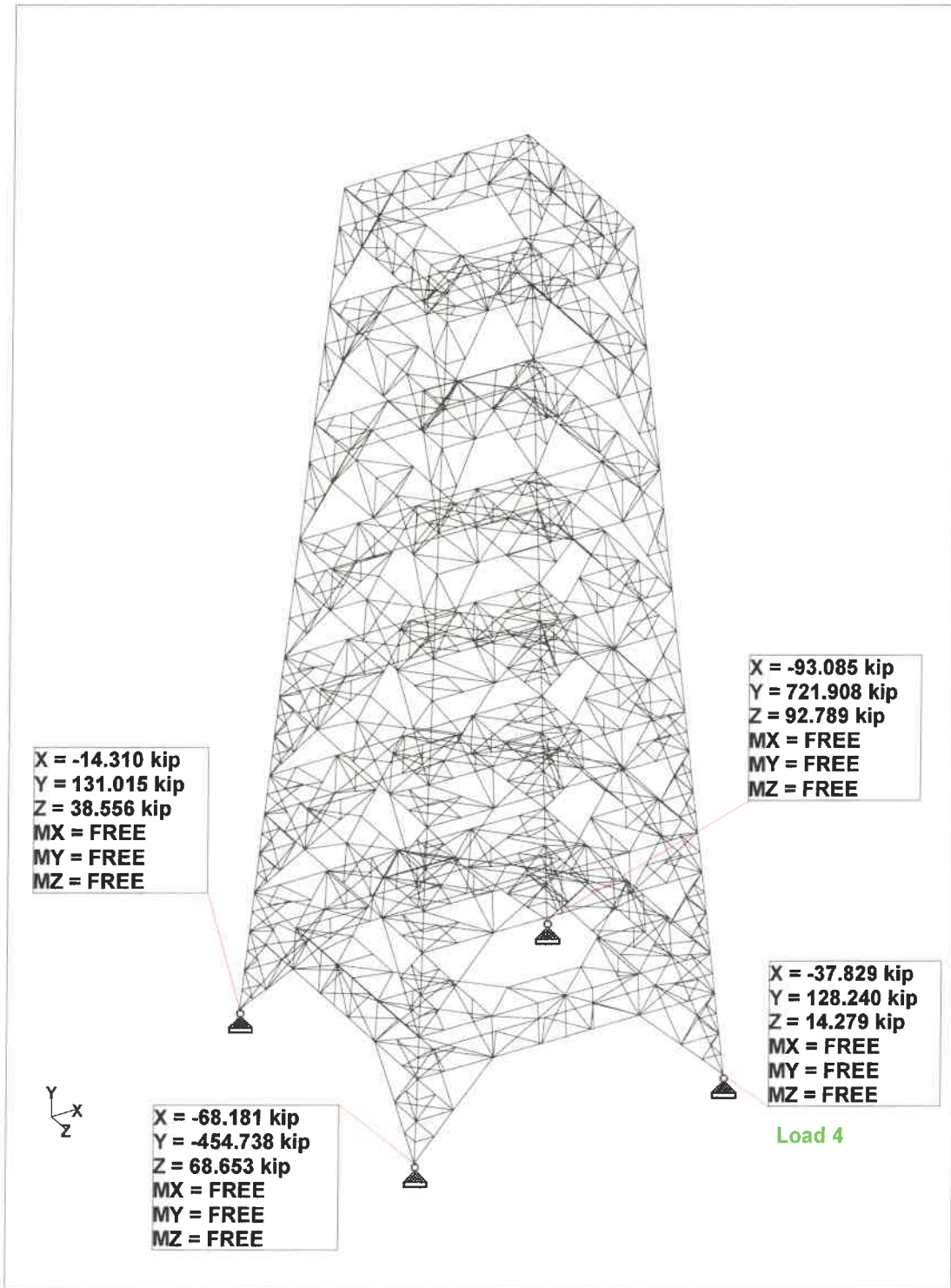
Date 7-Sep-17

Chd HML

Client Empire Telecom / AT&T

File CT04761S-17V0.std

Date/Time 07-Sep-2017 11:57



Reactions

FOUNDATION DESIGN PRINTOUT

Version: FDN2-D72/AO

```

*****
* FOUNDATION ANALYSIS PROGRAM
* Spread Footing Analysis
* (c) 2006, Malouf Engineering Intl., Inc.
*****
MEI PROJECT ID = CT-04761S-17V0
DESCRIPTION = 350' S.S.TOWER / FOUNDATION
SITE NAME = NORWALK EAST-WILLARD RD SITE, CT
CLIENT NAME = EMPIRE TELECOM / AT&T
CHECK CODE = TIA/EIA-222-REV. G
TIME/DATE/FILE = 12:54:33 / 09-07-2017 / CT04761S.dat
    
```

 INPUT DATA

```

*LOADS*
UPLIFT FORCE (1 PEDESTAL) = 721.908 KIPS
SHEAR FORCE (1 PEDESTAL) = 487.011 KIPS
MOMENT = 131.500 KIPS
ECCENTRICITY OF AXIAL LOADS = .000 KIP-FT
    
```

 FOOTING DIMENSIONS AND PROPERTIES

```

DEPTH OF FOOTING = 14.000 FT
FOOTING DIMENSIONS (L X B) = 20.000 x 20.000 FT
THICKNESS OF FOOTING = 3.000 FT (FOOTING HAS NO TOE)
NUMBER OF PEDESTALS / TYPE = 1 / SQUARE
PEDESTAL WIDTH = 6.500 FT
EXTENSION ABOVE GRADE = .500 FT
CONCRETE DENSITY = .145 KCF
GROUNDWATER LEVEL BELOW BOTTOM OF FOUNDATION
    
```

 RESISTANCE FACTORS

```

PHI BEARING GUYED = .600
PHI BEARING SSI = .750
PHI BEARING MONOPOLE = .750
PHI UPLIFT = .750
PHI LATERAL/FRICTION = .750
    
```

 SOIL PROPERTIES

```

ULTIMATE BEARING CAPACITY = 12.000 KSF
SOIL DENSITY = .100 KCF
INTERNAL ANGLE OF FRICTION = 30.000 DEG
SOIL COHESION (FOR UPLIFT) = .000 KSF (PAD PERIMETER)
ULTIMATE PASSIVE PRESSURE = .300 KCF (Kp= 3.00)
DEPTH NEGLECTED FOR PASSIVE PR. = 4.000 FT
BASE SOIL/CONCRETE FRICTION = .150
    
```

 *** COMMENTS ***

```

-FOUNDATION DRAWING NOT MADE AVAILABLE. SOIL STABILITY CHECK ONLY
-FOUNDATION DETAILS AS PER GPD FOUNDATION CALCULATIONS
-GEOTECHNICAL REPORT NOT MADE AVAILABLE. SOIL PARAMETERS
AS PER GPD FOUNDATION CALCULATIONS
    
```

 RESULTS

```

VOL./WT. OF SOIL ABOVE = 3935.3 FT3 / 393.525 KIPS
VOL./WT. OF SOIL WEDGE = 838.3 FT3 / 83.831 KIPS
VOL./WT. OF PEDESTAL(S) = 3259.0 FT3 / 325.898 KIPS
VOL./WT. OF FOOTING = 485.9 FT3 / 70.452 KIPS
TOTAL RESISTING MOMENT = 13912.2 KIP-FT
TOTAL OVERTURNING MOMENT = 1906.8 KIP-FT
RATIO OF RESIST MON TO OTM = 7.296 > 1.000 (OK)

SOIL PRESSURES (KSF) = 3.808 GROSS / 1.610 IN-SITU / 3.808 PMIN
FRICTION DESIGN STRENGTH = .000 KIPS (SKF= .000KSF)
DOWNLOAD DESIGN STRENGTH = 9.000 KSF > 2.199 KSF (OK) R= .244
SOIL SHEAR DESIGN STRENGTH = 114.75 (PASSIVE) + 144.95 (FRICTION)
UPLIFT DESIGN STRENGTH = 223.5 KIPS > 131.5 KIPS (OK) R= .588
UPLIFT DESIGN STRENGTH = 759.6 KIPS > 487.0 KIPS (OK) R= .641
    
```

APPENDIX 2 – SOURCE / CHANGED CONDITION



From: Nicole Caplan [<mailto:ncaplan@empiretelecomm.com>]
Sent: Thursday, September 07, 2017 7:20 AM
To: Mark Malouf <malouf@maloufengineering.com>
Cc: Lauren Groppi <lgroppi@empiretelecomm.com>
Subject: RE: PLEASE CONFIRM ASAP: CT2132 / Norwalk East - Willard RD Site / FA #10034993

Mark,

I can confirm the counts and models below. I also just wanted to let you know that the modifications to the tower have not yet occurred. T-Mobile just got approval to move forward with the Mods, so those should occur soon.

Thanks,

Nicole Caplan
Site Acquisition Specialist
Empire Telecom
16 Esquire Road
Billerica, MA 01862

Phone: 978-284-3906

Fax: 978-923-7909

Email: ncaplan@empiretelecomm.com

Website: <http://empiretelecomm.com/>



From: Mark Malouf [<mailto:malouf@maloufengineering.com>]
Sent: Wednesday, September 06, 2017 7:29 PM
To: Nicole Caplan <ncaplan@empiretelecomm.com>
Cc: Lauren Groppi <lgroppi@empiretelecomm.com>
Subject: PLEASE CONFIRM ASAP: CT2132 / Norwalk East - Willard RD Site / FA #10034993
Importance: High

Nicole/Lauren,

Based on the provided RFDS sheets and the CD drawings, the following is the best estimation of the AT&T loading.

Please review and confirm the quantity and size.

Please let us know as soon as possible in the morning.

Final Configuration to be used

Exist. (3) Powerwave 7770 Panel Antennas

Exist. (3) CCI OPA-65R-LCUU-H4 Panel Antennas

Proposed (3) Andrew SBNHH-1D65A Panel Antennas

Exist. (6) Powerwave 7020 RET's

Exist. (6) Powerwave LGP21401 TMA's

Proposed (6) CCI Triplexers TPX-070821

Exist. (3) RRUS-32

Exist. (3) RRUS-11

Proposed (3) RRUS-32 B2

Exist. (3) DC6-48-60-18-8F OVP BOXES

Exist. (12) 1-5/8"

Exist. (6) 3/4" DC Cables

Exist. (2) 5/8" Fiber Cables

Exist. (3) Sector Mounts w/V-Stabilizer (Commscope MTC3615AD A)

Existing To be Removed

(3) KMW AM-X-CD-65-00T-RET Panel Antennas

(3) RRUS-11

Based on what we see, there are no changes to the feedlines, OVP boxes and coaxes, so these are based on the previous analysis and the last PDQ we have.

Best regards,

Mark Malouf, PE, SECB, IPF
mmalouf@maloufengineering.com
(O) 972-783-2578 ext.106

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Radio Frequency Emissions Analysis Report

AT&T Existing Facility

Site ID: CT2132

Norwalk East - Willard Rd
Willard Road
Norwalk, CT 6851

August 30, 2017

Centerline Communications Project Number: 950006-068

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	8.36 %



August 30, 2017

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT2132 – Norwalk East - Willard Rd**

Centerline Communications, LLC (“Centerline”) was directed to analyze the proposed AT&T facility located at **Willard Road, Norwalk, CT**, for the purpose of determining whether the emissions from the Proposed AT&T 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The number of $\mu\text{W}/\text{cm}^2$ 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 population 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 population 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.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately $467 \mu\text{W}/\text{cm}^2$ and $567 \mu\text{W}/\text{cm}^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is $1000 \mu\text{W}/\text{cm}^2$. 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 performed for the proposed AT&T Wireless antenna facility located at **Willard Road, Norwalk, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T 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.

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. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
UMTS	850 MHz	2	30
UMTS	1900 MHz (PCS)	2	30
LTE	700 MHz	4	60
LTE	850 MHz	2	60
LTE	2300 MHz (WCS)	2	60
LTE	1900 MHz (PCS)	2	60

Table 1: Channel Data Table



The following antennas listed in *Table 2* were used in the modeling for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. 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.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Powerwave 7770	347
A	2	CCI OPA-65R-LCUU-H4	347
A	3	Commscope SBNHH-1D65A	347
B	1	Powerwave 7770	347
B	2	CCI OPA-65R-LCUU-H4	347
B	3	Commscope SBNHH-1D65A	347
C	1	Powerwave 7770	347
C	2	CCI OPA-65R-LCUU-H4	347
C	3	Commscope SBNHH-1D65A	347

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC’s allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna A2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna A3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector A Composite MPE%							0.57
Antenna B1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna B2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna B3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector B Composite MPE%							0.57
Antenna C1	Powerwave 7770	850 MHz / 1900 MHz (PCS)	11.4 / 13.4	4	120	2,140.89	0.09
Antenna C2	CCI OPA-65R-LCUU-H4	700 MHz / 850 MHz / 2300 MHz (WCS)	10.55 / 11.15 / 14.65	6	360	6,426.73	0.28
Antenna C3	Commscope SBNHH-1D65A	700 MHz / 1900 MHz (PCS)	10.85 / 14.55	4	240	4,880.65	0.20
Sector C Composite MPE%							0.57

Table 3: AT&T Emissions Levels



The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum AT&T MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each AT&T Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	MPE%
AT&T – Max Sector Value	0.57 %
PageNet	0.05 %
SNET TMRS	0.06 %
SkyTel	0.11 %
RAM Mobile Data	0.01 %
PageNet 900 MHz	0.97 %
	0.25 %
Clearwire	0.06 %
Sprint	0.93 %
MediaFLO	3.87 %
XM Sat Radio	0.02 %
American Mobile Com.	0.01 %
GNARC	0.01 %
WSHU-AM	1.00 %
MetroPCS	0.44 %
Site Total MPE %:	8.36 %

Table 4: All Carrier MPE Contributions

AT&T Sector A Total:	0.57 %
AT&T Sector B Total:	0.57 %
AT&T Sector C Total:	0.57 %
Site Total:	8.36 %

Table 5: Site MPE Summary



FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

AT&T _ Frequency Band / Technology (Sectors)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	347	0.26	850 MHz	567	0.05%
AT&T 1900 MHz (PCS) UMTS	2	656.33	347	0.41	1900 MHz (PCS)	1000	0.04%
AT&T 700 MHz LTE	2	681.01	347	0.42	700 MHz	467	0.09%
AT&T 850 MHz LTE	2	781.90	347	0.48	850 MHz	567	0.09%
AT&T 2300 MHz (WCS) LTE	2	1,750.46	347	1.08	2300 MHz (WCS)	1000	0.11%
AT&T 700 MHz LTE	2	729.71	347	0.45	700 MHz	467	0.10%
AT&T 1900 MHz (PCS) LTE	2	1,710.61	347	1.06	1900 MHz (PCS)	1000	0.11%
						Total:	0.57%

Table 6: AT&T Maximum Sector MPE Power Values



Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	0.57 %
Sector B:	0.57 %
Sector C:	0.57 %
AT&T Maximum Total (per sector):	0.57 %
Site Total:	8.36 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **8.36 %** of the allowable FCC established general population 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.

A handwritten signature in black ink, appearing to read 'Scott Heffernan', is positioned above the contact information.

Scott Heffernan
RF Engineering Director
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
 William Ireland, chief Building Inspector
 City of Norwalk
 125 East Ave, Room 121
 Norwalk, CT 06851-5125



9590 9402 1864 6104 9644 41

2. Article Number (Transfer from service label)
 7016 2140 0000 9458 5927

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
 Agent
 Addressee
 B. Received by (Printed Name)
 C. Date of Delivery
 D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
 Adult Signature
 Adult Signature Restricted Delivery
 Certified Mail®
 Collect
 Collect Insured
 Insured (over \$5)
 Priority Mail Express®
 Registered Mail™
 Registered Mail Restricted Delivery

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
 The Honorable Harry Rilling, Mayor
 City of Norwalk
 125 East Ave, P.O. Box 5125
 Norwalk, CT 06856-5125



9590 9402 1864 6104 9644 34

2. Article Number (Transfer from service label)
 7016 2140 0000 9458 5934

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
 Agent
 Addressee
 B. Received by (Printed Name)
 C. Date of Delivery
 D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
 Adult Signature
 Adult Signature Restricted Delivery
 Certified Mail®
 Certified Mail Restricted Delivery
 Collect on Delivery
 Collect on Delivery Restricted Delivery
 Insured Mail
 Insured Mail Restricted Delivery (over \$500)
 Priority Mail Express®
 Registered Mail™
 Registered Mail Restricted Delivery
 Return Receipt for Merchandise
 Signature Confirmation™
 Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
 Fuller Development, LLC
 Attn: Sam Fuller, President
 1 North Water Street
 Suite 100
 Norwalk, CT 06854



9590 9402 1864 6104 9644 27

2. Article Number (Transfer from service label)

7016 2140 0000 9458 5941

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
 S Ferrier Agent
 Addressee

B. Received by (Printed Name)
S Ferrier

C. Date of Delivery
9-14-17

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:
 Steven Kleppin, Director Planning and
 Zoning
 City of Norwalk
 125 East Avenue, Room 223
 Norwalk, CT 06856



9590 9402 1864 6104 9644 58

2. Article Number (Transfer from service label)

7016 2140 0000 9458 5910

PS Form 3811, July 2015 PSN 7530-02-000-9053

COMPLETE THIS SECTION ON DELIVERY

A. Signature
 Quynh Tran Agent
 Addressee

B. Received by (Printed Name)
Quynh Tran

C. Date of Delivery
9.14.17

D. Is delivery address different from item 1? Yes
 If YES, enter delivery address below: No

3. Service Type
- Adult Signature
 - Adult Signature Restricted Delivery
 - Certified Mail®
 - Certified Mail Restricted Delivery
 - Collect on Delivery
 - Collect on Delivery Restricted Delivery
 - Insured Mail
 - Insured Mail Restricted Delivery (over \$500)
 - Priority Mail Express®
 - Registered Mail™
 - Registered Mail Restricted Delivery
 - Return Receipt for Merchandise
 - Signature Confirmation™
 - Signature Confirmation Restricted Delivery

Domestic Return Receipt