



STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: siting.council@ct.gov

Web Site: portal.ct.gov/csc

VIA ELECTRONIC MAIL

October 6, 2020

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

RE: **EM-AT&T-061-200909** – AT&T notice of intent to modify an existing telecommunications facility located at 65 Maple Avenue West, Haddam, Connecticut.

Dear Ms. Zsamba:

The Connecticut Siting Council (Council) is in receipt of your correspondence of October 2, 2020 submitted in response to the Council's September 24, 2020 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

s/Melanie A. Bachman

Melanie A. Bachman
Executive Director

MAB/IN/emr



Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

October 2, 2020

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

RE: EM-AT&T-061-200909 – AT&T notice of intent to modify an existing telecommunications facility located at 65 Maple Avenue West, Haddam, Connecticut

Dear Ms. Bachman:

I am in receipt of your notice of incomplete correspondence dated September 24, 2020 for the above noted telecommunication filing. Enclosed please find the following:

- A) The property card for 65 Maple Avenue West
- B) Revised construction drawings which reflect the address for the telecommunications facility as 65 Maple Avenue West
- C) Fedex tracking as proof of service upon the underlying property owner for 65 Maple Avenue West

Please confirm this now renders the filing complete. Thank you.

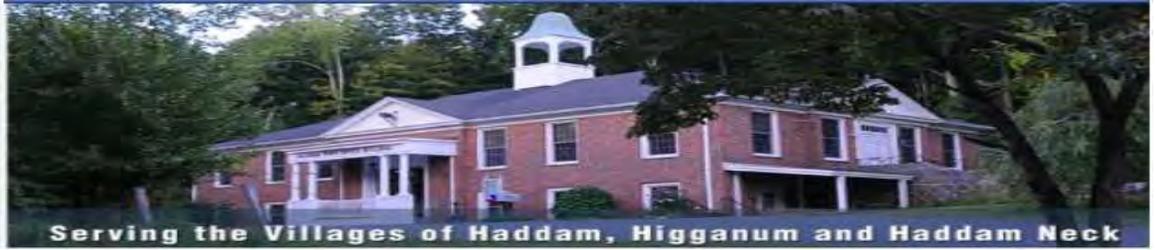
Sincerely,

Anne Marie Zsamba

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101,
Clifton Park, NY 12065
(201) 236-9224
annemarie.zsamba@crowncastle.com

Enclosure

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2015.



Information on the Property Records for the Municipality of Haddam was last updated on 9/23/2020.

Parcel Information

Location:	65 MAPLE AVE WEST UNIT C	Property Use:	Vacant Land	Primary Use:	Cell Tower
Unique ID:	MT380800	Map Block Lot:	23 001 1 C	Acres:	1.25
490 Acres:	0.00	Zone:	R-2	Volume / Page:	0336/0559
Developers Map / Lot:		Census:	5901		

Value Information

	Appraised Value	Assessed Value
Land	187,500	131,250
Buildings	0	0
Detached Outbuildings	188,860	132,200
Total	376,360	263,450

Owner's Information

Owner's Data

DAMICO LOUIS W JR + DAMICO ENZO
C/O CROWN ATLANTIC CO LLC PMB 3
4017 WASHINGTON RD
MCMURRAY, PA 15317

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
8 Ft Chain Fence	2007	0.00	0.00	2,240
Cell Shed	2007	0.00	0.00	580

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
DAMICO LOUIS W JR + DAMICO ENZO	0336	0559	04/05/2010		No	\$0
DAMICO LOUIS W SR + LOUIS W JR	0305	0805	10/10/2006		No	\$0
DAMICO LOUIS W & MARJORY C DAMICO FAMILY	0256	0789	01/27/2003		No	\$0
DAMICO LOUIS W	0233	1040	12/21/2000		No	\$0

Building Permits

Permit Number	Permit Type	Date Opened	Date Closed	Permit Status	Reason
8980	Unknown	12/05/2007		Closed	MOUNT 2 ANTENNAS ON EXIST TOWE

Summary ✕

65 MAPLE AVE WEST

DAMICO LOUIS W SR + LOUIS ⌵

Parcel_ID: 23 001 1 C

[View Details](#)

1-1C
0.25 AC
65



ORIGIN ID: SCHA (518) 350-3639
ANNE MARIE ZSAMBA
CROWN CASTLE
21 HEATHER DRIVE

SHIP DATE: 25SEP20
ACT WGT: 1.00 LB
CAD: 104924194/NET4280

GANSEVOORT, NY 12831
UNITED STATES US

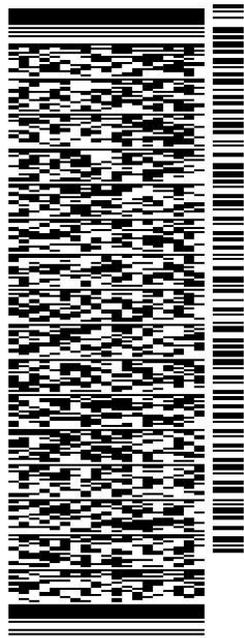
BILL SENDER

TO LOUIS W. D'AMICO

65 MAPLE AVENUE WEST

HIGGANUM CT 06441

(201) 236-9224 REF: 1734 7890
INV/ PO: DEPT:



J202020071401uv

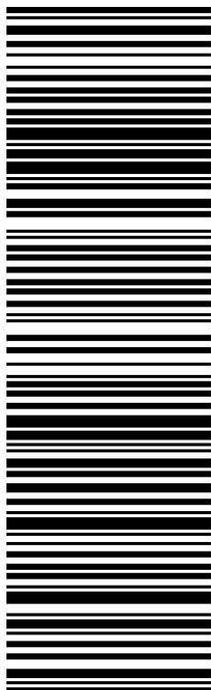
56B.J6/1545/B766

TRK# 7716 2986 0196
0201

MON - 28 SEP 10:30A
PRIORITY OVERNIGHT

SE RSPA

06441
CT-US BDL



After printing this label:

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.



IMPORTANT!
FedEx is closely monitoring the remnants from the Gulf Coast Storms and Wildfires in the Northwest. [Learn More](#)

TRACK ANOTHER SHIPMENT

771629860196



Delivered
Monday 9/28/2020 at 9:05 am



DELIVERED

Signature not required

[GET STATUS UPDATES](#)
[OBTAIN PROOF OF DELIVERY](#)

FROM

Crown Castle
Anne Marie Zsamba
21 Heather Drive
Gansevoort, NY US 12831
518 350-3639

TO

Louis W. D'Amico
65 Maple Avenue West
HIGGANUM, CT US 06441
201 236-9224

Travel History

Shipment Facts

Local Scan Time

Monday, 9/28/2020

9:05 am

HIGGANUM, CT

Delivered

Left at front door. Package delivered to recipient address - release authorized

[Expand History](#)

Friday, 9/25/2020

10:50 am

Shipment information sent to FedEx



AT&T SITE NUMBER: CT5386
AT&T SITE NAME: HADDAM NORTH CENTRAL
AT&T FA CODE: 10091802
AT&T PACE NUMBER: MRCTB047307
SITE TYPE: MONOPOLE

BUSINESS UNIT #: 806367
SITE ADDRESS: 65 MAPLE AVENUE WEST
HIGGANUM, CT 06441
COUNTY: MIDDLESEX
TOWER HEIGHT: 115'-6"

PROJECT: AT&T LTE 5C



AT&T SITE NUMBER:
CT5386
BU #: 806367
HRT 046 943209
65 MAPLE AVENUE WEST
HIGGANUM, CT 06441
EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	FWP
1	7/11/20	GER	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ

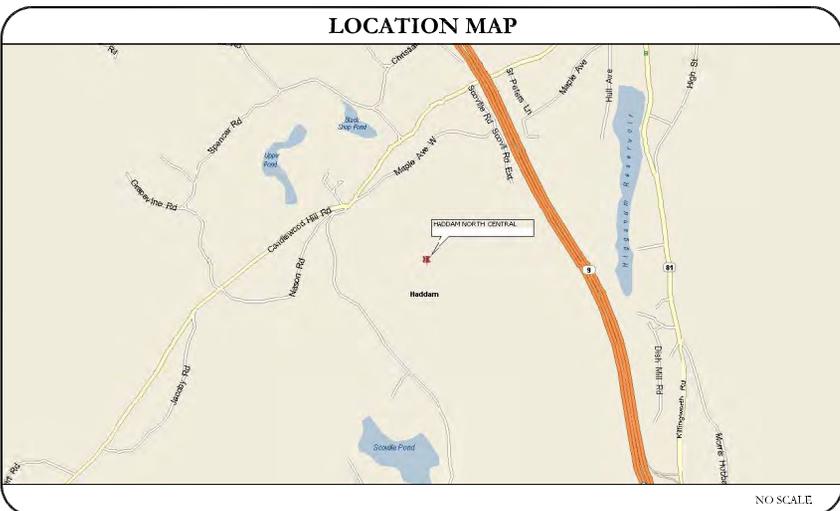
SITE INFORMATION

CROWN CASTLE USA INC.	HRT 046 943209
SITE NAME:	65 MAPLE AVENUE WEST
SITE ADDRESS:	HIGGANUM, CT 06441
COUNTY:	MIDDLESEX
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.484594
LONGITUDE:	-72.572447
LAT/LONG TYPE:	NAD83
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IBB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T MOBILITY ONE AT&T WAY BEDMINSTER, NJ 07921
CROWN CASTLE USA INC.	517104
APPLICATION ID:	

DRAWING INDEX

SHEET #	TITLE SHEET	SHEET DESCRIPTION
T-1	GENERAL NOTES	
T-2	SITE PLAN	
C-1	EQUIPMENT PLAN	
C-2	CABINET DETAILS	
C-2.1	TOWER ELEVATIONS	
C-3	ANTENNA ORIENTATION	
C-4	ANTENNA SCHEDULE	
C-5	ANTENNA AND RRH SPECS.	
C-6	ANTENNA AND RRH DETAIL	
C-7	PLUMBING DIAGRAM	
C-8	COLOR CODE STANDARD	
C-9	GROUNDING DETAILS	
G-1	GROUNDING DETAILS	
G-2	GROUNDING DETAILS	

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO PROPOSE AN ANTENNA MODIFICATION ON AN EXISTING WIRELESS SITE.

TOWER SCOPE OF WORK

- RELOCATE (3) ERICSSON 8843 B2/B66A RRHS

GROUND SCOPE OF WORK

- INSTALL (3) ERICSSON 4478 B14 RRHS
- INSTALL (1) IDL
- INSTALL (1) PURCELL PL12-2420 CABINET

DESIGN PACKAGE BASED ON THE RFDs
 REVISIONS: 1/00
 DATE: 3/25/20

DESIGN PACKAGE BASED ON THE APPLICATION ID: 517104
 REVISIONS: 0

PROJECT TEAM

A&E FIRM	B+T GROUP 1717 SOUTH BOULDER, SUITE 300 TULSA, OK 74119 MIKE OAKES (918) 217-8574
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3200 HORIZON DRIVE, SUITE 150 KING OF PRUSSIA, PA 19406

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:

MOUNT ANALYSIS: TOWER ENGINEERING PROFESSIONALS
 APRIL 23, 2020

NOTE:
 PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

CALL CONNECTICUT ONE CALL (800) 922-4455
 CALL 3 WORKING DAYS BEFORE YOU DIG!



B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-1
REVISION: 2

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONTROLLED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-1006B "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL REGULATIONS FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS, INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLAN, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR OR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TA-322 (LATEST EDITION).

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4") CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL, OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATIONS FOR CAST-IN-PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
 - CONCRETE CAST AGAINST EARTH.....3 IN.
 - CONCRETE EXPOSED TO EARTH OR WEATHER:
 - #6 AND LARGER.....2 IN.
 - #4 AND SMALLER.....1 1/2 IN.
 - CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND.....1 1/2 IN.
 - SLAB AND WALLS.....3/4 IN.
 - BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

MASONRY NOTES:

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1, THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F_m) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYPE "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
 - CONTRACTOR- GENERAL CONTRACTOR (CONSTRUCTION)
 - CARRIER- AT&T
 - TOWER OWNER- CROWN CASTLE USA INC.
 - 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 AND CROWN CASTLE USA INC.
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 SCALE 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. "KITING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY THE CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

ABBREVIATIONS AND SYMBOLS:

ABBREVIATIONS:	SYMBOLS:
ACL ABOVE GRADE LEVEL	—S/G— SOLID GROUND BUS BAR
BTS BASE TRANSCEIVER STATION	—S/N— SOLID NEUTRAL BUS BAR
EXS EXISTING	— SUPPLEMENTAL GROUND CONDUCTOR
MIN MINIMUM	— 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
REF REFERENCE	— TYPICAL
RF RADIO FREQUENCY	— SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
T.B.D. TO BE DETERMINED	— AMERICAN WIRE GAUGE
T.B.R. TO BE RESOLVED	— MASTER GROUND BAR
REQ REQUIRED	— EQUIPMENT GROUND BAR
REGR REGR	— EQUIPMENT GROUND BAR
AWG AMERICAN WIRE GAUGE	— BARE COPPER WIRE
MOB MASTER GROUND BAR	— SMART INTEGRATED ACCESS DEVICE
ED EQUIPMENT GROUND BAR	— GENERATOR
BCW BARE COPPER WIRE	— INTERIOR GROUND RING (HALO)
SIAD SMART INTEGRATED ACCESS DEVICE	— RADIO BASE STATION
GEN GENERATOR	
IGR INTERIOR GROUND RING (HALO)	
RBS RADIO BASE STATION	
	— EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
	— MECHANICAL CONNECTION
	— GROUNDING WIRE

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILT epoxy ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RINGS.
6. EACH END OF EVERY POWER, POWER PHASE CONDUIT (I.E., HOTS), GROUNDING AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR CAPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL THE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600 V, OIL RESISTANT THIN OR THIN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600V, OIL RESISTANT THIN OR THIN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TO CABLE (#14 AWG OR LARGER), 600 V, OIL RESISTANT THIN OR THIN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET AND DRY) OPERATION WITH OUTER JACKET LISTED OR LABELED FOR THE LOCATION USE UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLED, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC TUBING (I.E. RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXING IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT MANLIKE MANNER. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED OR EPOXY-COATED SHEET STEEL SHALL MEET OR EXCEED UL 90 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
23. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL SHALL MEET OR EXCEED UL 90 AND RATED NEMA 1 (OR BETTER) INDOORS OR NEMA 3R (OR BETTER) OUTDOORS.
24. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING. SHALL MEET OR EXCEED UL 514 AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
25. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "AT&T".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GE'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM EEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING PER IEEE 1100 AND #11 FOR GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDING 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.
5. 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 ITS EQUIPMENT.
6. EACH 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 SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS GROUNDS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTI-OXIDANT COATINGS (I.E. CONDUENT GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. 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., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 2" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	RED-POLARITY MARK AT TERMINATION
VDC NEG	-	BLACK-POLARITY MARK AT TERMINATION
240V OR 2ØB, 3Ø	PHASE A	BLACK
	PHASE B	RED/ORG. (IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

* SEE NEC 210.5(C)(1) AND (2)



AT&T SITE NUMBER: CT15386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-0"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTF
1	7/11/20	GBB	CONSTRUCTION	G4B
2	9/29/20	MLC	CONSTRUCTION	MTJ



B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: T-2 REVISION: 2

T-2 2



AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PVE
1	7/11/20	GER	CONSTRUCTION	GDR
2	9/29/20	MLC	CONSTRUCTION	MTJ

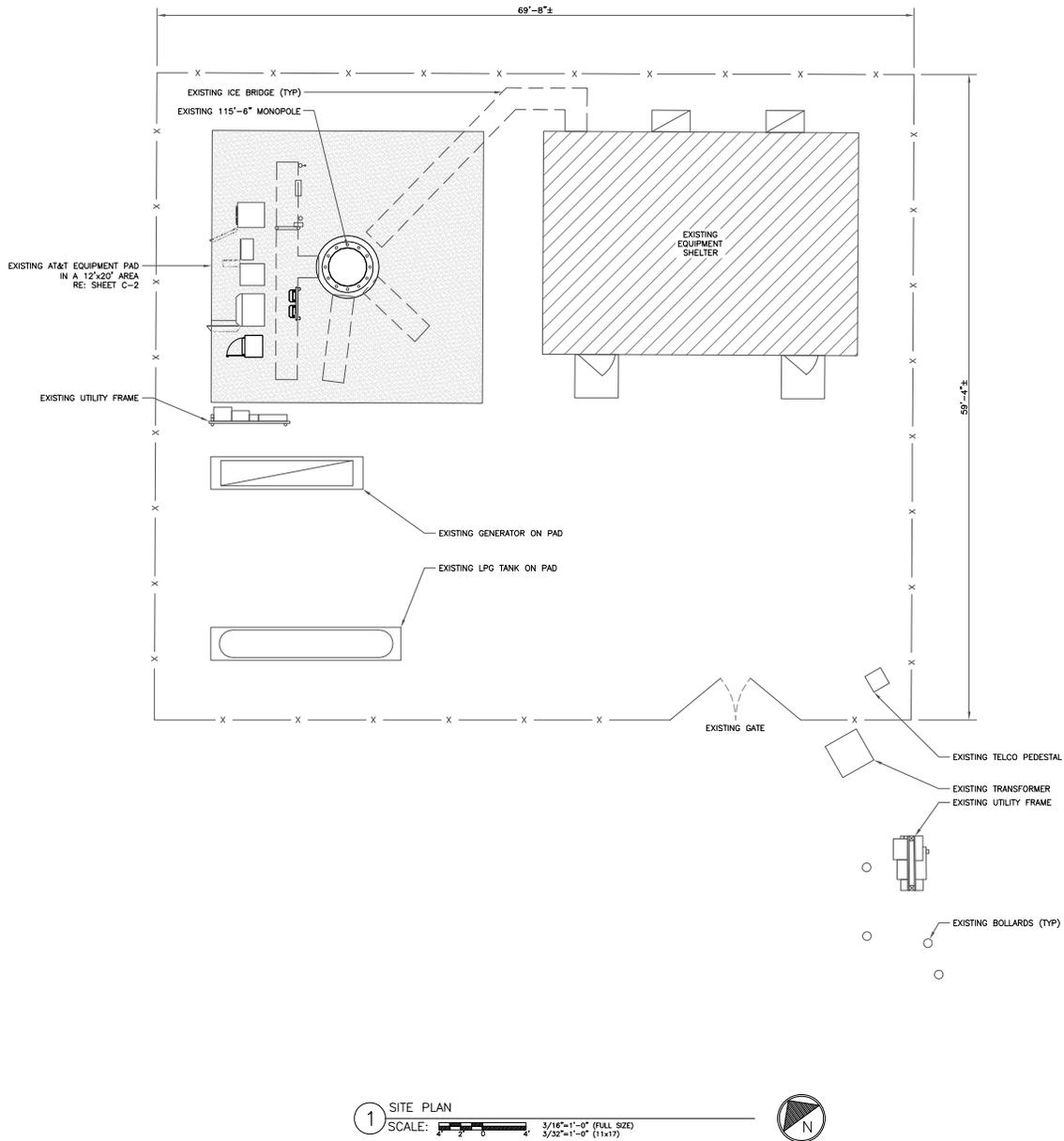


B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

C-1 **2**

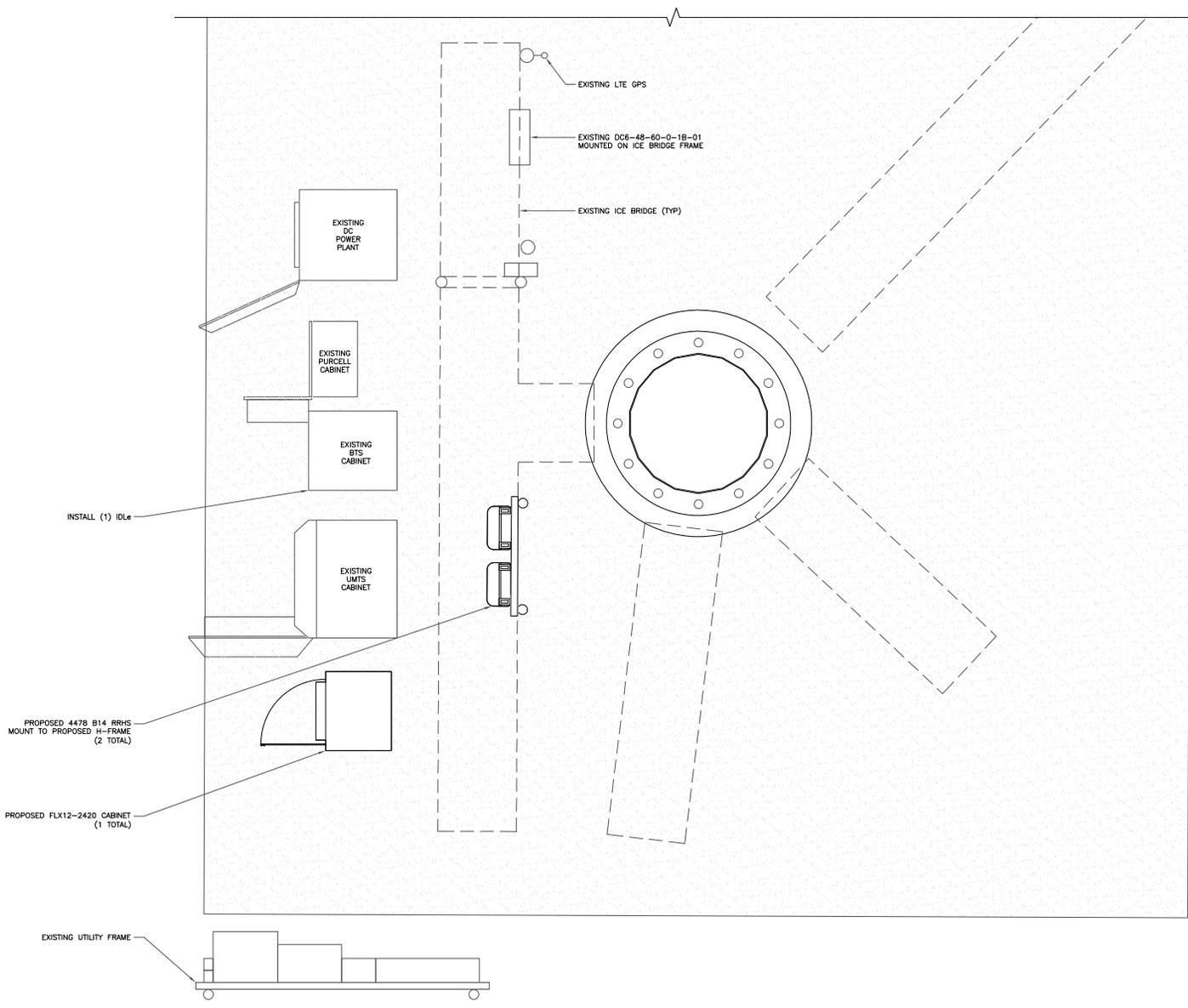


1 SITE PLAN
SCALE: 3/16"=1'-0" (FULL SIZE)
3/32"=1'-0" (11x17)



142974_806367_HRT_046_943209.dwg - Sheet C-1 - User: mjonas - Sep 29, 2020 - 9:14am

1:42974_806367_HRT_046_943209.dwg - Sheet C-2 - User: mjpomas - Sep 29, 2020 - 9:15am



1 EXISTING EQUIPMENT PLAN
 SCALE: 3/4"=1'-0" (FULL SIZE)
 3/8"=1'-0" (11x17)



ONE AT&T WAY
 BEDMINSTER, NJ 07921

3200 HORIZON DRIVE, SUITE 150
 KING OF PRUSSIA, PA 19406

1717 S. BOULDER
 SUITE 300
 TULSA, OK 74119
 PH: (918) 587-4830
 www.btgrp.com

AT&T SITE NUMBER:
CT5386

BU #: 806367
 HRT 046 943209

65 MAPLE AVENUE
 WEST
 HIGGANUM, CT 06441

EXISTING 115'-6"
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PVE
1	7/11/20	GER	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,
 UNLESS THEY ARE ACTING UNDER THE DIRECTION
 OF A LICENSED PROFESSIONAL ENGINEER,
 TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-2** REVISION: **2**

FlexSure® FLX12-2420

Power and Equipment Enclosure Solutions



Purcell System's Flexible EncloSure (FlexSure®) solution architecture allows the rapid creation and growth of virtually any outdoor cabinet configuration by leveraging pre-engineered common interchangeable components. The FlexSure® series is available in 12, 16, 20, 25, and 36 RU equipment bay options.

FlexSure® enclosures are UL 508 Listed, and certified by independent third-party Nationally Recognized Testing Laboratories to Telcordia GR-487. A wide range of thermal management system technologies and capacities ensures that the equipment you deploy in the cabinet will operate within its design parameters with the highest reliability and lowest Total Cost of Ownership. Options include battery backup, AC/DC power termination and distribution, cross connect and line protection, equipment and enclosure mounting features.

Applications

Provides a secure, thermally-controlled environment for any electronic equipment supporting a wide-range of Cable/MSO, Energy/Utility, Land Mobile Radio, Transportation, U.S. Government/Military, and Wireless and Wireline Telecommunication applications.

Product Features:

- Telcordia GR-487 certified, UL508 Listed
- Highly flexible and scalable
- Energy efficient advanced thermal solutions
- Field upgradeable
- AC and DC power options
- Pad, pole, wall, H-frame mounting options



The Purcell Advantage

Purcell Systems designs and manufactures thermally-managed outdoor enclosures that meet the exact needs of the enclosed equipment for network operators and utilities. Our enclosures provide comparable solutions to prefabricated buildings, containers and shelters at a fraction of the cost. Both standard and custom enclosures are delivered with the following capabilities:

Choice of Options: Pre-engineered and interchangeable modules provide optimal configurations with minimal cost and lead time.

Thermal Management: The industry's widest selection of heating and cooling systems ensures the most efficient thermal management solution with the lowest energy consumption.

Lowest Total Cost of Ownership: Engineering analysis and modeling ensures your enclosure configuration minimizes installation, maintenance, repair, capital, and operational expenses.

Equipment Integration and Staging: Electronic equipment can be staged and installed in our enclosures prior to final deployment and installation.

Fanatical Service®: A national service organization with 24/7/365 access means procurement, installation, support, and warranty requests are addressed immediately.

FlexSure® FLX12-2420

Dimensions and Expansion Options		Thermal Management Systems			
Exterior Dimensions		12RU	Air Conditioner	Heat Exchanger	Thermoelectric Cooler
No plinth	24" W x 20" D x 23" H 610mm x 508mm x 584mm	12RU	2X RTU/885W with 500W heater	30W/DC heater	400W with heater
4" plinth	24" W x 20" D x 27" H 610mm x 508mm x 688mm				
14" plinth	24" W x 20" D x 37" H 610mm x 508mm x 942mm				
13" Battery Base	24" W x 20" D x 35" H 610mm x 508mm x 914mm				

Specifications		
EXTERIOR	Mounting Options	Other Options
Construction <ul style="list-style-type: none"> • Frame: 0.125" Corrosion Resistant Aluminum; single wall construction • Finish: Ultra-light gray polyester powder coat • Weight (Base Configuration): 82 lbs 	<ul style="list-style-type: none"> • Anchor Plate Kit for Concrete/Pad Mounting • Pole Mount Kit • Wall or H-Frame Mount Kit • Plinth: 4" or 14" height, standard footprint • Corrosion Inhibiting pad gasket • Stack on FI X16-2520 or FI X12-2420 for increased capacity in same footprint 	<ul style="list-style-type: none"> • Convenience Closures: 15 or 20A, GFCI or standard • Bonding and Grounding: Copper isolated or integrated; up to 15 positions • Alarm Blocks: Up to 16 positions (includes intrusion and thermal alarms) • 400 Watts -48VDC heater; 240 Watts 12VDC heater
Door/Side/Top Panels <ul style="list-style-type: none"> • Doors: Front and rear doors; left or right open; rear hatch • Door Handles: Pad-locked • Door Hinges: Hidden hinges 	Interior <ul style="list-style-type: none"> • Equipment Mounting <ul style="list-style-type: none"> • 19" equipment rails; configurable locations front-to-back • Second set of 19" 12RU equipment rails optional 	<ul style="list-style-type: none"> • 6" high demark box • Cable access box (with battery pedestal) • Slide chamber optional (left side) • Accessories: Optical fiber storage; Service light; document holder; equipment security partitions
Battery Pedestal <ul style="list-style-type: none"> • Ventilated compartment • 13" Height: Supports up to (1) 100Ahr 12 Volt batteries • Battery heater max: 130 Watts • Compatible with pad, pole, or wall/H-frame mount 	AC Power Termination and Distribution <ul style="list-style-type: none"> • Load Center Location: Internal to equipment bay • 6-12 position internal load centers • Up to 30 Amp Main Breaker • Surge Protection Device (SPD) • Generator Cable: 15 Amp 	OTHER <ul style="list-style-type: none"> • Telcordia GR-487 Issue 2; Issue 3 Optional • UL Listed - UL508A • NEMA 3R
Side Chamber <ul style="list-style-type: none"> • Slide chamber: left side; 12" depth 	DC Power Systems and Distribution <ul style="list-style-type: none"> • Multiple suppliers and configurations available • DC Distribution: Up to 20 positions 	Environmental <ul style="list-style-type: none"> • IP Protection: Designed to IP 54 • Maximum Earthquake Risk Zone-4 (as per Telcordia GR-83)
		Warranty <ul style="list-style-type: none"> • 5 Years on Enclosure; 1 Year on Thermal System



16125 East Euclid Avenue
Spokane, Washington 99216
509.765.0341
www.purcellsystems.com

FLX12-2420 2014-12-22
© 2008-2014 Purcell Systems, Inc. All Rights Reserved. All trademarks and logos are the property of Purcell Systems, Inc. Due to continual product enhancements, specifications may change without notice.



AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTF
1	7/11/20	GER	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ



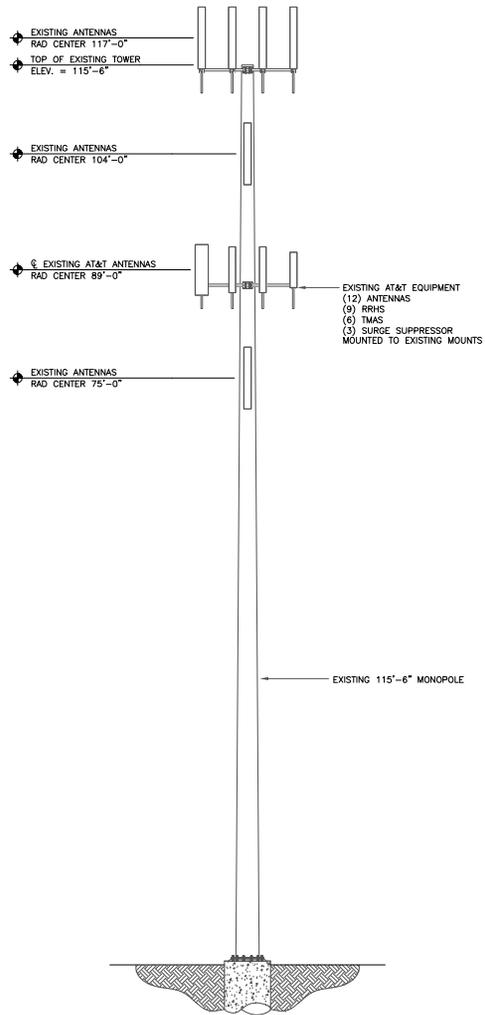
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

C-2.1 2

AT&T EQUIPMENT
 ANTENNA CL: 89'-0"
 MOUNT CL: 89'-0"



1 EXISTING ELEVATION
 SCALE: NOT TO SCALE



AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
 WEST
 HIGGANUM, CT 06441

EXISTING 115'-6"
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PWF
1	7/11/20	GER	CONSTRUCTION	GDR
2	9/29/20	MJC	CONSTRUCTION	MTJ

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: C-3 **REVISION:** 2

1:42:27.41_806367_HRT_046_943209.dwg - Sheet C-3 - User: mjonas - Sep 29, 2020 - 9:21am



AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTF
1	7/11/20	GBH	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ



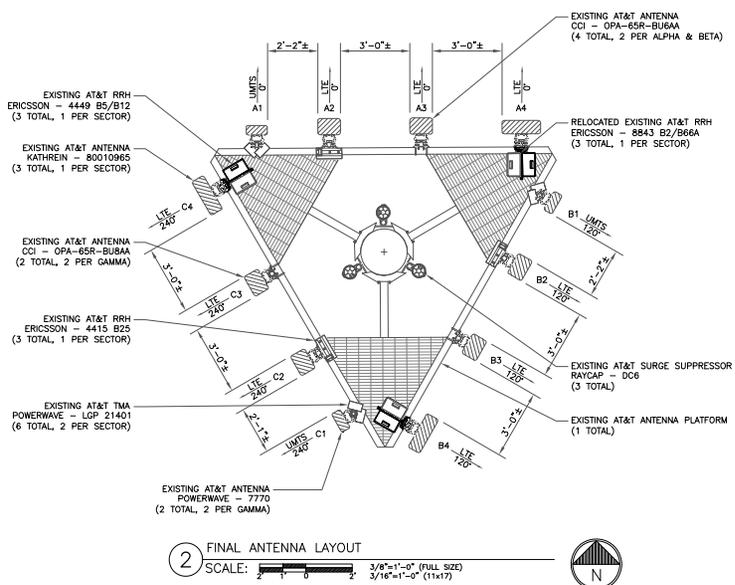
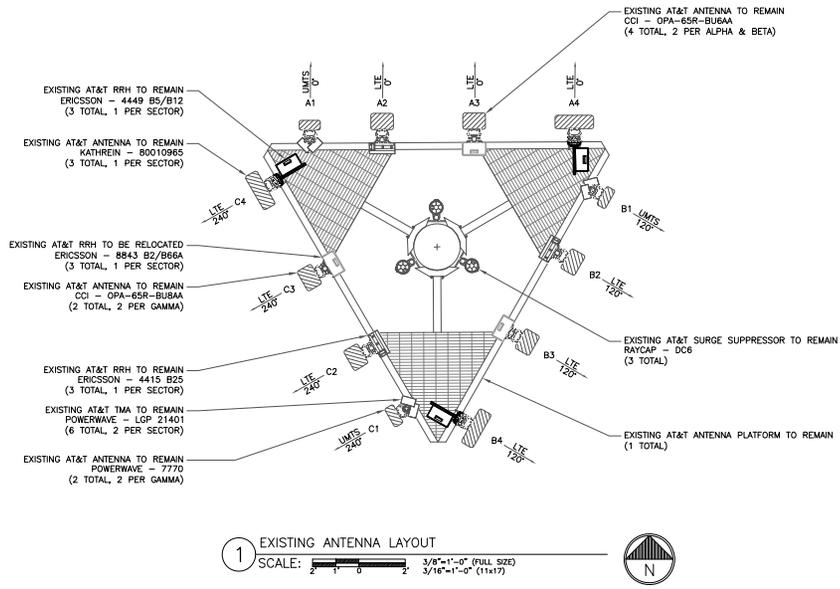
B&T ENGINEERING, INC.
PECC.0001564
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

C-4

2



1:42:27.41_806367_HRT_046_943209.dwg - Sheet C-4 - User: mjonas - Sep 29, 2020 - 9:22am



AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PVE
1	7/11/20	GER	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ



B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-5** REVISION: **2**

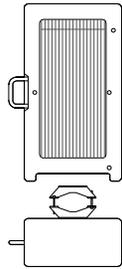
FINAL ANTENNA AND COAXIAL CABLE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	RAYCAP	DC (WR-VGR6ST-BRD) FIBER CABLES (FB-L98B-034-XXXXXX)	RRHS	DIPLEXER	RET CABLE	
ALPHA SECTOR																	
A1	UMTS	EXISTING	0°	POWERWAVE 7770	89°-0"	0°	6°	7/8"	100'-0"	4	LGP (2) 21401	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	-	-	
A2	LTE	EXISTING	0°	CCI HPA-65R-BU6AA	89°-0"	0°	2'	-	-	-	-			(1) 4415 B25	-	-	-
A3	LTE	EXISTING	0°	CCI HPA-65R-BU6AA	89°-0"	0°	3'/2'	-	-	-	-			(1) 4478 B14 (GROUND)	-	-	-
A4	LTE	EXISTING	0°	KATHREIN 80010965	89°-0"	0°	3'/3'/3'	-	-	-	-			(1) 4449 B5/B12 (1) 8843 B2/B66A	-	-	-
BETA SECTOR																	
B1	UMTS	EXISTING	120°	POWERWAVE 7770	89°-0"	0°	4°	7/8"	100'-0"	4	LGP (2) 21401	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	-	-	
B2	LTE	EXISTING	120°	CCI HPA-65R-BU6AA	89°-0"	0°	6°	-	-	-	-			(1) 4415 B25	-	-	-
B3	LTE	EXISTING	120°	CCI HPA-65R-BU6AA	89°-0"	0°	6'/6'	-	-	-	-			(1) 4478 B14 (GROUND)	-	-	-
B4	LTE	EXISTING	120°	KATHREIN 80010965	89°-0"	0°	6'/6'/6'/6'	-	-	-	-			(1) 4449 B5/B12 (1) 8843 B2/B66A	-	-	-
GAMMA SECTOR																	
C1	UMTS	EXISTING	240°	POWERWAVE 7770	89°-0"	0°	2'	7/8"	100'-0"	4	LGP (2) 21401	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	-	-	
C2	LTE	EXISTING	240°	CCI HPA-65R-BU6AA	89°-0"	0°	2'	-	-	-	-			(1) 4415 B25	-	-	-
C3	LTE	EXISTING	240°	CCI HPA-65R-BU6AA	89°-0"	0°	2'/2'	-	-	-	-			(1) 4478 B14 (GROUND)	-	-	-
C4	LTE	EXISTING	240°	KATHREIN 80010965	89°-0"	0°	1'/2'/3'/2'	-	-	-	-			(1) 4449 B5/B12 (1) 8843 B2/B66A	-	-	-

NOTE: BOLD DENOTES NEW EQUIPMENT

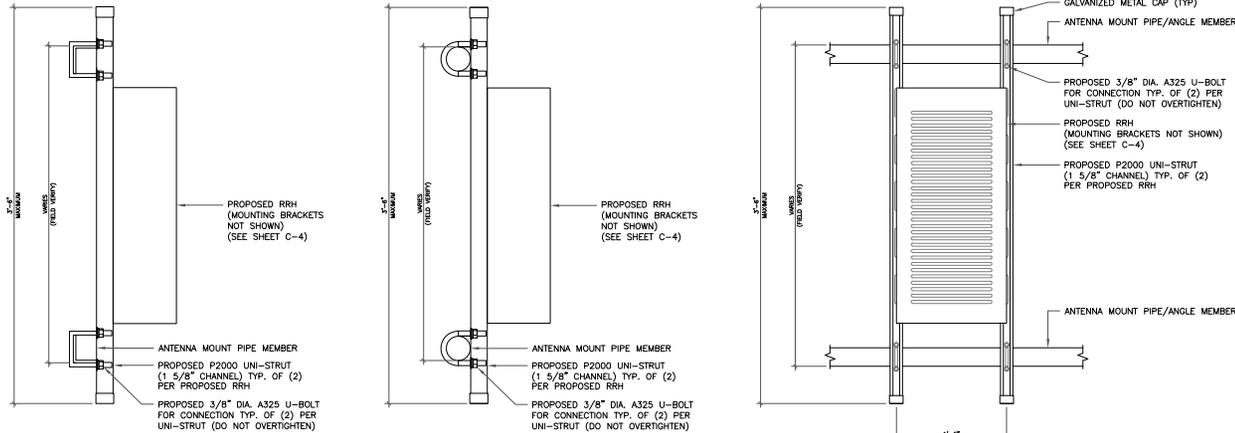
1 FINAL ANTENNA AND COAXIAL CABLE SCHEDULE
SCALE: NOT TO SCALE

1:42:24.806367_HRT_046_943209.dwg - Sheet C-5 - User: mjpone - Sep 29, 2020 - 9:22am



ERICSSON - 4478 B14
 WEIGHT (FULLY EQUIPPED): 59.4 LBS
 SIZE (HxWxD): 18.1x13.4x8.26 IN.

1 RRH DETAIL
 SCALE: NOT TO SCALE



2 RRH UNISTRUT H-FRAME MOUNTING DETAILS
 SCALE: N.T.S.



AT&T SITE NUMBER:
CT5386

BU #: 806367
 HRT 046 943209

65 MAPLE AVENUE
 WEST
 HIGGANUM, CT 06441

EXISTING 115'-6"
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTP
1	7/11/20	GBB	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ



B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IF IN A VIOLATION OF LAW FOR ANY PERSON,
 UNLESS THEY ARE ACTING UNDER THE DIRECTION
 OF A LICENSED PROFESSIONAL ENGINEER,
 TO ALTER THIS DOCUMENT.

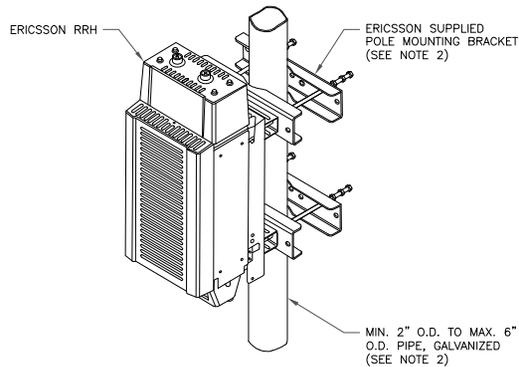
SHEET NUMBER: REVISION:

C-6

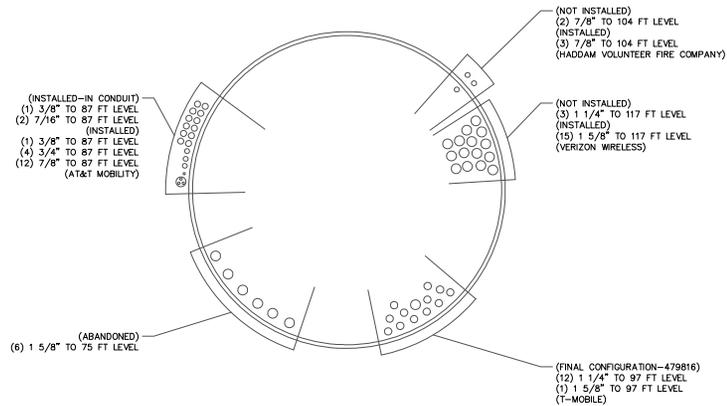
2

NOTES:

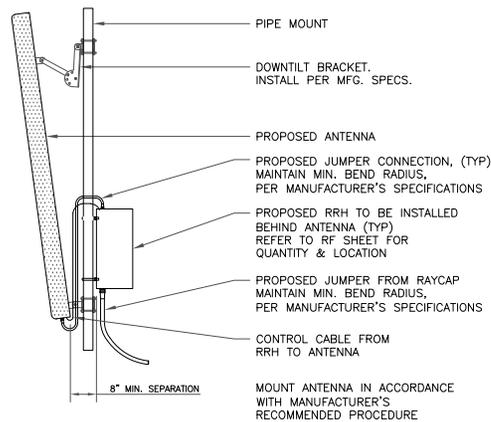
- ERICSSON VIA AT&T SUPPLIES RRH, RRH POLE-MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRH POLE-MOUNTING BRACKET. ERICSSON INSTALLS RRH AND MAKES CABLE TERMINATIONS.
- FOR POLE DIAMETERS FROM 6" TO 15", ERICSSON CAN SUPPLY A PAIR OF POLE MOUNTING METAL BANDS WITH BOLTING WELDMENT.
- NO PAINTING OF THE RRH OR SOLAR SHIELD IS ALLOWED



1 RRH MOUNTING DETAIL
SCALE: NOT TO SCALE



2 BASE LEVEL DRAWING
SCALE: NOT TO SCALE



3 ANTENNA MOUNTING DETAIL
SCALE: NOT TO SCALE



ONE AT&T WAY
BEDMINSTER, NJ 07921



3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406



1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgps.com

AT&T SITE NUMBER:
CT5386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTP
1	7/11/20	GBB	CONSTRUCTION	GDH
2	9/29/20	MLC	CONSTRUCTION	MTJ



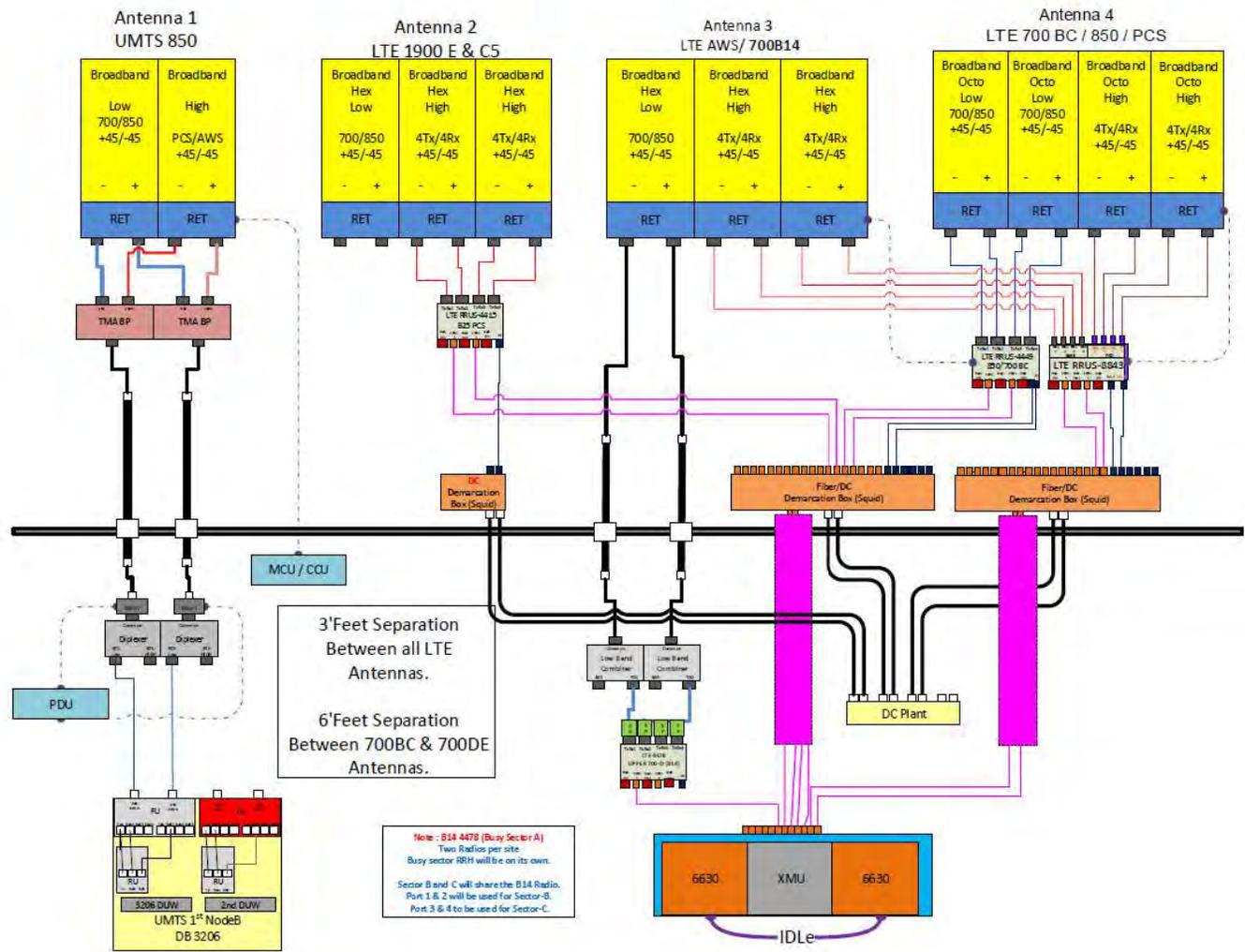
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

IF IN A VIOLATION OF LAW FOR ANY PERSON,
UNLESS THEY ARE ACTING UNDER THE DIRECTION
OF A LICENSED PROFESSIONAL ENGINEER,
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

C-7

2



1 PLUMBING DIAGRAM
 SCALE: NOT TO SCALE



AT&T SITE NUMBER:
CT5386

BU #: 806367
 HRT 046 943209

65 MAPLE AVENUE
 WEST
 HIGGANUM, CT 06441

EXISTING 115'-6"
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PVE
1	7/11/20	GER	CONSTRUCTION	GDR
2	9/29/20	MLC	CONSTRUCTION	MTJ

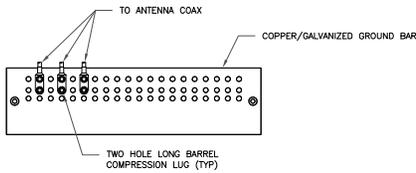


B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-8** REVISION: **2**

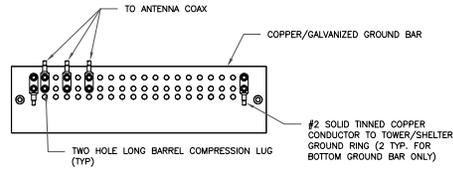
142974_806367_HRT_046_943209.dwg - Sheet C-8 - User: mjonas - Sep 29, 2020 - 9:22am



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

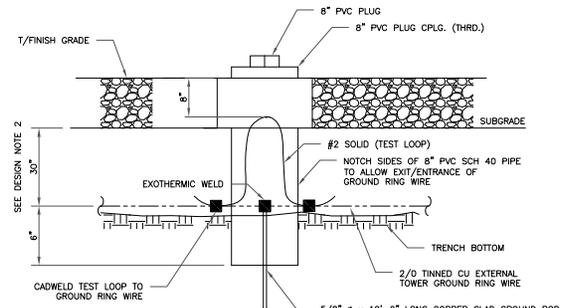
① ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

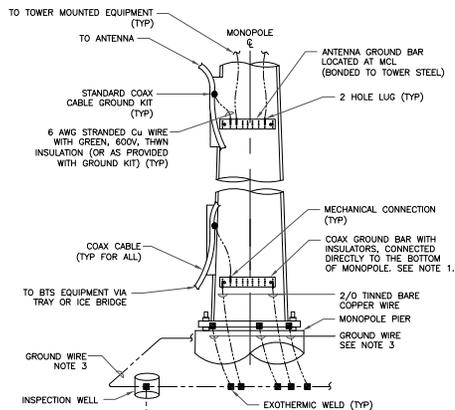
② TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

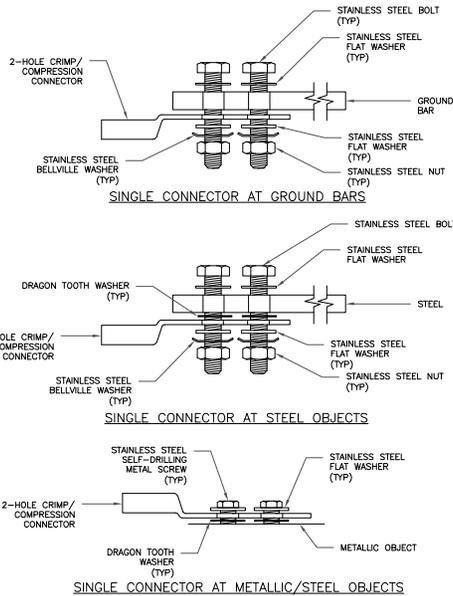
③ INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



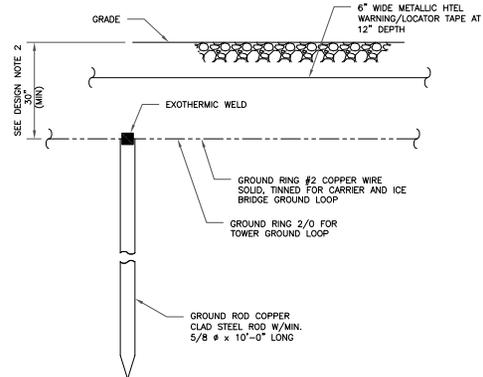
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER. ANTENNA LOCATIONS AND CONNECTION ORIENTATION, COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

④ TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



⑤ HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

⑥ GROUND ROD DETAIL
SCALE: NOT TO SCALE



AT&T SITE NUMBER:
CT15386

BU #: 806367
HRT 046 943209

65 MAPLE AVENUE
WEST
HIGGANUM, CT 06441

EXISTING 115'-6"
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PWF
1	7/11/20	GBB	CONSTRUCTION	GDB
2	9/29/20	MLC	CONSTRUCTION	MTJ

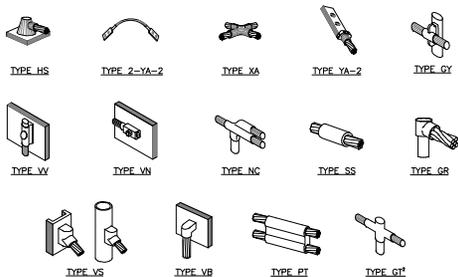


B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

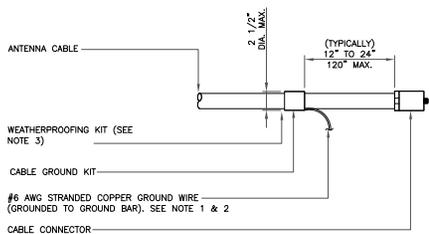
SHEET NUMBER: REVISION:

G-1 **2**



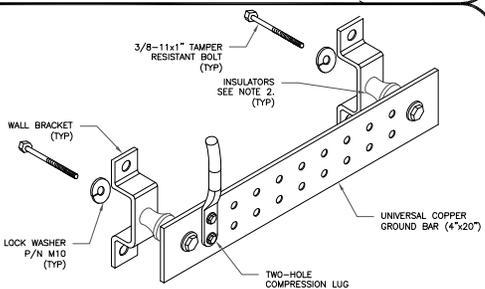
NOTE:
 1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
 2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
 SCALE: NOT TO SCALE



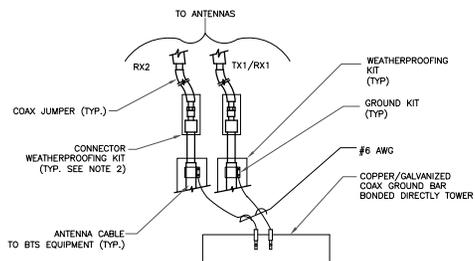
NOTES:
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
 2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
 3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

3 CABLE GROUND KIT CONNECTION
 SCALE: NOT TO SCALE



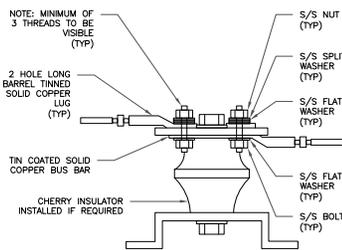
NOTES:
 1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
 2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL. USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
 SCALE: NOT TO SCALE



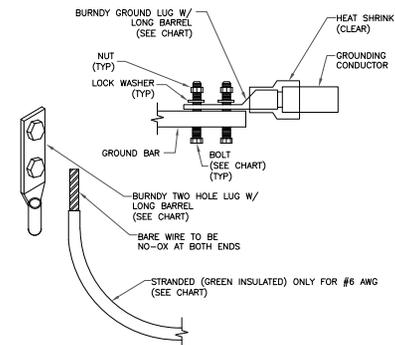
NOTES:
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
 2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
 SCALE: NOT TO SCALE



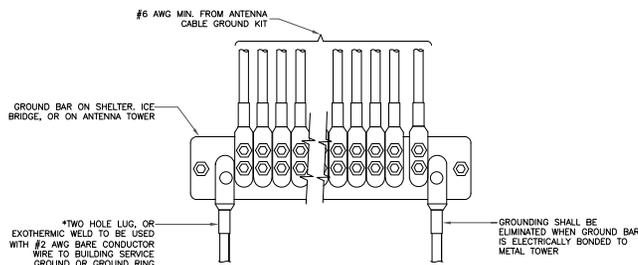
7 LUG DETAIL
 SCALE: NOT TO SCALE

WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT

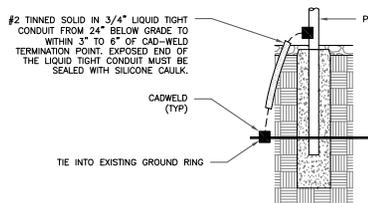


NOTES:
 1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

2 MECHANICAL LUG CONNECTION
 SCALE: NOT TO SCALE



5 GROUNDWIRE INSTALLATION
 SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
 SCALE: NOT TO SCALE



AT&T SITE NUMBER:
CT15386

BU #: 806367
 HRT 046 943209

65 MAPLE AVENUE
 WEST
 HIGGANUM, CT 06441

EXISTING 115'-6"
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/17/20	STH	CONSTRUCTION	PTF
1	7/11/20	GBB	CONSTRUCTION	GDB
2	9/29/20	MLC	CONSTRUCTION	MTJ



B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

G-2 **2**